

Drainage and Wastewater Management Plan Strategic Environmental Assessment

Environmental Report



Report for

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Doc Ref. 807598-WOOD-XX-XX-RP-OS-00002_A_3

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Document revisions

No.	Details	Date
1	Draft	June 2022
2	Revised	June 2022
3	Final	June 2022



Non-Technical Summary

Introduction

United Utilities Water (Uuw) is currently preparing its first Drainage and Wastewater Management Plan (DWMP). The DWMP is new, and whilst not currently a statutory obligation, Uuw, as one of the eleven England and Wales water and sewerage companies (WaSCs), has committed to produce a DWMP in accordance with the Water UK DWMP Framework¹ (the Framework).

The DWMP will set out how Uuw intends to extend, improve and maintain a robust and resilient drainage and wastewater system. The plan will take a long-term view, setting out responses to challenges over a planning period of at least 25 years. The draft DWMP will be published in summer 2022 and then finalised following consultation in spring 2023 to support business plans for the 2024 Price Review. The DWMP will then be re-assessed and produced on a 5-year cycle.

DWMPs are not currently a statutory requirement, and as such, they do not fall within the scope of Strategic Environmental Assessment (SEA) regulations² or the Habitats Regulations³; however, as Section 6.3 of the Framework notes, completing such assessments would be best practice, would inform option assessments and is recommended. Reflecting this, Uuw are undertaking an SEA, a Habitat Regulations Assessment (HRA) and Water Framework Directive (WFD) Assessment to inform⁴ the development of the DWMP to inform the development of the DWMP.

This Non-Technical Summary (NTS) provides an overview of the Environmental Report produced as part of the SEA of the draft DWMP. The Environmental Report represents the second formal output of the SEA of the draft DWMP following the Scoping Report which was issued to SEA consultation bodies in November 2021. The SEA is being carried out to assess the likely significant economic, social and environmental effects of the draft DWMP and to identify ways in which adverse effects can be avoided, minimised or mitigated and how any positive effects can be enhanced.

The Environmental Report presents the findings of the SEA and is being issued for consultation alongside the draft DWMP. The following sections of this NTS:

- provide an overview of the draft DWMP;
- describe the SEA process together with how it is to be applied to the draft DWMP;
- present the relevant contextual information and outline the approach to undertaking the assessment of the draft DWMP; and
- summarise the findings of the SEA of the draft DWMP; and
- set out the next steps in the SEA of the DWMP.

What is the Drainage and Wastewater Management Plan?

The DWMP will set out how Uuw intends to extend, improve and maintain a robust and resilient drainage and wastewater system. It will take a long-term view, setting out a planning period that is appropriate to the risks faced by Uuw, covering at least 25 years. Collectively the plan will contain measures to meet planning

¹ Water UK in collaboration with Defra, Welsh Government, Ofwat, Environment Agency, Natural Resources Wales, Consumer Council for Water, ADEPT and Blueprint for Water (2019) *A framework for the production of Drainage and Wastewater Management Plans*

² Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004

³ Statutory Instrument 2017 No 1012 - The Conservation of Habitats and Species Regulations (2017)

⁴ Separate HRA and WFD Assessment Reports have been completed of the draft DWMP

objectives covering a range of issues covering sewer capacity, wastewater treatment works capacity and environmental capacity.

In developing the DWMP, and consistent with the approach outlined in the Framework, UJW has identified that the plan will operate at the following spatial levels:

- **Level 1 (L1): Company** - Over-arching companywide plan which sets out key company objectives, risks faced and summarises investment needed.
- **Level 2 (L2): Strategic Planning Area** - Catchment plans co-created with stakeholders through strategic planning groups at a River Basin level.
- **Level 3 (L3): Tactical Planning Unit (TPU)** - Drainage area plans which assess how future changes will affect catchment performance and the steps that need to be put in place to manage risks.

To address the identified challenges and risks, a range of management areas and interventions are being considered which include *inter alia*:

- Combined and Foul Sewer Systems;
- Customer Side Management;
- Indirect measures Influencing policy;
- Sludge;
- Wastewater Treatment; and
- Surface Water Management.

Detailed modelling and optioneering work has been undertaken. Intervention 'blends' have been selected and the preferred programme identified for inclusion in the DWMP. These will provide the best value solutions to address the identified risks and contribute towards meeting the relevant planning objectives.

Section 1.3 of the Environment Report provides further information on the DWMP.

What is Strategic Environmental Assessment (SEA)?

SEA became a statutory requirement following the adoption of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. In England, this was transposed into legislation on 20th July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004.

SEA is a systematic decision support process, aiming to ensure that the likely significant environmental effects of plans and programmes are identified, described to avoid, manage or mitigate any significant adverse effects and to enhance any beneficial effects. In this context, the purpose of SEA is to encourage relevant plan authors to integrate environmental considerations into the development of any plan or programme. Generally, a SEA is therefore conducted before an Environmental Impact Assessment (EIA) is undertaken.

⁵ EU law has ceased to apply in the UK under the terms of the Withdrawal Agreement and EU Treaties. The European Union (Withdrawal) Act 2018 (EUWA) has established a new body of domestic law known as retained EU law. Any references to EU Directives in this Technical Note should be read as references to the domestic legislation that implemented the Directive (including that domestic legislation as it is revised or replaced from time to time).

In this context, the purpose of the SEA of the draft DWMP is to:

- identify the potentially significant environmental effects of the draft DWMP in terms of the measures being considered by U UW to manage drainage and wastewater conditions;
- help identify appropriate measures to avoid, reduce or manage adverse effects and to enhance beneficial effects associated with the implementation of the draft DWMP wherever possible;
- give the statutory SEA bodies, stakeholders and the wider public the ability to see and comment upon the effects that the draft DWMP may have on them, their communities and their interests, and encourage them to make responses and suggest improvements to the draft DWMP; and
- inform U UW's selection of measures to be taken forward into the final DWMP.

SEA comprises five key stages:

- **Stage A:** Scoping;
- **Stage B:** Develop and Refine Alternatives and Assess Effects;
- **Stage C:** Prepare Environmental Report;
- **Stage D:** Consult on the Draft Plan and Environmental Report and Prepare the Post Adoption (SEA) Statement; and
- **Stage E:** Monitor Environmental Effects.

Stage A of the SEA of the draft DWMP led to the production of the Scoping Report. The scoping stage itself comprised five tasks that are listed below:

- i. Review of other relevant policies, plans, programmes and strategies (hereafter referred to as 'plans and programmes').
- ii. Collation and analysis of baseline information.
- iii. Identification of key sustainability issues.
- iv. Development of an assessment framework.
- v. Consultation on the scope of the SEA (this Scoping Report).

Information collected and analysed (as part of tasks i and ii) covers England, Wales and Scotland. This reflected the potential for the DWMP to have effects in England, in Wales (on the Dee Estuary) and in Scotland (on the Solway Firth Estuary), although assessment has subsequently shown that the effects of the draft DWMP are in England only. The Scoping Report set out the proposed framework for assessing the likely significant environmental effects of the draft DWMP. It was issued for a 5-week consultation to the SEA scoping consultation bodies between 5th November to 10th December 2021 (see **Appendix A** for a summary of responses).

Following consultation and amendment, the framework has been used for assessing the effects (including cumulative effects) of the selected interventions contained in the draft DWMP (**Stage B**). These assessments are presented in this Environmental Report (**Stage C**). U UW will publish the draft DWMP and accompany documents (including the Environmental Report) for consultation (**Stage D**). Following consultation, U UW will prepare a Statement of Response to the representations received. U UW will amend the draft DWMP and issue a final DWMP. In conjunction with publishing the final DWMP, U UW will also issue a Post Adoption Statement. This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final DWMP. The SEA requires monitoring of any resulting environmental effects of the DWMP (**Stage E**).

Section 1.4 of the Environment Report describes in further detail the requirement for SEA of the DWMP and the SEA process including its relationship with the preparation of the UUW DWMP.

What are the Key Environmental, Social and Economic Issues for the DWMP?

As part of the SEA process, a review has been undertaken to identify the key economic, social and environmental issues which are relevant to the assessment of the draft DWMP. The topic areas cover all those identified in the SEA regulations and have been identified from a variety of sources, including a review of baseline data and other relevant plans and programmes. A summary of the issues identified as being most relevant to the assessment of the draft DWMP are shown in **Table NTS.1**.

Table NTS.1 Key Environmental, Social and Economic Issues Relevant to the Draft DWMP

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> • The need to protect, restore and enhance biodiversity, ecological functions and biodiversity connectivity within UUW's operational area, particularly protected sites designated for nature conservation. • The need to continue to increase and improve the condition of priority habitats and habitats of priority species, and restore populations of these species and other specially protected species. • The need to avoid activities likely to cause irreversible damage to natural heritage. • The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors. • The need to recognise the importance of ensuring biodiversity is resilient to the effects of climate change, including allowing adaptation. • 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.
Geology Land Use and Soils	<ul style="list-style-type: none"> • The need to sustainably manage and/or improve the quality of agricultural land in the region. • The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health. • The need to protect, maintain and enhance geomorphological functions and services. • 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 protect peatlands in the North West. • The need to make use of previously developed land (PDL), and to reduce the prevalence of derelict land. • The need to maintain soil function.
Water	<ul style="list-style-type: none"> • The need to maintain and further improve the quality of the region's river, estuarine and coastal waters and in particular the biological quality of rivers, taking into account WFD/RBMP objectives. • The need to maintain and further improve the quantity and quality of groundwater resources taking into account WFD/RBMP objectives. • The need to ensure the continued risk of flooding is mitigated effectively. • 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 water and groundwaters. • The need to ensure sustainable abstraction to protect the water environment. • The need to ensure that people understand the value of water.
Air Quality	<ul style="list-style-type: none"> • The need to minimise emissions of pollutant gases and particulates and enhance air quality. • The need to reduce the need to travel and promote sustainable modes of transport.

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
Climatic Factors	<ul style="list-style-type: none"> • The need to reduce the need to travel and promote sustainable modes of transport. • The need to reduce greenhouse gas emissions arising from implementation of the DWMP. • The need to take into account, and where possible adapt to, the potential effects of climate change. • The need to increase environmental resilience to the effects of climate change.
Population and Human Health	<ul style="list-style-type: none"> • The need to ensure drainage and wastewater services remain affordable, especially for deprived or vulnerable communities. • The need to ensure water quantity and quality is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture. • The need to ensure a balance between the built and natural environment that will help to provide opportunities for local residents and tourists for access to green infrastructure and the natural and historic environment, as well as protecting and enhancing recreational resources. • The need to ensure that the DWMP measures do not adversely affect the health and well-being of any member of the community. • The need to ensure that the DWMP measures do not have an adverse economic impact and that benefits are maximised. • The need to ensure that 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 wellbeing and the economy.
Material Assets and Resource Use	<ul style="list-style-type: none"> • The need to promote water efficiency. • The need to maintain the balance between capacity, use and constraints for water. • The need to reduce energy consumption. • The need to ensure the sustainable and efficient use of resources such as construction materials. • The need to minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.
Cultural Heritage	<ul style="list-style-type: none"> • The need to conserve and enhance the historic significance of buildings, monuments, features, sites, places, areas and landscapes of archaeological and cultural heritage interest, and their settings. • The need to avoid damage to important wetland areas with potential for palaeoenvironmental deposits.
Landscape	<ul style="list-style-type: none"> • The need to protect and improve the natural beauty of the region's national parks, coastline, other areas of natural beauty, including undesignated landscapes and encourage the growth of woodland and forest in the region. • The need to conserve and enhance the landscape distinctiveness of the area. • The need to minimise any adverse impacts upon landscape that may result from measures in the DWMP.

The key issues listed in **Table NTS.1** above have informed the proposed assessment framework that has been used to assess the effects of the draft DWMP (**Table NTS.2**).

Section 2 of the Environment Report summarises the review of plans and programmes relevant to the draft DWMP and SEA that is contained at Appendix B.

Section 3 and Appendix C presents the baseline analysis of social, economic and environmental characteristics, along with how these are likely to change in the future.

How the Effects of the Draft DWMP have been Assessed?

A draft framework was developed to assess the economic, social and environmental effects of the draft DWMP. This was then amended to reflect scoping consultation comments. The revised framework sets out 13 assessment objectives relating to the key issues identified in **Table NTS.1**. For each objective, guide questions are provided. The assessment framework that has been used to assess the draft DWMP measures is shown in **Table NTS.2**.

Table NTS.2 SEA Assessment Framework for the Draft DWMP

Topic	Proposed SEA Objective
Biodiversity, Flora and Fauna	1. To protect, restore and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species, enhanced ecosystem resilience, habitat connectivity and creation and contribute to the sustainable management of natural habitats and ecosystems.
Soils, Land Use and Geology	2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the appropriate and efficient use of land.
Water – Quantity and Quality	3. To protect and enhance the quality and quantity of surface and groundwater resources.
Water – Flood Risk	4. To reduce or manage flood risk.
Air	5. To minimise emissions of pollutant gases and particulates and enhance air quality.
Climatic Factors	6. To reduce greenhouse gas emissions. 7. To adapt and improve resilience to the threats of climate change.
Population	8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.
Human Health	9. To protect and enhance human health and well-being.
Material Assets - Water Resources	10. To promote and enhance the sustainable and efficient use of resilient water resources.
Material Assets – Waste and Resource Use	11. To minimise waste, promote resource efficiency and move towards a circular economy.
Cultural Heritage	12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.
Landscape	13. To conserve, protect and enhance landscape and townscape character and visual amenity.

The performance of the proposed interventions within the draft DWMP and any reasonable alternatives have been assessed against these SEA objectives to identify, describe and evaluate the likely positive and negative effects and ensure that each intervention is assessed in a robust and consistent manner. The SEA has considered the effects of the draft DWMP in a staged process, complementary to the development of the plans, and reflecting the decision-making requirements, as follows:

- **High-level interventions** categorised by management areas, to address planning objective per drainage area have been considered with environmental constraints identified, assessed and implications for mitigation identified, drawing where appropriate from other assessments (such as the WRMP24 where interventions are common between plans, e.g., behavioural change). This was a GIS driven process used to inform initial optioneering.
- **Generic interventions** covering 34 option types, ranging from 'domestic and business customer education' to 'increased treatment capacity of wastewater treatment works'.
- **Preferred programme of interventions** per identified drainage area, combining generic and location specific options with a particular focus on the complex and strategic locations. This has ensured that the effects of the draft Plan have been identified, described and evaluated.

- **Alternative Plan assessments:** where alternative plans or plan pathways are identified for the draft DWMPs, the cumulative effects will be identified, described and evaluated for consideration along with the preferred plan.

The draft DWMP interventions have been assessed based on the nature of the effect, its timing and geographic scale, the sensitivity of the human or environmental receptor that could be affected, and how long any effect might last. Specific guidance has been developed for what constitutes either a neutral, minor, moderate or significant positive or negative effect for each of the SEA objectives. These 'definitions of significance' have helped to ensure a consistent approach to interpreting the significance of effects and will help the reader understand the decisions made by the assessor. Assessment matrices have been completed to capture the assessment of each measure in a consistent manner.

The SEA Regulations require that the cumulative effects of a plan or programme are taken into account. This includes the cumulative effects of the draft DWMP in combination with other plans and programmes and the cumulative effects of individual measures within the draft DWMP, which in combination represent the proposed approach.

The results of the assessment will help inform U UW's selection of drainage and wastewater management options to be taken forward into the final DWMP.

Section 4 of the Environment Report provides further information in relation to the approach to the assessment of the draft DWMP.

Summary of Effects

Intervention Effects

Generic assessments of each of the 34 option types have been undertaken and are summarised in **Section 5.2**, which groups the options according to the nine management areas, with commentary on the likely effects of each option type. Detailed versions of the generic assessments of each option type are contained at **Appendix E**. As the assessments are generic and relate to the broad option types rather detailed schemes, where a potential effect is identified, there are a range of uncertainties identified, owing to the fact that for the generic options the scale and location of the option, proximity to sensitive receptors and sensitivity of potential receptors, are not specified. As such no likely significant positive or negative effects have been identified in the generic assessments of the option types, however, in general the probability of adverse effects increases for those option types which are likely to include or relate to physical development than those which do not. For example the generic assessments of the option types within the Customer Side Management and Indirect Measures management areas (which largely relate to behavioural or policy changes) in general identify less potential for negative effects than to those option types within the Combined and Foul Sewer Systems, Sludge, Surface Water Management, and Wastewater Treatment management areas (which largely relate to physical development and assets).

U UW has identified 403 options for the 26 strategic or complex Tactical Planning Unit (TPU) catchments. There a small number of TPUs which have not been assessed and will therefore be included between draft and final DWMP. For each of the 22 strategic and complex TPU catchments that have been assessed, an increased treatment capacity option has been identified as a legal obligation. Each of the 22 strategic or complex TPU options have been screened in for assessment, in line with the assumptions described above (regarding an increase in physical built development/expansion of assets). The remaining options were screened for likely significant effects based on the available option information. Whilst scheme information has been limited due to the strategic nature of the plan, CAPEX, embodied carbon and operational carbon emissions has been available and has been used to screen the remaining options in line with the SEA thresholds for significant effect. As a result of this screening, an additional 11 options across 7 of the strategic and complex TPU catchments were screened in for assessment.

Table NTS.3 provides a breakdown of the 33 options that were screened in for assessment. It presents the number of options per TPU catchment and a summary of the likely significant positive and negative effects that have been identified.

Table NTS.3 Summary of the Options Screened in for Assessment and Summary Findings

TPU Catchment	Number of options screened in	Likely significant effects identified	Comments
Altrincham	1	☑	One proposed scheme with likely significant negative effects against one SEA objective during operation.
Blackburn	2	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction. One proposed scheme with likely significant negative effects against one SEA objective during operation.
Bromborough	1	☑	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Burscough	1	☒	No likely significant effects identified.
Carlisle	1	☑	One proposed scheme with likely significant negative effects against two SEA objectives during construction. In operation, likely significant negative effects against two SEA objectives.
Carnforth	1	☒	No likely significant effects identified.
Davyhulme	2	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction. One proposed scheme with likely significant negative effects against three SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Ellesmere Port	1	☑	One proposed scheme with likely significant negative effects against two SEA objectives during construction. In operation, likely significant negative effects against two SEA objectives.
Fleetwood	2	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction and one proposed scheme with likely significant negative effects against one SEA objective during operation.
Hillhouse	1	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction. In operation, likely significant negative effects against two SEA objectives.
Knutsford	1	☑	One proposed scheme with likely significant negative effects against one SEA objective during operation.
Lancaster	1	☒	No likely significant effects identified.

TPU Catchment	Number of options screened in	Likely significant effects identified	Comments
Macclesfield	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against one SEA objective during operation.
Partington	1	<input type="checkbox"/>	No likely significant effects identified.
Penrith	2	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against one SEA objective during construction.
Preston	4	<input checked="" type="checkbox"/>	Three proposed schemes with likely significant negative effects against one SEA objective during construction, one of which also includes a likely significant negative effect against one SEA objective during operation. One proposed scheme with likely significant negative effects against two SEA objectives during operation.
Sale	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Salford	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Stretford	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against one SEA objective during construction and likely significant negative effects against one SEA objective during operation.
Whitehaven	3	<input checked="" type="checkbox"/>	Three schemes with likely significant negative effects against one SEA objective during construction, one of which also includes a likely significant negative effect against one SEA objective during operation.
Wigan	3	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives. Two proposed schemes with likely significant negative effects against one SEA objective during construction, one of which also includes a likely significant negative effect against one SEA objective during operation.
Workington	1	<input type="checkbox"/>	No likely significant effects identified.
	33		

Further information is presented in **Section 5.3** (Assessment) of the main report and detailed versions of the option assessments are contained at **Appendix E**.

Cumulative Effects

Schedule 2 (6) of the SEA regulations requires that the cumulative effects of a plan or programme are taken into account. This includes the cumulative effects of the draft DWMP in combination with other plans and programmes and the cumulative effects of individual measures within the draft DWMP, which in combination represent the proposed approach. Further information on cumulative effects is presented in **Section 5.4** of the main report.

The extent to which the draft DWMP options can act cumulatively is dependent on a number of variables. These include the nature, location and timing of option implementation, the number of options that are ultimately implemented either within a TPU catchment, Strategic Planning Area catchment or across the network area, and the interaction of these options with other plans or programmes. The effects are also dependent on the sensitivity of receptors, their extent and the receiving environment to the effects of the proposed options whether operating alone, or cumulatively.

Construction activity, unless of significant scale and concentrated in specific localities and occurring concurrently is unlikely to lead to cumulative significant effects on receptors, as it is anticipated that the effects of the options can be managed through the application of the mitigation hierarchy and a range of construction mitigation practices (see **Section 5.6**). However, for some of the schemes, as they represent significant engineering works and capital investment, there will be individual and cumulatively significant positive and negative effects in terms of SEA Objectives 6 'Greenhouse Gas Emissions', 8 'Economic and Social Wellbeing' and 11 'Waste and resources'.

Operationally, the schemes seek to reduce wastewater entering the sewerage network through policy and demand management measures and increase treatment capacity across the UUW area (with any increase in discharge volumes associated with the operation of TPU options to increase treatment capacity at wastewater treatment works assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality). Therefore, they should at minimum do no harm to the water environment or communities in which they are located, and preferably make a (significant) contribution to enhancing the quality of each locality, by reducing the adverse effects arising from flooding and poor water quality. There may be specific instances where at present, due to uncertainty of scheme design or location, the operational effects may be considered uncertain, and potentially negative; however, as proposed schemes are still evolving, there is further opportunity to complete investigation and refine scheme design as well as consider further assessment (whether scheme specific or linked to the WINEP).

Section 5 of the Environmental Report presents the findings of the assessment of the draft DWMP.

Section 6.4 sets out the proposed monitoring measures for the effects of the DWMP.

What are the Next Steps in the SEA Process?

This Environmental Report is being issued for consultation to the SEA consultation bodies (the Environment Agency, Historic England and Natural England) and provided as part of the evidence base to support the consultation on the draft DWMP. The consultation will run from **Thursday 30th June – Thursday 22nd September 2022**.

Details of how to respond to the consultation are provided below.

This Consultation: How to Give Us Your Views

We would welcome views on any aspect of this report. However, responses to the following questions would be particularly welcomed:

- 1. Do you think that the Environmental Report has correctly identified the likely significant effects of the Draft DWMP? If not, what other significant effects do you think we have missed, and why?**
- 2. Do you agree with the conclusions of the Environmental Report and the recommendations concerning the mitigation and enhancement of significant effects?**
- 3. Do you agree with the proposed arrangements for monitoring the significant effects of the implementation of the DWMP? If not, what measures do you propose?**

Please provide your comments by Thursday 22nd September 2022. You can e-mail your responses to DWMPConsultation@uuplc.co.uk

Acronyms

Acronym	Full Term
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
BAP	Biodiversity Action Plan
BEIS	Department for Business, Energy & Industrial Strategy
BNG	Biodiversity Net Gain
CaBA	Catchment Based Approach
CAMS	Catchment Abstraction Management Strategy
CAPEX	Capital expenditures
CaST	Catchment System Thinking
CFC	Chlorofluorocarbon
CFMP	Catchment Flood Management Plan
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
CROW	Countryside and Rights of Way
cSAC	candidate Special Area of Conservation
DCMS	Department for Culture, Media and Sport
dDWMP	draft Drainage and Wastewater Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DWMP	Drainage and Wastewater Management Plan
EC	European Commission
EIA	Environmental Impact Assessment
EMP	Eel Management Plan
ESA	Environmentally Sensitive Area
FRMP	Flood Risk Management Plan

Acronym	Full Term
GCR	Geological Conservation Review
GES	Good Environmental Status
GHG	Greenhouse Gas
GIS	Geographical Information Systems
Gwh	Gigawatt Hours
HE	Historic England
HES	Historic Environment Scotland
HRA	Habitats Regulations Assessment
Kt	Kilo Tonnes
l/hd/d	Litres per head per day
LGAP	Local Geodiversity Action Plans
LWS	Local Wildlife Site
MCZ	Marine Conservation Zone
MHCLG	Ministry for Housing, Communities and Local Government
MI/d	Mega litres per day
Mt	Million tonnes
MTAN	Minerals Technical Advice Note
Mtoe	Million tonnes of equivalent
MWe	Megawatt electrical
NCA	National Character Area
NE	Natural England
NNR	National Nature Reserve
NOx	Nitrogen Oxide
NPPF	National Policy Planning Framework
NRW	Natural Resources Wales
NTS	Non-Technical Summary
NVZ	Nitrate Vulnerable Zone
ODS	Ozone Depleting Substances

Acronym	Full Term
OfWAT	Office of Water Services
OPEX	Operating expenditures
PPW	Planning Policy Wales
pSAC	possible Special Area of Conservation
pSPA	potential Special Protection Area
RBD	River Basin District
RBMP	River Basin Management Plan
RIG	Regionally Important Geological and Geomorphological
ROWMP	Public Rights of Way Improvement Plan
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAP	Sector Adaptation Plan
SCaMP	Sustainable Catchment Management Programme
SCI	Site of Community Importance
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SIP	Site Improvement Plans
SMP	Shoreline Management Plan
SoNaRR	State of Natural Resources Report
SPA	Special Protection Area
SPG	Strategic Planning Group
sq km	Square kilometre
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TAN	Technical Advice Note
TPU	Tactical Planning Unit
UKCIP	United Kingdom Climate Impacts Programme
UKCP	United Kingdom Climate Projections

Acronym	Full Term
UKTAG	United Kingdom Technical Advisory Group
UKWIR	United Kingdom Water Industry Research
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UUW	United Utilities Water
WaSC	Water and Sewerage Company
WFD	Water Framework Directive
WHS	World Heritage Site
WINEP	Water Industry National Environment Programme
WPZ	Water Protection Zone
WRMP	Water Resource Management Plan
WRZ	Water Resource Zone

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1. Introduction

1.1 Overview

- 1.1.1 United Utilities Water (UW) is currently preparing its first Drainage and Wastewater Management Plan (DWMP). The DWMP is new, and whilst not currently a statutory obligation, UW, as one of the eleven England and Wales water and sewerage companies (WaSCs), has committed to produce a DWMP in accordance with the Water UK DWMP Framework⁶ (the Framework).
- 1.1.2 The DWMP sets out how UW intends to extend, improve and maintain a robust and resilient drainage and wastewater system. The plan takes a long-term view, setting out responses to challenges over a planning period of at least 25 years. The draft DWMP is being published in 2022 and will then be finalised following consultation to support business plans for the 2024 Price Review.
- 1.1.3 DWMPs are not currently a statutory requirement, and as such, they do not fall within the scope of Strategic Environmental Assessment (SEA) regulations⁷; however, as Section 6.3 of the Framework notes, completing such an assessment would be best practice, would inform option assessments and is recommended. Reflecting this, UW has chosen to undertake an SEA to inform the development of the DWMP. The SEA will help ensure any likely significant effects are identified, and any adverse effects avoided, minimised or mitigated. The SEA also has the potential to demonstrate positive environmental outcomes and provides an opportunity to strengthen the plan development process by providing approaches that could endure over a number of plan cycles.

1.2 Purpose of the Environmental Report

- 1.2.1 This Environmental Report presents the findings of the SEA of the draft DWMP. The purpose of the report is:
- to ensure that the likely significant environmental and socio-economic effects of the draft DWMP and any reasonable alternatives are identified, characterised and assessed;
 - to help identify appropriate measures to avoid, reduce or mitigate adverse effects and to enhance beneficial effects associated with the implementation of the draft DWMP wherever possible;
 - to provide a framework for monitoring the potential significant effects arising from the implementation of the draft DWMP;
 - to give the statutory consultees, stakeholders and the wider public the opportunity to review and comment upon the environmental and socio-economic effects that the Draft DWMP may have on them, their communities and their interests, and to encourage and support them to make responses and suggest improvements to the draft DWMP;
 - to inform UW's decisions on the draft DWMP; and
 - to demonstrate that the draft DWMP has been developed in a manner consistent with the requirements of the SEA Regulations.

⁶ Water UK in collaboration with Defra, Welsh Government, Ofwat, Environment Agency, Natural Resources Wales, Consumer Council for Water, ADEPT and Blueprint for Water (2019) *A framework for the production of Drainage and Wastewater Management Plans*

⁷ Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004

1.3 United Utilities Water Drainage and Wastewater Management Plan

Overview

- 1.3.1 UUW provides drainage and wastewater services to over 3 million homes and 200,000 businesses in the North West of England.
- 1.3.2 It owns and is responsible for the management of 77,000 of sewers and 567 wastewater treatment works⁸ collecting wastewater before it is cleaned and safely returned to the environment.
- 1.3.3 It is essential that this drainage system can continue to operate effectively day to day as well as being able to cope with future pressures such as climate change, increased urbanisation and population growth which will all place increased demands on the system’s capacity and treatment processes.
- 1.3.4 The DWMP will set out how UUW intends to extend, improve and maintain a robust and resilient drainage and wastewater system. It will take a long-term view, setting out a planning period that is appropriate to the risks faced by UUW, covering at least 25 years. Collectively the plan will contain measures to the planning objectives illustrated in **Figure 1.1**.

Figure 1.1 United Utilities Water Planning Objectives

Planning objective	 We will collect, treat and recycle wastewater in compliance with our permits, now and in the future, to protect the natural environment	 We will protect, restore and improve the natural environment of the North West through our actions	 We will sustainably reduce the risk of sewer flooding in the North West
Metric	Wastewater Quality Compliance Pollution Incidents	Storm Overflow Performance Environmental Obligations (WINEP)	Internal Flooding External Flooding Flooding of Open Spaces Sewer Collapses Risk of 1:50 Year Storm

Drainage and Wastewater Management Plans

- 1.3.5 WaSCs have been asked to produce DWMPs for the first time, following the guidance of the Framework⁹. This Framework has been developed in collaboration with other regulating bodies that serve to protect communities and the environment. In supporting the business planning process, the Framework has been developed such that, through DWMPs, companies will:

⁸ United Utilities (2021) *Our Water Cycle*. Available online at: <https://www.unitedutilities.com/corporate/about-us/what-we-do/water-cycle/> [Accessed August 2021].

⁹ Water UK in collaboration with Defra, Welsh Government, Ofwat, Environment Agency, Natural Resources Wales, Consumer Council for Water, ADEPT and Blueprint for Water (2019) *A framework for the production of Drainage and Wastewater Management Plans*



- Set out the company's assessment of long-term drainage and wastewater capacity and the drivers, risks and scenarios being planned for;
- Assess where (largely drainage) infrastructure managed by other stakeholders may impose additional risks to drainage and wastewater services; and
- Identify those options that offer best value to customers and the environment, ensuring robust, resilient and sustainable drainage and wastewater services in the long-term.

1.3.6 The Framework outlines the following stages for DWMP development:

- Strategic Context;
- Risk Based Catchment Screening (RBCS);
- Baseline Risk and Vulnerability Assessment (BRAVA);
- Problem Characterisation;
- Options Development and Appraisal;
- Programme Appraisal; and
- Final DWMP Programme.

1.3.7 In developing the DWMP, and consistent with the approach outlined in the Framework, UUW has identified that the plan will operate at the following spatial levels:

- **Level 1 (L1): Company** - Over-arching companywide plan which sets out key company objectives, risks faced and summarises investment needed.
- **Level 2 (L2): Strategic Planning Area** - Catchment plans co-created with stakeholders through strategic planning groups at a River Basin level. There are 14 Strategic Planning Areas across the UUW area. These are illustrated in **Figure 1.2**.
- **Level 3 (L3): Tactical Planning Unit (TPU)** - Drainage area plans which assess how future changes will affect catchment performance and steps that need to be put in place to manage. UUW has identified 567 TPUs.

Figure 1.2 United Utilities Water 14 Strategic Planning Areas



1.3.8 Following the completion of the RBCS and BRAVA process, U UW has identified 372 drainage areas where drainage, flooding, pollution and treatment risks have been identified. A limited number of these drainage areas are characterised as being either complex or strategic:

- Complex drainage areas reflect the outcome of the problem characterisation which has identified multiple issues and the need for adaptive planning to mitigate risks; and
- Strategic drainage areas are those where significant future population growth and development has been planned which will result in significant and complex additional investment needs.

1.3.9 Options have been developed to address the identified risks at the TPU level and to deliver one or more of the planning objectives. The range of options that are being considered are outlined in **Table 1.1**.

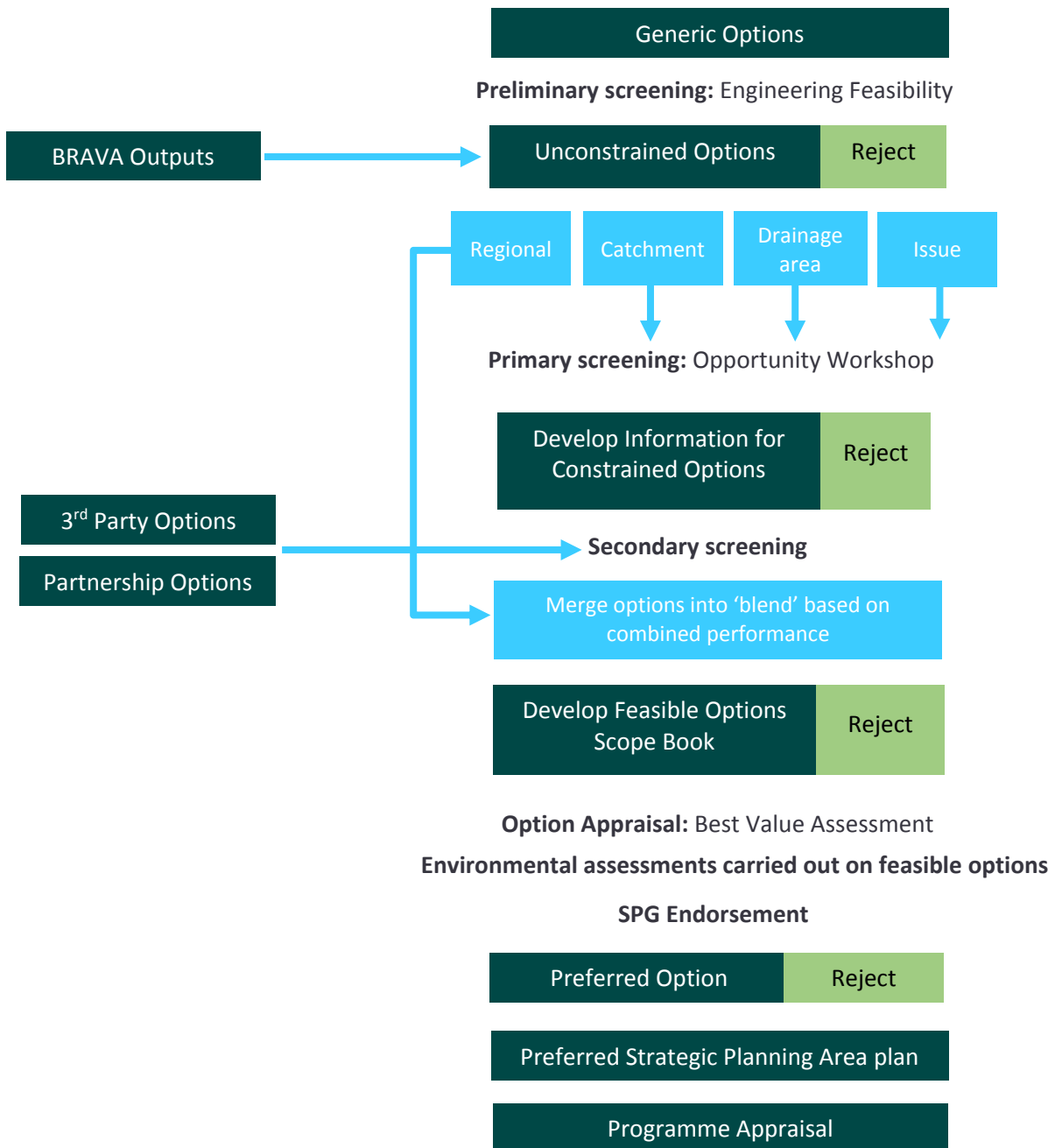
Table 1.1 DWMP Generic Options

Management Area	Option Ref	DWMP Generic Option
Combined and Foul Sewer Systems	N1	Intelligent network operation
	N2	Increase the capacity of existing foul / combined networks
	N4	Intelligent asset maintenance
	N5	Sewer rehab
	N6	Property Level Resilience (PLR)
	N7	Enhanced operational maintenance
	N8	Attenuation
	N9	Sewer maintenance

Management Area	Option Ref	DWMP Generic Option
	N10	Cross boundary transfer
Customer Side Management	CM1	Water efficient appliances
	CM2	Water efficiency measures
	CM3	Rainwater harvesting
	CM4	Customer incentives
	CM5	Domestic and business customer education
	CM6	Greywater treatment and reuse
	CM7	Charging and bill incentives
Indirect measures	IM1	Influencing policy
	IM2	Investigate and monitor
	IM3	Future technology
Sludge	B1	Resource recovery
	B2	Sludge centre rationalisation
	B3	Sludge centre decentralisation
	B4	Increase treatment capacity
Surface Water Management	SW1	Surface water source control measures
	SW2	Surface water pathway interception measures
	SW3	Attenuation
Wastewater treatment	W1	Treat or pre-treat wastewater in the network
	W2	Increase treatment capacity
	W3	Intelligent treatment works operation
	W4	Treatment works rationalisation
	W5	Treatment works de-centralisation
	W6	Modification of consent / permits
	W7	Catchment management initiatives
	W8	Effluent reuse

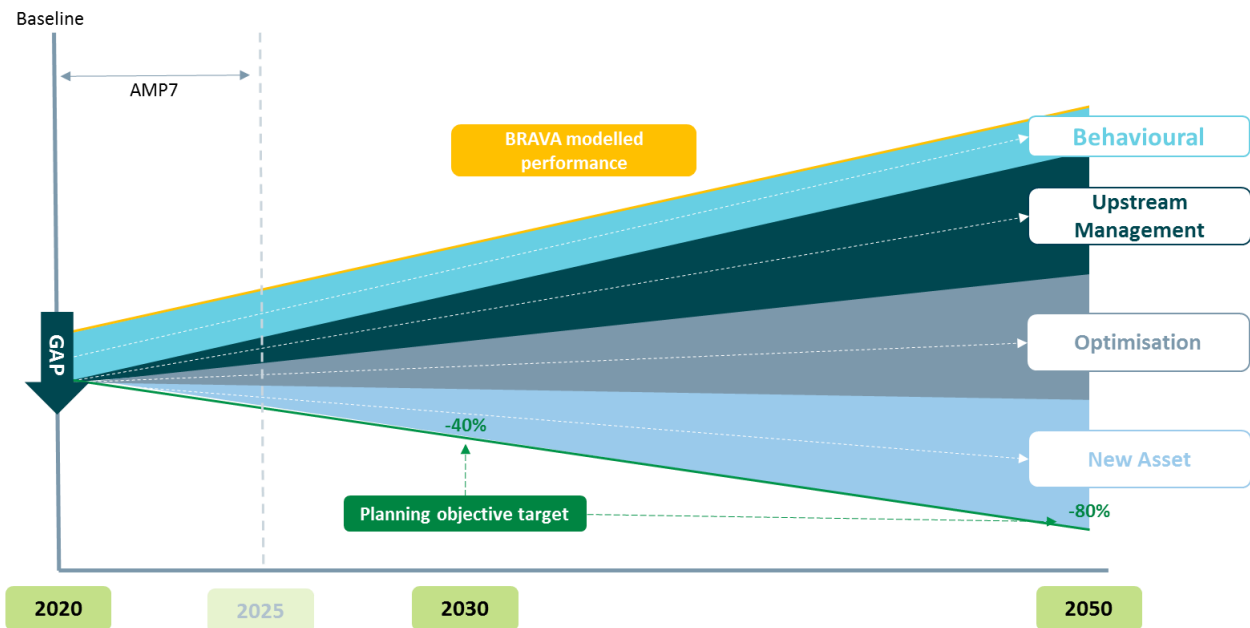
- 1.3.10 The option development process mirrors the Water Resources Management Plan (WRMP) process, with unconstrained, feasible and preferred options being developed and subject to appraisal. **Figure 1.3** illustrates the option development process.

Figure 1.3 United Utilities Water DWMP option development process



1.3.11 Detailed modelling and optioneering works has been undertaken to determine the most appropriate, effective response. Option 'blends' have been selected. These will provide the best value solutions to address the identified risks and contribute towards meeting the relevant planning objectives. **Figure 1.4** provides an illustrative example of such an option 'blend'.

Figure 1.4 Illustrative example of an option blend to address a planning objective



1.3.12 The outputs of the optioneering has enabled the selection of the preferred programme of options. The preferred programme will be included in the draft DWMP which will be published in summer 2022 for public consultation. Consultation responses will be analysed, and as necessary the DWMP will be revised. The DWMP will then be finalised in summer 2023.

1.4 Strategic Environmental Assessment

Overview

- 1.4.1 SEA became a statutory requirement following the adoption¹⁰ of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. In England, this was transposed into legislation on 20th July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004.
- 1.4.2 SEA is a systematic decision support process, aiming to ensure that the likely significant environmental effects of plans and programmes are identified, described and assessed to avoid, manage or mitigate any significant adverse effects and to enhance any beneficial effects. In this context, the purpose of SEA is to encourage relevant plan authors to integrate environmental considerations into the development of any plan or programme. Generally, a SEA is therefore conducted before an Environmental Impact Assessment (EIA) is undertaken.
- 1.4.3 The purpose of the SEA of the draft DWMP is to:
- identify the potentially significant environmental effects (adverse and beneficial) of the draft plan in terms of the drainage and wastewater management options being considered;
 - help identify appropriate measures to avoid, reduce or manage adverse effects and to enhance beneficial effects associated with the implementation of the draft plan wherever possible;

¹⁰ EU law has ceased to apply in the UK under the terms of the Withdrawal Agreement and EU Treaties. The European Union (Withdrawal) Act 2018 (EUWA) has established a new body of domestic law known as retained EU law. Any references to EU Directives in this Environmental Report should be read as references to the domestic legislation that implemented the Directive (including that domestic legislation as it is revised or replaced from time to time).

- give the statutory SEA bodies, stakeholders and the wider public the ability to see and comment upon the effects that the draft plan may have on them, and encourage them to make responses and suggest improvements to the draft plans; and
- inform the selection of drainage and wastewater management options to be taken forward into the final version of the plan.

Applying SEA to Drainage and Wastewater Management Plans

1.4.4 Under regulation 2(1) of the SEA Regulations, the plans and programmes subject to SEA are those which are:

- are subject to preparation or adoption by an authority at national, regional or local level; or
- are prepared by an authority for adoption, through a legislative procedure by Parliament or Government; and, in either case,
- are required by legislative, regulatory or administrative provisions.

1.4.5 The definition of a national, regional or local level authority referenced in (a) has been set out in paragraph 3.12 of the European Commission (EC) Guidance on SEA¹¹ which states:

"The concept of an 'authority' has been given a large scope in the case law of the European Court of Justice. It can be defined as a body, whatever its legal form and regardless of the extent (national, regional or local) of its powers, which has been made responsible, pursuant to a measure adopted by the State, for providing a public service under the control of the State, and it has for that purpose special powers beyond those which result from the normal rules applicable in relations between individuals (case C-188/89 Foster and others v British Gas). For example, privatised utility companies may be required to carry out some tasks or duties (such as preparing long-term plans for ensuring water resources) which in non-privatised regimes would be carried out by public authorities. In respect of those functions they would be treated as authorities for the purposes of the Directive. In other respects (such as providing consultancy services overseas) they would not be considered to be authorities in the sense of the Directive."

1.4.6 In consequence, WaSCs have been considered an authority for the purposes of the SEA regulations. It is assumed that this interpretation has not changed following the UK's withdrawal from the EU.

1.4.7 In relation to part (c) of the SEA Regulation 2(1) definition, whilst the first cycle of DWMP's are exempt as they are required by legislative, regulatory or administrative provisions, all subsequent cycles will be¹² under Section 79(1) of the Environment Act, which amends the Water Industry Act 1991 and states that:

"Each sewerage undertaker must prepare, publish and maintain a drainage and sewerage management plan".

1.4.8 However, as these requirements do not formally apply to the first cycle of plans, and as noted in the Framework:¹³

¹¹ European Commission (2003) *Implementation of Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment*. Commission of the European Communities, Brussels.

¹² Welsh Government, Defra, Ofwat, Environment Agency and NRW (2022) *Principle 3 Environment in Guiding principles for drainage and wastewater management plans*, published 16 February 2022. Available online <https://www.gov.uk/government/publications/drainage-and-wastewater-management-plans-guiding-principles-for-the-water-industry/guiding-principles-for-drainage-and-wastewater-management-plans#fn:4> [Accessed March 2022]

¹³ Water UK (2019) *A framework for the production of Drainage and Wastewater Management Plans, September 2019*. Available online: https://www.water.org.uk/wp-content/uploads/2020/01/Water_UK_DWMP_Framework_Report_Main_September-2019.pdf. [Accessed July 2021]

"DWMPs are not currently a statutory obligation for companies and, as such, they do not fall within the SEA regulations."

- 1.4.9 It is therefore at the discretion of UJW whether SEA is applied to the DWMP. Taking into account the nature of the catchments included in the DWMP and the associated challenges that the DWMP seeks to address, it is likely that plan will include options that will have likely significant effects, and in consequence, UJW has chosen to undertake an SEA of the DWMP. This allows UJW to benefit from undertaking an SEA, as summarised in the Framework:

"...undertaking an SEA on the final optimised plan would be 'best practice' and is recommended... Collation of this information based on those interventions included within the optimised plan should enable an SEA to be readily undertaken and be able to demonstrate that the plan delivers the best, sustainable outcomes for customers, stakeholders and the environment"

- 1.4.10 In consequence, although application of SEA to the DWMP is not a regulatory requirement, UJW has elected to undertake SEA of the plan, in order to strengthen the plan development process.

Stages of Strategic Environmental Assessment

- 1.4.11 Following screening, SEA comprises five key stages:

- ▶ **Stage A:** Scoping;
- ▶ **Stage B:** Develop and Refine Alternatives and Assess Effects;
- ▶ **Stage C:** Prepare Environmental Report;
- ▶ **Stage D:** Consult on the Draft Plan and Environmental Report and Prepare the Post Adoption (SEA) Statement; and
- ▶ **Stage E:** Monitor Environmental Effects.

- 1.4.12 **Stage A** of the SEA of the DWMP has led to the production of a Scoping Report¹⁴. The scoping stage itself comprises five tasks that are listed below:

- i. Review of other relevant policies, plans, programmes and strategies (hereafter referred to as 'plans and programmes').
- ii. Collation and analysis of baseline information.
- iii. Identification of key sustainability issues.
- iv. Development of the assessment framework.
- v. Consultation on the scope of the SEA (the Scoping Report).

- 1.4.13 Information collected and analysed (as part of tasks i and ii) covers England, Wales and Scotland. This reflected the potential for the DWMP to have effects in England, in Wales (on the Dee Estuary) and in Scotland (on the Solway Firth Estuary), although assessment has subsequently shown that the effects of the draft DWMP are on England only.

- 1.4.14 The Scoping Report sets out the proposed framework for assessing the likely significant environmental effects of the draft DWMP. It was issued for a 5-week consultation to the SEA scoping consultation bodies between 5th November to 10th December 2021 (responses are summarised in **Appendix A**). Following consultation and amendment, the framework has been

¹⁴ Wood (2021) Drainage and Wastewater Management Plan Strategic Environmental Assessment Scoping Report (November 2021)

used for assessing the effects (including cumulative effects) of the drainage and wastewater management proposals contained in the draft DWMP and any reasonable alternatives (**Stage B**).

- 1.4.15 These assessments will be presented in an Environmental Report (in a form to meet the requirements of Schedule 2 of the SEA Regulations) which will be issued to accompany the plan (**Stage C**).
- 1.4.16 The draft DWMP and accompany documents (including the Environmental Report) have been published for consultation (**Stage D**). Following consultation, U UW will prepare a Statement of Response to the representations received during the consultation period setting out how and why the draft DWMP has or has not been revised to take account of the consultation responses. U UW will amend the draft DWMP. U UW will publish the final DWMP and implement it accordingly. In conjunction with publishing the final DWMP, U UW will also issue a Post Adoption Statement (to meet the requirements of SEA regulation 16 (4)). This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final DWMP.
- 1.4.17 The SEA requires monitoring of any resulting environmental effects of DWMP (**Stage E**).

1.5 Habitats Regulations Assessment

- 1.5.1 Regulations 63 and 64 of The Conservation of Habitats and Species Regulations (2017) (the 'Habitats Regulations') transpose the provisions of Articles 6(3) and 6(4) of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') as they relate to plans or projects in England and Wales. Regulation 63 states that if a plan or project is "*(a) is likely to have a significant effect on a European site¹⁵ or a European offshore marine site¹⁶ (either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site*" then the competent authority must "*...make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before the giving consent or authorisation (etc.).
- 1.5.2 The plan or project can only be given effect if it can be concluded (following an 'appropriate assessment') that it "*...will not adversely affect the integrity*" of a site, unless the provisions of Regulation 64 are met.
- 1.5.3 The process by which Regulation 63 (and, if applicable, Regulation 64) is met is known as HRA¹⁷. A HRA determines whether there will be any 'likely significant effects' on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects)¹⁸ and, if so, whether there will be any 'adverse effects on site integrity'¹⁹.
- 1.5.4 The Habitats Regulations require every Competent Authority, in the exercise of any of its functions, to have regard to the requirements of the Habitats Directive. The non-statutory nature of the DWMP, means at present, U UW has chosen to complete the plan and its categorisation as a

¹⁵ Strictly, 'European sites' are: any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agreed the site as a 'Site of Community Importance' (SCI) (if this was before 31 Jan 2020); any classified Special Protection Area (SPA); and any candidate SAC (cSAC). However, the term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') apply; and to possible SACs (pSACs) and listed Ramsar Sites. "European site" is therefore used in this proposal in its broadest sense, as an umbrella term for all of the above designated sites.

¹⁶ 'European offshore marine sites' are defined by Regulation 18 of The Conservation of Offshore Marine Habitats and Species Regulations 2017; these regulations cover waters (and hence sites) over 12 nautical miles from the coast.

¹⁷ The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is now more accurately termed 'HRA', with the term 'Appropriate Assessment' limited to the specific stage within the process.

¹⁸ Also referred to as the 'test of significance'.

¹⁹ Also referred to as the 'integrity test'.

Competent Authority is perhaps premature. However, if proposals in the DWMP could affect European sites (through scheme siting, land take and construction), undertaking an HRA enables the effects to be identified, avoided or minimised and helps U UW demonstrate that the plan delivers the best, sustainable outcomes for customers, stakeholders and the environment. In consequence, U UW has undertaken a separate HRA, whose findings have been cross-referenced as appropriate through this assessment, notably when identifying effects on biodiversity.

1.6 Water Framework Directive

- 1.6.1 The Water Framework Directive (WFD)²⁰ sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve 'good' status or potential by 2027 at the latest. The current (baseline) status (e.g. 2015 classification), and the measures required to achieve the 2027 status objective, are set out for each water body in the relevant River Basin Management Plans (RBMPs), prepared by the Environment Agency and Natural Resources Wales (NRW) every six years. The current RBMPs (known as the 'Cycle 2 plans') were published in February 2016 and are expected to be updated in September 2022.
- 1.6.2 U UW must be able to demonstrate that DWMP will not cause a deterioration in respect of these baseline conditions. Furthermore, for those water bodies that are not currently attaining good status, U UW must be able to confirm that it would not preclude the delivery of measures to facilitate the improvements needed to attain good status.
- 1.6.3 In consequence, U UW has completed a separate WFD Assessment of the DWMP to provide the evidence base for water companies to respond to these requirements. Its findings have been used, as appropriate, in the completion of the SEA, notably when considering the effects on the SEA topic of water.

1.7 Welsh legislation

The Well-being of Future Generations (Wales) Act 2015

- 1.7.1 The Well-being of Future Generations (Wales) Act (WFGA) 2015 places a duty on Welsh public bodies to carry out sustainable development. U UW is not a public body; however, the Act, as noted in section 6(3), can apply to other parties "*who exercise functions of a public nature*".
- 1.7.2 In this Act, sustainable development is defined as "*the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals*". In this context, the sustainable development principle means that public bodies "*must act in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs*". In order to act in this manner, the Act sets out that a public body (in this case, U UW in preparing the DWMP) must take into account:
- "-the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect;*
- 1.7.3 *- the need to take an integrated approach, by considering how—*
- 1.7.4 *(i)the body's well-being objectives may impact upon each of the well-being goals;*

²⁰ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy and the Water Environment (WFD) (England and Wales) Regulations 2017

- 1.7.5 *(ii) the body's well-being objectives impact upon each other or upon other public bodies' objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another;*
- 1.7.6 *- the importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of—*
- 1.7.7 *(i) Wales (where the body exercises functions in relation to the whole of Wales), or*
- 1.7.8 *(ii) the part of Wales in relation to which the body exercises functions;*
- 1.7.9 *- how acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives;*
- 1.7.10 *- how deploying resources to prevent problems occurring or getting worse may contribute to meeting the body's well-being objectives, or another body's objectives."*

The Environment (Wales) Act 2016

- 1.7.11 The Environment (Wales) Act 2016 introduced a new legislative approach for the sustainable management of natural resources (SMNR). The Act seeks to maintain and enhance the resilience of Wales' ecosystems and the services and benefits they provide and, in so doing, meet the needs of the present generation without compromising the ability of future generations to meet their needs. Section 3(1) of the Environment (Wales) Act 2016 defines SMNR as:
- 1.7.12 *"- using natural resources in a way and at a rate that promotes achievement of the SMNR objective;*
- 1.7.13 *- taking other action that promotes achievement of that objective; and*
- 1.7.14 *- not taking action that hinders achievement of that objective."*
- 1.7.15 The objective for SMNR referred to above is *"to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing—*
- 1.7.16 *(a) meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and*
- 1.7.17 *(b) contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015"*.
- 1.7.18 Section 6 of the Act places a duty on public authorities to *"seek to maintain and enhance biodiversity"* so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to *"promote the resilience of ecosystems"*.

Application of Welsh legislation to the DWMP

- 1.7.19 In line with the legislation, consideration has been given to the effects on Wales in the assessment undertaken and reported in this Environmental Report.

1.8 Environmental Report Structure

- 1.8.1 The remainder of this Environmental Report is structured as follows:
- **Section 2: Review of Plans and Programmes** - Provides an overview of the review of those plans and programmes relevant to the DWMP and SEA that is contained at **Appendix B**;

- **Section 3: Baseline Analysis** - Presents an overview of the baseline analysis and identifies the key issues relevant to the draft plan and SEA with the detailed social, economic and environmental characteristics presented in **Appendix C**;
- **Section 4: Approach to the Assessment** - Outlines the revised approach to the SEA of the draft DWMP including the assessment framework comprising assessment objectives and guide questions, categorisation of effects, matrices and definitions of significance/thresholds (**Appendix D**);
- **Section 5: Assessment of the DWMP** - Presents the findings of the assessment of the Draft DWMP (detailed assessment matrices for options are contained at **Appendix E**) and the alternatives;
- **Section 6: Next Steps and Proposals for Monitoring** - Details the next steps in the SEA process and presents views on how the environmental effects of the DWMP will be monitored.

1.8.2 The report also contains the following appendices:

- **Appendix A: Schedule of Scoping Consultation Responses.**
- **Appendix B: Review of Plans and Programmes.**
- **Appendix C: Baseline.**
- **Appendix D: Effects Thresholds.**
- **Appendix E: Detailed Assessments.**
- **Appendix F: Quality Assurance Checklist.**

2. Review of Plans and Programmes

- 2.1.1 The SEA Regulations require a report containing “an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes” (Schedule 2(1)) as well as “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” (Schedule 2(5)).
- 2.1.2 One of the first steps in undertaking the SEA of the draft plans is therefore to identify and review other relevant plans and programmes which could influence the plan. These may be plans and programmes at an international/European, national, regional, or sub-regional level, commensurate with the scope of the draft DWMP. The review aims to identify the relationships between the draft plans and these other documents i.e., how the draft DWMP could be affected by the other plans’ and programmes’ aims, objectives and/or targets, or how it could contribute to the achievement of their environmental and sustainability objectives. It is also a valuable source of information to support the completion of baseline analysis and to determine the key issues for the draft plans and SEA (see **Section 3** and **Appendix C**).
- 2.1.3 The completed review of plans and programmes is used to provide the policy context for the subsequent assessment process and helps to inform the development of objectives that comprise the assessment framework (see **Section 4**).

2.2 Overview

- 2.2.1 Over 100 international/European, national, regional/sub-regional and local level plans and programmes have been reviewed in preparing this Environmental Report.
- 2.2.2 Those that are relevant to the DWMP are listed in **Table 2.1**. These are summarised in **Appendix B**.

Table 2.1 List of Plans and Programmes relevant to the DWMP

International
Conservation of Migratory Species (CMS) (1979) The Bonn Convention on the Conservation of Migratory Species of Wild Animals
Council of Europe (1979) The Convention on the Conservation of European Wildlife and Natural Habitats (The Bern Convention)
Council of Europe (1985) The Granada Convention for the Protection of the Architectural Heritage of Europe
Council of Europe (1992) Convention on the Protection of Archaeological Heritage (The Valetta Convention)
Council of Europe (2000), European Landscape Convention (The Florence Convention) (became binding March 2007)
Council of Europe (2003) European Soils Charter
European Commission (1991) The Nitrates Directive 91/676/EEC
European Commission (1991) Urban Waste Water Treatment Directive 1991/271/EEC
European Commission (1992) The Habitats Directive 1992/43/EEC
European Commission (1998) Drinking Water Directive 1998/83/EC
European Commission (1999) Directive on the Landfill of Waste 99/31/EC
European Commission (2000) The Water Framework Directive 2000/60/EC
European Commission (2001) National Emissions Ceiling Directive 2001/81/EC
European Commission (2001) Directive on the Assessment of the Effects of Certain Plans and Programmes on the Environment (The SEA Directive) 2001/42/EC
European Commission (2002) Directive on the Energy Performance of Buildings 2002/91/EC
European Commission (2002) The Environment Noise Directive 2002/49/EC
European Commission (2004) Environmental Liability Directive 2004/35/EC
European Commission (2005) Thematic Strategy on Air Pollution
European Commission (2006) The Bathing Waters Directive 2006/7/EC

European Commission (2006) Directive on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals 2006/88/EC
 European Commission (2006) Directive on the protection of groundwater against pollution and deterioration 2006/118/EC
 European Commission (2006) Fresh Water Fish Directive 2006/44/EC
 European Commission (2006) Mining Waste Directive 2006/21/EC
 European Commission (2006) Thematic Strategy for Soil Protection
 European Commission (2007) The Eel Directive 2007/1100/EC
 European Commission (2007) Floods Directive 2007/60/EC
 European Commission (2008) Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC and Air Quality Framework Fourth Daughter Directive 2004/107/EC and previous directives (96/62/EC; 99/30/EC; 2000/69/EC & 2002/3/EC)
 European Commission (2008) Directive on Waste (Directive 75/442/EEC, 2006/12/EC 2008/98/EC as amended)
 European Commission (2008) Environmental Quality Standards Directive 2008/105/EC
 European Commission (2008) Marine Strategy Framework Directive 2008/56/EC
 European Commission (2009) Directive on the Conservation of Wild Birds 2009/147/EC (codified version of Council Directive 79/409/EEC as amended)
 European Commission (2009) Promotion of the use of energy from renewable sources Directive 2009/28/EC
 European Commission (2010) Energy 2020 - A Strategy for Competitive, Sustainable and Secure Energy
 European Commission (2010) Europe 2020 - A Strategy for Smart, Sustainable and Inclusive Growth
 European Commission (2010) Industrial Emissions Directive (integrated pollution prevention and control) 2010/75/EU
 European Commission (2011) Directives on Environmental Impact Assessment (Codified Directive 2011/92/EU and Revised Directive 2014/52/EU)
 European Commission (2011) A Resource- Efficient Europe- Flagship Initiative Under the Europe 2020 Strategy, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (COM 2011/21)
 European Commission (2011) A Roadmap for Moving to a Competitive Low Carbon Economy in 2050
 European Commission (2012) Energy Efficiency Directive 2012/27/EU
 European Commission (2013) Towards Social Investment for Growth and Cohesion 2014-2020
 European Commission (2014) The EU Regulation on invasive alien (non-native) species 1143/2014/EU
 European Commission (2014) Seventh Environmental Action Programme
 European Commission (2014) A Policy Framework for Climate and Energy in the Period from 2020 to 2030
 European Commission (2015) 'Closing the loop - An EU Action Plan for the Circular Economy' policy package
 European Commission (2016) National Emissions reduction Commitments (NEC) Directive 2016/2284/EU
 European Commission (2020) Biodiversity strategy for 2030
 European Commission (2020) Proposal for a Decision of the European Parliament and of the Council on a General Union Environment Action Programme to 2030 (Proposal for the 8th Environmental Action Programme)
 European Commission (2021) EU strategy on adaptation to climate change
 ICOMOS (2011) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties
 IUCN (2013) World Heritage Advice Note: Environmental Assessment
 UNEP (1973) Convention on International Trade in Endangered Species of Wild Fauna and Flora
 UNESCO (1971) Ramsar Convention on Wetlands of International Importance
 UNESCO (1972) Convention Concerning the Protection of the World Cultural and Natural Heritage.
 UNESCO (2001) Convention on the Protection of Underwater Cultural Heritage
 United Nations (1992) Convention on Biological Diversity (The Rio Convention)
 United Nations (1997) The Kyoto Protocol to the UN Framework Convention on Climate Change
 United Nations Economic Commission for Europe (1998), Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (The Aarhus Convention)
 United Nations (2002) The World Summit on Sustainable Development
 United Nations (2016) The Paris Agreement
 United Nations Framework Convention on Climate Change (UNFCCC) (2011) The Cancun Agreements
 World Commission on Environment and Development (1987) Our Common Future (The Brundtland Report)
 World Health Organisation (2004) Children's Environment and Health Action Plan for Europe

National

BEIS (2011) Carbon Plan: Delivering our Low Carbon Future
 BEIS (2011) National Policy Statements for Energy Infrastructure
 BEIS (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity
 BEIS (2011) UK Renewable Energy Roadmap
 Canal & River Trust (2015) Living Waterways Transform Places & Enrich Lives: Our 10 Year Strategy
 Canal and River Trust (2015) Water Resources Strategy 2015 – 2020
 Centre for Environment Fisheries and Aquaculture Science, Environment Agency and Natural Resources Wales (2019) Assessment of Salmon Stocks and Fisheries in England and Wales 2019
 Climate Change Committee (2020) The path to Net Zero and progress on reducing emissions in Wales
 Department for Culture, Media and Sport (DCMS) (2001) The Historic Environment – A Force for the Future
 DCMS and Welsh Government (2007) Heritage Protection for the 21st Century
 DCMS (2013) Scheduled Monuments & Nationally Important but Non-Scheduled Monuments

DCMS (2016) The Culture White Paper
 Defra (2002) The Strategy for Sustainable Farming and Food – facing the future
 Defra (2004) Rural Strategy
 Defra (2004) The First Soil Action Plan for England
 Defra (2005) Making space for water: taking forward a new government strategy for flood and coastal erosion risk management in England
 Defra (2006) Shoreline Management Plan Guidance
 Defra (2007) Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt
 Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland
 Defra (2009) Safeguarding our Soils – A Strategy for England
 Defra, Department of the Environment (NI), Scottish Government and Welsh Assembly Government (2010) Air Pollution: Action in a Changing Climate
 Defra (2010) Making Space for Nature: A Review of England’s Wildlife Sites and Ecological Network
 Defra (2011) UK National Ecosystem Assessment and Defra (2014), UK National Ecosystems Assessment Follow on, Synthesis of Key Findings
 Defra (2011) Water for Life - Water White Paper
 Defra (2011) Biodiversity 2020: A Strategy for England’s Wildlife and Ecosystem Services
 Defra (2011) Government Review of Waste Policy in England 2011
 Defra (2011) Mainstreaming Sustainable Development
 Defra (2011) Natural Environment White Paper
 Defra (2012) National Policy Statement for Waste Water
 Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report
 Defra (2013) The National Adaptation Programme – Making the Country Resilient to a Changing Climate
 Defra (2015) The government’s response to the Natural Capital Committee’s Third State of Natural Capital report
 Defra (2016) Guiding principles for water resources planning for water companies operating wholly or mainly in England
 Defra (2017) Air Quality Plan for Nitrogen Dioxide (NO2) in UK
 Defra (2020) Drought Plan Direction 2020
 Defra (2020) Water abstraction plan: Environment
 Defra (2021) Waste Management Plan for England
 Defra, Environment Agency, Natural England, Forestry Commission England (2016) Creating a great place for living
 Defra, Scottish Government, Welsh Government (2015) The Great Britain Invasive Non-native Species Strategy
 Defra and Welsh Government (2014), River Basin Planning Guidance
 Environment Agency (2004) Catchment Flood Management Plans: Guidelines – Volume 1 Policy
 Environment Agency (2007) Soil: A Precious Resource
 Environment Agency (2008) Better Sea Trout and Salmon Fisheries: Our Strategy for 2008-2021
 Environment Agency (2009) Water for People and the Environment - Water Resources Strategy for England and Wales
 Environment Agency (2010) Water Resources Action Plan for England and Wales
 Environment Agency (2013) Areas of Water Stress: Final Classification
 Environment Agency (2013) Managing Water Abstraction
 Environment Agency (2020) EA2025 creating a better place
 Environment Agency (2020) Meeting our future water needs: a national framework for water resources
 Environment Agency (2020) National Flood and Coastal Erosion Risk Management Strategy for England
 Environment Agency (2020) Water Company Drought Plan guideline
 Environment Agency and Natural Resources Wales (2018) Water Resources Planning Guideline: Interim update
 Environment Agency, OfWAT and Natural Resources Wales (2020) Water Resources Planning Guideline Draft for consultation – July 2020, and Technical Supplementary Guidance
 Environment Agency (undated) Hydroecology: Integration for modern regulation
 Environment Agency (undated) Restoring Sustainable Abstraction Programme
 Environment Agency (undated) WFD River Basin Characterisation Project: Technical Assessment Method - River abstraction and flow regulation.
 English Heritage (2008) Climate Change and the Historic Environment
 English Heritage (2010) Heritage at Risk
 Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment
 The Historic Environment Group (2018) Historic Environment and Climate Change Sector Adaptation Plan
 HM Government (1975) Salmon and Freshwater Fisheries Act, 1975
 HM Government (1975) Reservoirs Act
 HM Government (1979) Ancient Monuments and Archaeological Areas Act 1979
 HM Government (1981) Wildlife and Countryside Act, 1981
 HM Government (1990) Environmental Protection Act
 HM Government (1990) Planning (Listed Buildings and Conservation Areas) Act 1990
 HM Government (1990) Town and Country Planning Act 1990
 HM Government (1991 and 1994) Land Drainage Act
 HM Government (1991) Water Industry Act 1991 (as amended by the Flood and Water Management Act 2010)
 HM Government (1991) Water Resources Act 1991
 HM Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994

HM Government (1994) UK Biodiversity Action Plan
 HM Government (1994) Urban Waste Water Treatment (England and Wales) Regulations 1994
 HM Government (1995) Environment Act 1995
 HM Government (2000) The Countryside and Rights of Way (CROW) Act 2000
 HM Government (2002) The National Heritage Act 2002
 HM Government (2003) The Water Act 2003
 HM Government (2003) The Water Environment (WFD) (England and Wales) Regulations 2003
 HM Government (2005) Securing the Future; Delivering UK Sustainable Development Strategy
 HM Government (2006) Climate Change and Sustainable Energy Act 2006
 HM Government (2006) Natural Environment and Rural Communities Act 2006
 HM Government (2007) Water Resources Management Plan Regulations 2007
 HM Government (2008) The Climate Change Act 2008 and The Climate Change Act 2008 (2050 Target Amendment) Order 2019
 HM Government (2008) The Energy Act 2008
 HM Government (2008) Planning Act 2008
 HM Government (2009) The Eels (England and Wales) Regulations 2009 (as amended 2011)
 HM Government (2009) The Groundwater (England and Wales) Regulations 2009
 HM Government (2009) Marine and Coastal Access Act 2009
 HM Government (2009) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI 3104
 HM Government (2009) The UK Renewable Energy Strategy
 HM Government (2010) Flood and Water Management Act 2010
 HM Government (2011) Localism Act 2011
 HM Government (2011) UK Marine Policy Statement
 HM Government (2011) Water for Life: White Paper
 HM Government (2013) The Energy Act 2013
 HM Government (2014) Water Act 2014
 HM Government (2015) The Environmental Damage (Prevention and Remediation) (England) Regulations 2015
 HM Government (2015) Infrastructure Act 2015
 HM Government (2015) The Nitrate Pollution Prevention Regulations 2015
 HM Government (2015) Ozone-Depleting Substances Regulations 2015
 HM Government (2015) Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
 HM Government (2016) Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018)
 HM Government (2017) Conservation of Habitats and Species Regulations 2017 (and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019)
 HM Government (2017, updated 2019) UK Clean Growth Strategy: Leading the way to a low carbon future
 HM Government (2017) Second UK Climate Change Risk Assessment (CCRA2)
 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment
 HM Government (2020) The Agriculture Act 2020
 HM Government (2020) Energy White Paper: Powering our Net Zero Future
 HM Treasury (2016) National Infrastructure Delivery Plan
 JNCC and Defra (2012) UK Post-2010 Biodiversity Framework
 Ministry for Housing, Communities and Local Government (MHCLG, formerly Department for Communities and Local Government) (2014) National Planning Policy for Waste
 MHCLG (2019) National Planning Policy Framework 2019
 MHCLG (various) Planning Practice Guidance
 National Assembly for Wales (2015) Well-being of Future Generations Act (2015)
 National Assembly for Wales (2016) Environment (Wales) Act 2016
 Natural England (2011) UK Geodiversity Action Plan
 Natural Resources Wales (2016) The State of Natural Resources Report (SoNaRR)
 Natural Resources Wales (2020) The State of Natural Resources Report (SoNaRR) for Wales 2020
 Ofwat (2008) Water Supply and Demand Policy
 Ofwat (2016) Water 2020
 Ofwat (2017) Resilience in the Round
 UKCIP (2018) UK Climate Projections UKCP18
 UKTAG: Phase 3 Review of Environmental Standards
 Waterwise (2017) Water Efficiency Strategy for the UK
 Welsh Government (2021) Planning Policy Wales (Edition 11)

Regional

Canal & Rivers Trust (2015) North West Waterway Fisheries & Angling Action Plan
 Environment Agency (2011) North West of England and North Wales Shoreline Management Plan SMP2
 Environment Agency (2012), Midlands Region Drought Plan
 Environment Agency (2020) North West Operational Drought Plan
 English Heritage, now known as Historic England, Heritage at Risk Register: North West (2018) and West Midlands (2018)
 Natural Resources Wales (2017) Drought Plan

Transport for the North (2019) Strategic Transport Plan
United Utilities Final Drought Plan 2018
United Utilities (2019) Final Water Resources Management Plan 2019
United Utilities (2020) Revised Business Plan 2020-2025

Water Company (various) Drought Plans:

- Hafren Dyfrydwy Draft Drought Plan 2019
- Dwr Cymru Welsh Water Draft Drought Plan 2020
- Severn Trent Draft Drought Plan 2019-2024
- Yorkshire Water Draft Drought Plan 2019
- Northumbrian Water Final Drought Plan 2019

Water Company (various) Water Resources Management Plans (published and draft):

- Hafren Dyfrydwy Final Water Resources Management Plan 2019
- Dwr Cymru Welsh Water Final Water Resources Management Plan 2019
- Severn Trent Final Water Resources Management Plan 2019
- Yorkshire Water Revised Draft Water Resources Management Plan 2019
- Northumbrian Water Final Water Resources Management Plan 2019

Sub-Regional/Local

Area of Outstanding Natural Beauty (AONB) Management Units (various) AONB Management Plans
Cheshire and Warrington Enterprise Partnership (2017) Cheshire and Warrington Matters, A Strategic and Economic Plan for Cheshire and Warrington

Cumbria Strategic Partnership, Sustainable Cumbria - A sub-regional strategy for Cumbria (2004)

Defra (2010), Eel Management Plans (various)

Environment Agency (various) Catchment Flood Management Plans

Environment Agency and Natural Resources Wales (various) Salmon Action Plans

Environment Agency (2013) Abstraction Licensing Strategies (CAMS process)

Environment Agency, Defra, Natural Resources Wales and Natural Scotland (2015) River Basin Management Plans (various):

- North West River Basin Management Plan
- Solway Tweed River Basin Management Plan
- Dee River Basin Management Plan

Environment Agency, Natural Resources Wales and SEPA (2016) Flood Risk Management Plans (various)

- North West Flood Risk Management Plan
- Solway Tweed Flood Risk Management Plan
- Dee Flood Risk Management Plan

Greater Manchester Combined Authority (2017), Our People Our Place: Greater Manchester Strategy

Hadrian's Wall Partnership Board (2015), Hadrian's Wall Management Plan 2015-2019

Lake District National Park Authority (2006) A Vision for 2030

Lake District National Park Authority (2008) Landscape Character Assessment and Guidelines

Lake District National Park Authority (2010) Core Strategy

Lake District National Park – State of the Park (2018): Reporting on the Partnership's Plan 2015-2020

Local Biodiversity Action Plans (BAPs) (various)

Local Planning Authority (various) Land Use Plans

Local Geodiversity Action Plans (LGAPs)

Local Planning Authority (various) Local Plans/Local Development Plans

Local Wildlife Trust Strategies (various)

National Park Management Plans (various):

- Lake District National Park Partnership – The Management Plan 2015-2020
- Peak District National Park Management Plan 2018-2023
- Snowdonia National Park Management Plan 2010-2015
- Yorkshire Dales National Park Management Plan 2019-2024

Natural England, Site Improvement Plans (SIPs) for Natura 2000 Sites (various)

Natural England National Character Area (NCA) Profiles (various)

Natural England and Environment Agency (various) River Restoration and Water Level Management Plans

Outline Water Cycle Studies

One West Lancs Partnership

Public Rights of Way Improvement Plans (ROWIPs)

2.3 Policy Objectives Relevant to the Plan Assessments

2.3.1 The review of plans and programmes presented in **Appendix B** has identified a number of objectives and policy messages relevant to the draft DWMP. Reflecting the topics identified in

Schedule 2 of the SEA regulations, these objectives and messages are set out for the following topic areas:

- Biodiversity, Flora and Fauna;
- Geology Land use and Soils;
- Water (including flood risk);
- Air Quality;
- Climatic Factors;
- Population and Human Health;
- Material Assets and Resource Use;
- Cultural Heritage; and
- Landscape.

2.3.2

The policy objectives and messages identified from the review of other plans and programmes are summarised in **Table 2.2**. It is important that the assessment takes these into account as this will help to highlight any areas where the draft plan will help or hinder the achievement of the objectives of the other plans. Only the key sources are included; however, it is acknowledged that many other plans and programmes could also be included. The relevance of the key objectives and policy measures to the assessment of the DWMP is also indicated in **Table 2.2**.

Table 2.2 Key Policy Objectives Identified in Other Plans and Programmes relevant to the Assessment of the DWMP

Key Policy Objectives and Policy Messages	Key Sources	Relevant to the SEA of the DWMP?
Biodiversity, Flora and Fauna		
Conservation and enhancement of the levels and variety of biodiversity, including designated sites, priority species and habitats	Bern Convention; Bonn Convention; Habitats Directive; Invasive Alien Species Regulation; Ramsar Convention on Wetlands; Birds Directive; EU Biodiversity Strategy to 2020; Marine Strategy Framework Directive; Biodiversity 2020; UK post 2010 Biodiversity Framework; Eel Regulations: Wildlife and Countryside Act; The Natural Environment and Rural Communities Act; UK Biodiversity Action Plan; Marine and Coastal Access Act; Conservation of Habitats & Species Regulations; Better Sea Trout and Salmon Fisheries; The Great Britain Invasive Non-native Species Strategy; A Green Future: Our 25 Year Plan to Improve the Environment; UK Marine Policy Statement; Countryside and Rights of Way Act; National Planning Policy Framework; The State of Natural Resources Report (SoNaRR); Natural Resources Policy (NRP); Nature Recovery Action Plan NRAP; Local Biodiversity Action Plans (BAP) including Species and Habitats Action Plans (various); Local Planning Authority Local Plans (various); AONB Management Plans; National Park Management Plans (various).	Yes
Soils, Land Use and Geology		
Protection and enhancement of soil quality, promoting sustainable patterns of land use and protecting designated geological features	Thematic Strategy for Soil Protection; National Planning Policy Framework; Soil: A Precious Resource; Local Planning Authority Local Plans (various); AONB Management Plans; National Park Management Plans (various).	Yes

Key Policy Objectives and Policy Messages	Key Sources	Relevant to the SEA of the DWMP?
Water (including flood risk)		
Protection and enhancement of all water supplies and resources	Bathing Waters Directives; Drinking Water Directive; Nitrates Directive; Urban Waste Water Directive; Water Framework Directive; Environmental Quality Standards Directive; Habitats Directive; the Wildlife & Countryside Act; the Conservation of Habitats & Species Regulations; Restoring Sustainable Abstraction Programme; Future Water; Meeting our future water needs: a national framework for water resources; A Green Future: Our 25 Year Plan to Improve the Environment; National Planning Policy Framework; River Basin Management Plans (various); Water Company Drought Plans (various); Water Company Water Resource Management Plans (various); Abstraction Licensing Strategies (various); Local Planning Authority Local Plans (various).	Yes
Promoting the sustainable and efficient use of water	Water Framework Directive; The Water Environment (WFD) (England and Wales) Regulations; Water for People and the Environment; Managing Water Extraction; Restoring Sustainable Abstraction Programme; Meeting our future water needs: a national framework for water resources; Water Act; Water Supply and Demand Policy; A Green Future: Our 25 Year Plan to Improve the Environment; National Planning Policy Framework; River Basin Management Plans (various); Water Company Drought Plans (various); Water Company Water Resource Management Plans (various); Abstraction Licensing Strategies (various); Local Planning Authority Local Plans (various).	Yes
Minimising flood risk and improving flood control infrastructure	Floods Directive; Water Framework Directive; Flood and Water Management Act; Shoreline Management Plan Guidance; National Flood and Coastal Erosion Risk Management Strategy for England; Flood and Water Management Act; National Planning Policy Framework; Shoreline Management Plans (various); Catchment Flood Management Plans (various); River Basin Management Plans (various); Catchment Flood Management Plans (various); Local Planning Authority Local Plans (various).	Yes
Air		
Ensuring air quality is maintained or enhanced and that emissions of air pollutants are kept to a minimum	Ambient Air Quality and Cleaner Air for Europe; Industrial Emissions Directive; Air Quality Strategy for England, Scotland, Wales and Northern Ireland; Air Quality Plan for Nitrogen Dioxide (NO ₂) in UK; National Planning Policy Framework; Local Planning Authority Local Plans (various).	Yes
Climatic Factors		
Minimising emissions of greenhouse gases that cause climate change	Kyoto Protocol; Paris Agreement; Climate Change Act; Renewable Energy Roadmap; UK Sustainable Development Strategy; UK Renewable Energy Strategy; Energy White Paper; UK Clean Growth Strategy; Industrial Decarbonisation and Energy Efficiency Action Plans; UK Climate Change Risk Assessment; Local Planning Authority Local Plans (various).	Yes
Minimising the effects of climate change on natural resources, inhabitants and the economy	Strategy on Adaptation to Climate Change; UK Sustainable Development Strategy; National Flood and Coastal Erosion Risk Management Strategy for England; National Planning Policy Framework; Water Resources Management Plans (various); River Basin Management Plans (various); Shoreline Management Plans (various); Catchment Flood Management Plans (various); Local Planning Authority Local Plans (various).	Yes
Population and Human Health		
Addressing deprivation and reducing inequality	World Summit on Sustainable Development; Europe 2020; Sustainable Development Strategy; National Planning Policy Framework; Future Wales: The National Plan 2040; Planning Policy Wales Edition 11; Local Planning Authority Local Plans (various).	Yes
Promoting improvements to health and well-being	Aarhus Convention; Sustainable Development Strategy; World Summit on Sustainable Development; Seventh Environmental Action Programme to	Yes

Key Policy Objectives and Policy Messages	Key Sources	Relevant to the SEA of the DWMP?
	2020; National Planning Policy Framework; Local Planning Authority Local Plans (various).	
Providing high quality services, community facilities and social infrastructure that is accessible to all	National Planning Policy Framework; Planning Policy Wales Edition 11; Local Planning Authority Local Plans (various).	No
Achieving sustainable economic growth and promoting key sectors in the local economy	World Summit on Sustainable Development; Europe 2020; UK Marine Policy Statement; Sustainable Development Strategy; National Planning Policy Framework; Local Planning Authority Local Plans (various).	Yes
Improving and expanding the tourism economy	National Planning Policy Framework; Local Planning Authority Local Plans (various); AONB Management Plans (various); National Park Management Plans (various). Local Planning Authority Local Plans (various).	Yes
Maximising job opportunities for all and enhancing the quality of employment opportunities	National Planning Policy Framework; Local Planning Authority Local Plans (various).	Yes
Minimising noise pollution	Environment Noise Directive; Guidelines for Community Noise; National Planning Policy Framework; Local Planning Authority Local Plans (various).	Yes
Promoting sustainable transport	Sustainable Development Strategy; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; National Planning Policy Framework; Local Planning Authority Local Plans (various).	No
Material Assets and Resource Use		
Minimising waste production, promoting re-use and recycling	Waste Framework Directive; Landfill of Waste Directive; Waste Management Plan for England; National Planning Policy for Waste; Local Planning Authority Local Plans (various).	Yes
Promoting the most effective and efficient use of natural resources	World Summit on Sustainable Development; Seventh Environmental Action Programme to 2020; Energy 2020; Europe 2020; UK Sustainable Development Strategy; National Planning Policy for Waste; Towards Zero Waste; Local Planning Authority Local Plans (various).	Yes
Promoting the use of sustainable/renewable energy	Seventh Environmental Action Programme to 2020; Energy 2020; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; Renewable Energy Directive; Sustainable Development Strategy; Carbon Plan; Climate Change Act; UK Renewable Energy Strategy; UK Renewable Energy Roadmap; UK Sustainable Development Strategy; National Planning Policy Framework; Local Planning Authority Local Plans (various).	Yes
Promoting the use of sustainable design and construction and encouraging energy efficiency	Energy 2020; Energy Efficiency Directive; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; Renewable Energy Directive; UK Sustainable Development Strategy; National Planning Policy Framework; Local Planning Authority Local Plans (various).	Yes
Cultural Heritage		
Protecting and enhancing cultural heritage and archaeological sites	World Heritage Convention; Ancient Monuments and Archaeological Areas Act; Planning (Listed Buildings and Conservation Areas) Act; National Planning Policy Framework; Planning Policy Wales Edition 11; Local Planning Authority Local Plans (various).	Yes
Landscape		
Protecting and enhancing the quality and distinctiveness of natural	European Landscape Convention; National Planning Policy Framework; Planning Policy Wales Edition 11; AONB Management Plans (various); Local	Yes

Key Policy Objectives and Policy Messages	Key Sources	Relevant to the SEA of the DWMP?
landscapes and environmental resources	Planning Authority Local Plans (various); National Park Management Plans (various).	



3. Baseline Analysis

3.1 Overview

- 3.1.1 The SEA Regulations require a report containing 'The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme' (Schedule 2(2)), 'The environmental characteristics of areas likely to be significantly affected' (Schedule 2(3)), and '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(1) and the Habitats Directive' (Schedule 2(4))'.
- 3.1.2 In this context, an essential part of the SEA process is the identification of the current baseline conditions and their likely evolution. Only with a knowledge of existing conditions, and a consideration of their likely evolution, can the effects of the draft DWMP be identified and appraised and its subsequent success or otherwise be monitored. This is also useful in determining the key issues for each topic that should be taken forward in the SEA, through the SEA objectives and guide questions.
- 3.1.3 The current environmental baseline conditions relevant to the DWMP and its assessment have been outlined along with how these are likely to change in the future. This covers the operational area for UUW along with relevant national contextual information and also anticipates the potential effects for effects on the Dee (Wales) and Solway Firth (Scotland) by including relevant additional information as necessary. The analysis is presented in **Appendix C** for the following topics:
- Biodiversity, Flora and Fauna;
 - Geology Land use and Soils;
 - Water (including flood risk);
 - Air Quality;
 - Climatic Factors;
 - Population and Human Health;
 - Material Assets and Resource Use;
 - Cultural Heritage; and
 - Landscape.
- 3.1.4 The data has been drawn from a variety of sources, including a number of the plans and programmes reviewed as part of the SEA process (see **Section 2** of this report and **Appendix B**). Where appropriate, figures are referenced in this overview. The key sustainability issues arising from the review of baseline conditions are summarised for each topic.

3.2 Summary of Key Sustainability Issues

- 3.2.1 From the analysis of the baseline presented in **Appendix C**, a number of key sustainability issues have been identified as being relevant to the DWMP. These issues are summarised in **Table 3.1**.

Table 3.1 Key Issues Relevant to the DWMP

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft Drainage and Wastewater Management Plan
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> • The need to protect, restore and enhance biodiversity, ecological functions and biodiversity connectivity within UUW's operational area, particularly protected sites designated for nature conservation. • The need to continue to increase and improve the condition of priority habitats and habitats of priority species and restore populations of these species and other specially protected species. • The need to avoid activities likely to cause irreversible damage to natural heritage. • The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors. • The need to recognise the importance of ensuring biodiversity is resilient to the effects of climate change, including allowing adaptation • 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.
Geology Land Use and Soils	<ul style="list-style-type: none"> • The need to sustainably manage and/or improve the quality of agricultural land in the region. • The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health. • The need to protect, maintain and enhance geomorphological functions and services. • 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 protect peatlands in the North West. • The need to make use of previously developed land (PDL), and to reduce the prevalence of derelict land. • The need to maintain soil function.
Water	<ul style="list-style-type: none"> • The need to maintain and further improve the quality of the region's river, estuarine and coastal waters and in particular the biological quality of rivers, taking into account WFD/RBMP objectives. • The need to maintain and further improve the quantity and quality of groundwater resources taking into account WFD/RBMP objectives. • The need to ensure the continued risk of flooding is mitigated effectively. • 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 water and groundwaters. • The need to ensure sustainable abstraction to protect the water environment. • The need to ensure that people understand the value of water.
Air Quality	<ul style="list-style-type: none"> • The need to minimise emissions of pollutant gases and particulates and enhance air quality. • The need to reduce the need to travel and promote sustainable modes of transport.
Climatic Factors	<ul style="list-style-type: none"> • The need to reduce the need to travel and promote sustainable modes of transport. • The need to reduce greenhouse gas emissions arising from implementation of the DWMP. • The need to take into account, and where possible adapt to, the potential effects of climate change. • The need to increase environmental resilience to the effects of climate change.
Population and Human Health	<ul style="list-style-type: none"> • The need to ensure drainage and wastewater services remain affordable, especially for deprived or vulnerable communities. • The need to ensure water quantity and quality is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture. • The need to ensure a balance between the built and natural environment that will help to provide opportunities for local residents and tourists for access to green infrastructure and the natural and historic environment, as well as protecting and enhancing recreational resources.

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft Drainage and Wastewater Management Plan
	<ul style="list-style-type: none"> • The need to ensure that the DWMP measures do not adversely affect the health and well-being of any member of the community. • The need to ensure that the DWMP measures do not have an adverse economic impact and that benefits are maximised. • The need to ensure that 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 wellbeing and the economy.
Material Assets and Resource Use	<ul style="list-style-type: none"> • The need to promote water efficiency. • The need to maintain the balance between capacity, use and constraints for water. • The need to reduce energy consumption. • The need to ensure the sustainable and efficient use of resources such as construction materials. • The need to minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.
Cultural Heritage	<ul style="list-style-type: none"> • The need to conserve and enhance the historic significance of buildings, monuments, features, sites, places, areas and landscapes of archaeological and cultural heritage interest, and their settings. • The need to avoid damage to important wetland areas with potential for palaeoenvironmental deposits.
Landscape	<ul style="list-style-type: none"> • The need to protect and improve the natural beauty of the region's national parks, coastline, other areas of natural beauty, including undesignated landscapes and encourage the growth of woodland and forest in the region. • The need to conserve and enhance the landscape distinctiveness of the area. • The need to minimise any adverse impacts upon landscape that may result from measures in the DWMP.

3.3 Limitations of the Data and Assumptions Made

- 3.3.1 The information used has been sourced, so far as is possible, from recent datasets utilising a wide range of authoritative and official sources. It is important to acknowledge that there are variable time lags between raw data collection and its publication. Consequently, at the time of this Environmental Report's publication, the baseline or predicted future trends may have varied from those described above.
- 3.3.2 The data gathered to complete this baseline largely pre-dates the Covid-19 pandemic and its environmental, social and economic effects. Data that relates to these changes is only becoming available periodically and it may well be a number of years before the effects of the crisis can be determined, along with whether changes to the topics covered in the baseline have been short-term or sustained. This is an additional uncertainty within the assessment, and where relevant, some qualitative commentary may be provided.

4. Approach to the Assessment

4.1 Introduction

- 4.1.1 This section describes the approach to the assessment of the draft DWMP. It draws on the information contained in **Sections 2 and 3 and Appendices B and C** to define the scope of the assessment (in terms of the environmental and socio-economic issues to be considered) and sets out the SEA objectives and guide questions that comprise the assessment framework. The section then outlines how this assessment framework has been used to assess the options contained in the draft DWMP.

4.2 The Scope of the Assessment

Topics

- 4.2.1 The aim of SEA is to identify, describe and evaluate the likely significant effects of implementing the draft DWMP on the environment. Schedule 2 of the SEA Regulations require that the assessment includes information on the *"likely significant effects on the environment, including on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage, including architectural and archaeological heritage; landscape; and the inter-relationship between the issues referred to"*.
- 4.2.2 The key policy objectives identified from the review of other plans and programmes relevant to the assessment of the draft DWMP (**Table 2.2 and Appendix B**) and the economic, social and environmental issues arising from the analysis of the baseline (**Table 3.1**), together with the characteristics of the options, have been used to define the scope of the assessment in terms of the topics set out in Schedule 2 of the SEA Regulations.
- 4.2.3 **In this instance, all SEA topics identified by Schedule 2 of the SEA Regulations have been scoped in for assessment.**

Geographic Scope

- 4.2.4 The geographic extent of the SEA reflects the operational area covered by the DWMP.
- 4.2.5 In considering the adverse effects on European sites, the HRA has identified those European sites within 20km of an option or otherwise exposed to the environmental changes associated with its implementation (i.e. down- or upstream hydrologically linked sites); this is for clarity, to simplify the assessment process due to the number of options. In consequence, and on occasion, the study area may then extend outside the boundary of the plan under consideration. This approach is consistent with that taken for UUW WRMP24. In consequence, this also ensures consideration is given to the potential effects on the Dee (Wales) and Solway Firth (Scotland). However, the assessment has subsequently shown that the effects of the draft DWMP are on England only.
- 4.2.6 Where drainage and wastewater management options include transfers, where appropriate further consideration will be given to the effects outside the operational area of the plan. This also extends to the assessment of cumulative effects, where consideration of plans or programmes that cover areas that either overlap or are adjacent to the plan being assessed are also taken into account.

Timescales

- 4.2.7 When considering the timing of potential effects of the draft DWMP, the assessment has classified effects as 'short,' 'medium' or 'long-term.' This reflects an intention to capture the differences that could arise at different timescales, consistent with the requirements of Schedule 1 (2)(a) of the SEA Regulations where the assessment of the effects should have regard to "the probability, duration, frequency and reversibility of the effects".
- 4.2.8 **Table 4.1** below summarises the timescales applied in the SEA informed by the 5-year cycle of review of the plan. For the purposes of this assessment, short-term will be considered as up to 1 year, medium-term (from 1 year to 5 years (to the end of the plan review cycle)) and long-term will for the period beyond 5 years (beyond the plan review cycle).

Table 4.1 Duration of Short, Medium and Long Term

Estimated Length (years)	Duration
0-1 years	Short
>1-5 years	Medium
Over 5 years	Long

4.3 Assessment Framework

- 4.3.1 Establishing appropriate SEA objectives and guide questions is central to assessing the effects of the draft DWMP on the environment. Each of the option blends selected for the prioritised catchments will be assessed against the SEA objectives to determine the scale and significance of the effect. Guide questions focus the assessment on specific aspects of the objective that reflect issues identified from the review of baseline and contextual information.
- 4.3.2 The SEA objectives and guide questions used in the assessment of the draft DWMP reflect the topics contained in Schedule 2 (6) of the SEA regulations and have been informed by:
- the previous SEA assessment framework used to complete the SEA of UUW's WRMP19 and Drought Plan;
 - the SEA assessment framework developed for the WRW Regional Plan and core member water companies WRMP24, taking into account regulator comments;
 - the review of relevant plans and programmes and the associated key policy objectives and messages (**Section 2** and **Appendix B**)
 - the baseline information and key issues contained in **Section 3** and **Appendix C**.
- 4.3.3 The assessment framework is presented in **Table 4.2**. It contains 13 assessment objectives. It has been reviewed following scoping consultation and revised as appropriate to support the completion of the assessment of the DWMP.

Table 4.2 Assessment Framework

Topic	Objective	Guide Questions
Biodiversity, Flora and Fauna	1. To protect, restore and enhance biodiversity, including designated sites of nature conservation interest and protected habitats	<ul style="list-style-type: none"> • Will it protect, restore and enhance where possible, the most important sites for nature conservation (e.g., internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs)?

Topic	Objective	Guide Questions
	and species, enhanced ecosystem resilience, habitat connectivity and creation and contribute to the sustainable management of natural habitats and ecosystems.	<ul style="list-style-type: none"> • Will it protect, restore and enhance non-designated sites and local biodiversity? • Will it alter geomorphological forms and processes which underpin physical habitat for aquatic ecosystems? • Will it provide opportunities for new terrestrial and aquatic habitat creation or restoration and/or link existing habitats as part of the development process? • Will it protect, and enhance where appropriate, coastal and marine habitats and species? • Will it maintain and enhance the green infrastructure network and the biodiversity it supports? • Will it maintain and enhance ecosystem resilience? • Will it contribute to the sustainable management of natural habitats and ecosystems, i.e., within their limits and capacities taking into account climate change adaptability • Will it promote climate change resilience of both designated and non-designated sites?
Soils, Land Use and Geology	2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the appropriate and efficient use of land.	<ul style="list-style-type: none"> • Will additional land be required for the development or implementation of the intervention or will it require below ground works leading to land sterilisation? • Will it avoid damage to, protect and enhance where possible protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest? • Will it minimise the loss of best and most versatile agricultural land? • Will it avoid adverse effects on other land uses? • Will it minimise land contamination? • Will it ensure efficient use of land (e.g., make use of previously developed land)?
Water – Quantity and Quality	3. To protect and enhance the quality and quantity of surface and groundwater resources.	<p><u>Quantity</u></p> <ul style="list-style-type: none"> • Will it minimise the customer demand for water resources? • Will it result in changes to river flows, channel morphologies, wetted width or river levels? • Will it support the achievement of relevant environmental objectives set out in River Basin Management Plans? • Will it alter the sediment transport regime of the surface waters? <p><u>Quality</u></p> <ul style="list-style-type: none"> • Will it prevent pollution and protect and improve surface, groundwater, estuarine and coastal water quality? • Will it prevent the deterioration of Water Framework Directive (WFD) waterbody status (or potential)? • Will it support the achievement of WFD protected area objectives? • Will it ensure a new activity or new physical modification does not prevent the future achievement of good status for a water body? • Will it support the achievement of relevant environmental objectives set out in River Basin Management Plans? • Will the option prevent nutrient loading in water bodies?
Water – Flood Risk	4. To reduce or manage flood risk.	<ul style="list-style-type: none"> • Will it be at risk of flooding now or in the future? • Will it have the potential to help alleviate or mitigate flooding in the catchment area including to people and property now or in the future? E.g., will it avoid reducing flood plain storage, or provide opportunities to improve flood risk management? • Will it promote the use of sustainable drainage systems? • Will it promote opportunities for collaborative working with other risk management authorities?
Air	5. To minimise emissions of pollutant gases and particulates and enhance air quality.	<ul style="list-style-type: none"> • Will it reduce or minimise pollutant emissions to air? • Will it maintain or enhance ambient air quality, keeping pollution below Local Air Quality Management thresholds (e.g., in Air Quality Management Areas or sensitive habitats)?
Climatic Factors	6. To reduce greenhouse gas emissions.	<ul style="list-style-type: none"> • Will it reduce or minimise greenhouse gas emissions? • Will it have a low level of embodied carbon? • Will it provide new infrastructure that is energy efficient and/or minimises the use of energy?

Topic	Objective	Guide Questions
	7. To adapt and improve resilience to the threats of climate change.	<ul style="list-style-type: none"> Will it provide new infrastructure that could contribute or make use of renewable energy sources? Will the option affect carbon sequestration? Will it improve resilience and/or adaptability to the likely effects of climate change, e.g., by increasing resilience of water supplies or catchments? Will it increase environmental resilience to the effects of climate change including to impacts on flood risk and water quality?
Population	8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.	<ul style="list-style-type: none"> Will it ensure that sufficient wastewater treatment capacity is in place to support predicted increases in population (including any seasonal changes)? Will it help to meet the employment needs of local people? Will it contribute to sustaining and growing the local and regional economy? Will it avoid disruption through effects on the transport network? Will it avoid negative effects on built assets/ existing infrastructure including transport?
Human Health	9. To protect and enhance human health and well-being.	<ul style="list-style-type: none"> Will it maintain surface water and bathing water quality within statutory standards? Will it help to promote healthy communities and avoid risks to health and wellbeing (for example, due to noise resulting from construction traffic or disruption to safe and reliable water/sewerage services)? Will it improve opportunities for social interaction and community cohesion? Will it protect and enhance public access to, and enjoyment of, green and blue infrastructure, open space/recreational facilities and the natural and historic environment, and in doing so help promote healthy lifestyles including mental well-being?
Material Assets - Water Resources	10. To promote and enhance the sustainable and efficient use of resilient water resources.	<ul style="list-style-type: none"> Will it improve efficiency in water consumption? Will it increase the resilience of water resources, now and into the future? Will it contribute towards improving the awareness of water sustainability?
Material Assets – Waste and Resource Use	11. To minimise waste, promote resource efficiency and move towards a circular economy.	<ul style="list-style-type: none"> Will it make use of existing infrastructure? Will it promote the re-use and recycling of waste materials and reduce the proportion of waste sent to landfill? Will it help to encourage sustainable design or use of sustainable materials (e.g., supplied from local resources)?
Cultural Heritage	12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.	<ul style="list-style-type: none"> Will it avoid damage to, conserve or enhance the historic environment, including heritage assets and their settings such as historic buildings, conservation areas, features, places and spaces, that enhance local distinctiveness? Will it avoid or minimise damage to archaeologically important sites? Will it avoid damage to important wetland areas with potential for paleoenvironmental deposits? Will it improve access, value, understanding or enjoyment of heritage assets and culturally/historically important assets in the region?
Landscape	13. To conserve, protect and enhance landscape and townscape character and visual amenity.	<ul style="list-style-type: none"> Will it avoid adverse effects to, and enhance where possible, protected/designated landscapes and the settings of designated landscapes (including woodlands) such as National Parks or AONBs? 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? Will it protect and enhance landscape character, townscape, seascape and green infrastructure? Will it minimise adverse visual impacts?

4.4 Assessment Methodology

4.4.1 The effects of the draft DWMP have been assessed in a staged process, complementary to the development of the plans, and reflecting the decision-making requirements, as follows:

- **High-level interventions** categorised by management areas, to address planning objective per drainage area have been considered with environmental constraints identified, assessed and implications for mitigation identified, drawing where appropriate from other assessments (such as the WRMP24 where interventions are common between plans, e.g., behavioural change). This was a GIS driven process used to inform initial optioneering.
- **Generic interventions** covering 34 option types, ranging from 'domestic and business customer education' to 'increased treatment capacity of wastewater treatment works'.
- **Preferred programme of interventions** per identified drainage area, combining generic and location specific options with a particular focus on the complex and strategic locations. This has ensured that the effects of the draft Plan have been identified, described and evaluated.
- **Alternative Plan assessments:** where alternative plans or plan pathways are identified for the draft DWMPs, the cumulative effects will be identified, described and evaluated for consideration along with the preferred plan. The approach to these is described in more detail below.

High-level interventions

4.4.2 The environmental constraints of high-level interventions have been identified through a GIS led process for the following range of environmental topics, where data is available for each catchment. These will include inter alia:

- Biodiversity, flora and fauna:
 - ▶ Ramsar sites, SACs, SPAs, candidate SAC (cSAC) and potential SPAs (pSPAs, Priority Habitats, SSSIs, National Nature Reserves, Ancient Woodlands, Local Nature Reserves.
- Soils, Land Use and Geology:
 - ▶ Agricultural Land Classifications Grades 1, 2 and 3a, geological SSSIs.
- Air:
 - ▶ AQMAs.
- Cultural Heritage:
 - ▶ World Heritage Sites, Scheduled Monuments, Listed Buildings, Historic Battlefields.
- Landscape:
 - ▶ National Parks, AONBs and registered parks and gardens.

4.4.3 Where the relevant constraint could have a material effect on the generic intervention, proposed mitigation measures will be considered. Such considerations will be then reflected in high-level costings for the interventions. The outputs of this process will be used within the optioneering work undertaken to inform the selection of the preferred 'blends' of interventions.

Assessment of Generic Interventions

- 4.4.4 The generic interventions have been assessed to provide an indication of the effects arising from the broad option types proposed. These have been completed of generic interventions for 34 option types, ranging from ‘domestic and business customer education’ to ‘increased treatment capacity of wastewater treatment works’. For those interventions that would not require construction works *per se* and may be ongoing in nature (for example, the installation of water efficient devices, audits and educational programmes), construction in the context of the SEA refers to any enabling/installation works or option implementation.
- 4.4.5 The assessment identifies the neutral, minor, moderate and significant positive and negative effects for **construction** and operational of each option against the 13 assessment objectives. The assessments then demonstrate:
 - that the alternative options have been considered and assessed;
 - that the assessments provide a core assessment that would then need to be updated for location and scheme specific information for those options screened in for further assessment.
- 4.4.6 A matrix similar to the example layout shown in **Table 4.3** has been used to capture the assessment of each feasible option in a consistent manner (see **Appendix E** for the presentation of detailed assessments); a key to the meaning of the symbols used in the assessment matrices is presented in **Table 4.4**.

Table 4.3 Example Prioritised Catchment Options Assessment Matrix

Option Assessment Information														
Option ID														
Option Name		Sustainable												
Option Description		Removal of impermeable Area through the installation of SuDS technology.												
Option	Stage	1. Biodiversity	2. Soils, Sustainability and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction [negative]	-I?	-I?	0	-I?	-I?	-I?	-I?	0	-I?	0	-I?	0	-I?
	Construction [positive]	+I?	+I?	0	0	0	0	+I?	0	0	+I?	0	0	
	Operation [negative]	0	0	0	0	0	0	0	0	0	0	0	0	-I?
	Operation [positive]	+I?	0	+I?	+I?	0	0	+I?	+I?	+I?	+I?	0	0	+I?

Construction														
1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional wetland habitats through the use of SuDS technology (e.g. wetlands, rain gardens, swales). More generally construction of the scheme could affect non-designated habitats and species through direct landtake (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.														
2. Soils: The construction of the option may require greenfield land take for the development of SuDS technology (e.g. swales, wetlands, attenuation ponds, rain gardens, soakways, bioretention, tree pits, filter drains), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land, or would involve SuDS technology being installed on existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.) this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to a designated geological sites (SSSI, RIGS), such sites will be unaffected by construction.														
3. Water Quality: The option is assumed that it would not be situated within a Source Protection Zone and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.														
4. Flood Risk: If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.														
5. Air Quality: If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however may have a minor negative effect on this objective.														
6. Greenhouse Gas Emissions: The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, for the majority of options, it is not anticipated that there would be any significant effect against this objective due to the scale of works.														
7. Climate Change Resilience: If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding then the effect would be neutral.														
8. Economic and Social Wellbeing: The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.														
9. Health: Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.														
10. Water resources: It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.														
11. Waste and resources: The construction of the option would use materials such as concrete and steel however, the quantities of such materials required are not expected to lead to a significant effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.														
12. Historic environment: The development site is not in close proximity to any heritage assets and therefore is not anticipated to have any effects on the historic environment.														
13. Landscape: The development site is not within or in close proximity to any landscape designations but construction may have short term, temporary negative effects on local landscape/townscape character and visual amenity.														



Table 4.4 Qualitative Scoring System

Score	Description	Symbol
Major/Significant Positive Effect	Significant positive effect of the option on this objective	+++
Moderate Positive Effect	Moderate positive effect of the option on this objective	++
Minor Positive Effect	Minor positive effect of the option on this objective	+
Neutral	Neutral effect of the option on this objective	0
Minor Negative Effect	Negative effect of the option on this objective	-
Moderate Negative Effect	Moderate effect of the option on this objective	--
Major/Significant Negative Effect	Significant negative effect of the option on this objective	---
Uncertain	The option has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?

4.4.7

Preferred programme of interventions

- 4.4.8 The detailed modelling and optioneering works has identified the preferred 'blends' (or programme) of interventions for each TPU drainage area. These will provide the best value solutions to address the identified risks and contribute towards meeting the relevant planning objectives.
- 4.4.9 The selected options that make up the preferred 'blends' have been screened to identify those options, where due to scale or location are considered likely to have significant effects. This has been informed by the findings from the generic assessments which indicated that for some option types the potential for significant negative effects was far less likely than for others.
- 4.4.10 The construction and operational effects of those screened options of each preferred programme of interventions has been assessed against all of the SEA objectives that comprise the assessment framework. This approach ensures a comprehensive consideration of any likely effects. It also recognises that the environmental effects are likely to be different in their nature, scale and significance during construction as opposed to their operation. This will take account of updated information such as scheme design, incorporated mitigation measures, stakeholder and regulator views.
- 4.4.11 The assessment of effects will include consideration of the following:
- the nature of the potential effect (what is expected to happen);
 - the timing and duration of the potential effect (e.g., short, medium or long term);
 - the geographic scale of the potential effect (e.g., local, regional, national);
 - the location of the potential effect (e.g., whether it affects rural or urban communities, or those in particular parts of a water company area); and
 - the potential effect on vulnerable communities or sensitive sites.

- 4.4.12 Any further mitigation measures with the potential to avoid, minimise, reduce, mitigate or compensate for the identified effect(s) with evidence (where available) will be included in supporting commentary.

Assessment of Plan Alternatives

- 4.4.13 SEA Regulation 12(2) requires the identification, description and evaluation of *"the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme"*. The EC guidance²¹ on the SEA Directive discusses possible interpretations of handling 'reasonable alternatives'. It states that *"The alternatives chosen should be realistic. Part of the reason for studying alternatives is to find ways of reducing or avoiding the significant adverse effects of the proposed plan or programme. Part of the reason for studying alternatives is to find ways of reducing or avoiding the significant adverse effects of the proposed plan or programme"*. Echoing this, Government guidance²² of the SEA states *"Only reasonable, realistic and relevant alternatives need to be put forward. It is helpful if they are sufficiently distinct to enable meaningful comparisons to be made of the environmental implications of each"*. It is an area of plan making that has received considerable scrutiny and challenge.
- 4.4.14 For the purposes of this SEA, any other proposed programmes of interventions for each drainage area will be considered as reasonable alternatives to the preferred programme.
- 4.4.15 In addition, reasonable alternatives that operate at the plan level will also be considered, if identified.

Assessment of Secondary, Cumulative and Synergistic Effects

- 4.4.16 The SEA Regulations require that the cumulative effects of the draft DWMPs are assessed. In addition to the assessments of the preferred programme of option, this would also include the cumulative effects of the draft DWMP in-combination with other plans and programmes.

Definitions and Thresholds of Significance

- 4.4.17 Specific guidance has been developed for what constitutes a significant (major) effect, a moderate effect, a minor effect or a neutral effect for each of the SEA objectives. These 'definitions and thresholds of significance' help to ensure a consistent approach to interpreting the significance of effects and helps the reader understand the decisions made by the assessor.

4.5 Contribution to Wales' Well-being Goals and the Objective for the Sustainable Management of Natural Resources

- 4.5.1 Following completion of the assessment of likely significant effects, and if effects have been identified on Wales, a high-level analysis of the impact that the draft DWMP will have on the achievement of the seven well-being goals for Wales and the objective for SMNR, will be undertaken.

²¹ EC (2003) *Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment*.

²² Office of the Deputy Prime Minister et al (2005) *A Practical Guide to the Strategic Environmental Assessment Directive*. Available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf [Accessed June 2019]

4.6 Difficulties Encountered in Undertaking the Assessment

4.6.1

The SEA Regulation requires the identification of any difficulties (such as technical deficiencies or lack of knowledge) encountered during the assessment process. The difficulties encountered in undertaking the SEA of the draft DWMP are summarised below:

- In undertaking this assessment, a balance was needed between the information provided as an overview of the whole area and the detail of a specific location. For example, the baseline section of this report considers strategic information; however, in order to assess some of the potential effects, it was necessary to be aware of the local characteristics. Throughout the whole process, it was necessary to balance the need for enough information to undertake a robust assessment, while retaining its strategic focus.
- For the generic option assessments, information on option scale, location and design is absent and in consequence there are numerous uncertainties associated with the assessment as key factors in determining the magnitude and significant of an effect are missing, although the type, nature and breadth of effects can be identified, described and evaluated. Where such uncertainties are present, they have been noted.
- For the TPU options that have been assessed, only limited quantitative information is currently available. For example, whilst the location of the wastewater treatment works has been identified, any increase in treatment capacity, infrastructure requirements and engineering design has not been available. Where information has been provided, for example, capex, this has then been used as the proxy for construction scale, activity and resultant benefit. In this respect, the estimates of resource use and energy consumption used in this assessment can only be considered indicative.
- For some measures, there remains uncertainty with regard to the timing/duration of the option's implementation and the scale/magnitude of effects on species.
- The assessment of effects is based on outline descriptions provided for the broad type of intervention options proposed, with assumptions made regarding the type of infrastructure, equipment or activities that may be anticipated, consistent with the level of detail available at this stage.
- It is assumed that there is sufficient wastewater treatment works capacity to ensure that flows passed to a wastewater treatment works by an option will be treated in accordance with the various operational permits and consents required either currently or in the future (since the option would otherwise be non-compliant) and that water is not simply displaced to another point lower in the system creating spills elsewhere. For this first plan cycle, there is a residual uncertainty around this which will be addressed during subsequent investigations under cycle 2 of the DWMP.
- It is assumed that any increase in wastewater treatment works discharges would be consented (either as within the headroom on an existing consent, or that if an increase, that the Environment Agency would accept the changes in consent conditions) since the option would otherwise be non-compliant and that the effects (in terms of water bodies and designated sites) taking into account the DWMP objectives (of compliance) would lead to 'no effect' conclusions with regard to water bodies and water dependent designated conservation sites.
- Whilst the assessment of the cumulative effects of the implementation of the draft DWMP and other plans and programmes has been based on the most up to date information available at the time of writing, in many cases there is a lack of detailed information at this stage to make robust conclusions. This is a typical issue encountered during the assessment of strategic plans.

5. Assessment of the DWMP

5.1 Introduction

- 5.1.1 This section describes the findings of the assessment of the draft DWMP. In particular, it presents:
- **Section 5.2: Assessment of generic interventions** which provides an outline assessment of the effects arising from the generic option types proposed for each management area.
 - **Section 5.3: Assessment of preferred option blends** based on screening the TPU preferred options and for those where significant effects have considered likely, the completion of their assessment. This includes the legal obligation interventions to increase treatment capacity, and other options associated with a significant carbon emissions or capital expenditure.
 - **Section 5.4: Secondary, cumulative and synergistic effects** identifying, describing and evaluating the cumulative effects assessment of the preferred programme of options.
 - **Section 5.5: Contribution of the draft DWMP to Wales' Well-being Goals and the Objective for SMNR** that considers the relevance of potential effects of the draft DWMP on communities and locations in Wales.
 - **Section 5.6: Mitigation and enhancement** identifying future opportunities to reduce some of the potential negative effects identified in the assessment process, or to enhance positive effects.

5.2 Assessment of Generic Interventions

- 5.2.1 A total of 34 generic option types are proposed in the draft DWMP to address the risks identified for drainage and wastewater management. These are categorised according to one of the following six key management areas:
- Combined and Foul Sewer Systems (9 options);
 - Customer Side Management (7 options);
 - Indirect Measures (3 options);
 - Sludge (4 options);
 - Surface Water Management (3 options);
 - Wastewater Treatment (8 options).
- 5.2.2 Assessments of each of the generic option types has been undertaken and the findings are summarised in the following sections for each management area, with commentary on the likely effects of each option type. Detailed versions of the generic assessments of each option type are contained at **Appendix E**. The assessments reflect the generic nature of the broad option types, which in the absence of detailed scheme information, include many uncertainties associated with the where a potential effects identified, owing to the fact that for the generic options the scale and location of the option, proximity to sensitive receptors and sensitivity of potential receptors cannot be not specified. Where the assessment identifies effects common to more than one option or management area, reference may be made to earlier commentary relevant to the issue.

5.2.3 A key to the meaning of the symbols used in the assessment matrices for generic interventions is presented in **Table 5.1**.

Table 5.1 Qualitative Scoring System

Score	Description	Symbol
Major/Significant Positive Effect	Significant positive effect of the option on this objective	+++
Moderate Positive Effect	Moderate positive effect of the option on this objective	++
Minor Positive Effect	Minor positive effect of the option on this objective	+
Neutral	Neutral effect of the option on this objective	0
Minor Negative Effect	Negative effect of the option on this objective	-
Moderate Negative Effect	Moderate effect of the option on this objective	--
Major/Significant Negative Effect	Significant negative effect of the option on this objective	---
Uncertain	The option has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?

Combined and Foul Sewer Systems Options

5.2.4 The options assessed for the combined and foul sewer systems management area are outlined in **Table 5.2**.

Table 5.2 DWMP Combined and Foul Sewer Systems Options

Management Area	Option Ref	DWMP Generic Option	Description
Combined and Foul Sewer Systems	N1	Intelligent network operation	Controlling flow movement in reaction to the current situation. Allows the system to be operated proactively, maximising the use of existing assets. These options cover a range of different approaches e.g. modifying the start-stop levels at strategic pumping stations, creation of new network control points which allow for flow to be temporarily held back in the catchment.
	N2	Increase the capacity of existing foul / combined networks	Replace sewer with a large diameter sewer to increase capacity.
	N4	Intelligent asset maintenance	Allows the system to be maintained proactively, maximising the use and longevity of existing assets (for example by repairing minor sewer damage before a collapse occurs).
	N5	Sewer rehab	Sewer rehabilitation to improve asset health.
	N6	Property Level Resilience (PLR)	Create additional volume to reduce storm impact (attenuation) or treatment of storm discharges Non return valves, pumps, flood gates etc.

Management Area	Option Ref	DWMP Generic Option	Description
	N7	Enhanced operational maintenance	Pro-active and targeting operation and maintenance programmes
	N8	Attenuation	Creation of additional volume to reduce storm impact.
	N9	Sewer maintenance	Repair and rehabilitation to maintain service
	N10	Cross boundary transfer	The movement of flow to another area, or company.

5.2.5 Generic assessments of each of these options were undertaken and are summarised in **Table 5.3**, with commentary on the likely effects of each option provided below. Detailed versions of the generic assessments of each option are contained at **Appendix E**.

Table 5.3 Generic Assessment of the Combined and Foul Sewer Systems Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
N1	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N2	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N4	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N5	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
N6	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N7	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	-/?	-/?	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N8	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N9	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
N10	Construction (negative)	--/?	-/?	0	-/?	--/?	--/?	-/?	-/?	-/?	0	-/?	--/?	--/?
	Construction (positive)	0	0	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction effects

- 5.2.6 Each of the Combined and Foul Sewer Systems options has the potential to involve construction activities, ranging from the installation of new monitoring or control equipment to the repair, maintenance or replacement of sewer system infrastructure.
- 5.2.7 For all of the options, with the exception of SEA Objective 3 (Water Quality) and SEA Objective 10 (Water Resources), potential negative effects have been determined for each SEA Objective during the construction phase. In the case of three options: **N1** (Intelligent network operation), **N8** (Attenuation) and **N10** (Cross boundary transfer), this includes negative effects for SEA Objective 2

(Soils, Geodiversity and Land Use) due the potential for land-take for installation of new equipment or infrastructure, which is not considered to be a significant effect for the other Combined and Foul Sewer Systems options. Apart from option **N10** (Cross boundary transfer), the potential negative effects on the SEA Objectives are assessed to be of minor significance. Due to the potential geographic extent and scale of construction activities for option **N10** (Cross boundary transfer), the potential negative effects are considered to be of moderate significance for SEA Objectives 1 (Biodiversity), 5 (Air Quality), 6 (Greenhouse Gas Emissions), 12 (Historic Environment) and 13 (Landscape).

- 5.2.8 For all of the options the potential for positive effects have been identified for SEA Objective 8 (Economic and Social Wellbeing) and 11 (Waste and Materials) during the construction stage. Positive effects are generally considered to be of minor significance for each SEA Objective, however, for option **N10** (Cross boundary transfer), due to the potential scale of capital expenditure the potential for positive effects on Objective 8 are considered to be of moderate significance.
- 5.2.9 Where negative effects have been identified for SEA Objective 1 (Biodiversity) construction activity has the potential to affect designated or non-designated biodiversity sites and species., either through direct land take (if situated on greenfield land) or disturbance (e.g. noise, vibration, dust, air pollution). Similarly, for SEA Objective 2 (Soils, Geodiversity and Land Use), where negative effects have been identified this is associated with a possible requirement for greenfield land take, particularly if situated on best and most versatile agricultural land (ALC Grades 1-3).
- 5.2.10 With respect to SEA Objectives 4 (Flood Risk) and 7 (Climate Change Resilience) there is potential for negative effects if construction is situated in an area at high risk of flooding.
- 5.2.11 In the case of SEA Objectives 5 (Air Quality) and 6 (Greenhouse Gas Emissions) negative effects during the construction stage are associated with emissions from vehicle movements (for example, to transport materials to a site) and the use of plant/machinery for construction activities; there may also be a requirement for use of materials with embodied carbon, with further negative effects on SEA Objective 6. The use of material resources and the associated generation of construction waste, is considered to have potential negative effects on SEA Objective 11 (Waste and Materials); however, there is also potential for a positive effect on Objective 11, as waste materials could potentially be recycled or reused.
- 5.2.12 For SEA Objective 8 (Economic and Social Wellbeing), capital expenditure for construction may have a positive effect, although there may also be negative effects for Objective 8, and SEA Objective 9 (Human Health), due to the potential for emissions, noise and disturbance from construction activities, particularly where they are situated in close proximity to residential and recreational receptors, or if there is requirement for works affecting transport routes.
- 5.2.13 For SEA Objective 12 (Historic Environment) there is the potential for negative effects if construction activities are situated on or adjacent to heritage assets. Also, for SEA Objective 13 (Landscape), there is potential for negative effects if construction is situated within or within close proximity to designated landscapes, and/or could have negative effects on local landscape/townscape character and visual amenity.
- 5.2.14 There are not expected to be any effects from the Combined and Foul Sewer Systems options on SEA Objectives 3 (Water Quality) or 10 (Water Resources), assuming construction best practice and mitigation is implemented.

Operation effects

- 5.2.15 Operational activities for the Combined and Foul Sewer Systems options are generally assumed to be carried out within the sewer network (i.e. sewer pipes, control points, pumping stations and storage tanks), with effects arising from optimisation of capacity within the sewer network.

- 5.2.16 For the majority of the options a potential negative effect has been identified for SEA Objective 6 (Greenhouse Gas Emissions); the exceptions are options **N5** (Sewer rehab) and **N9** (Sewer maintenance), which are not considered to require additional energy use (and associated carbon emissions) during the operation stage, and for which no negative effects have been identified. Two of the options: **N8** (Attenuation) and **N10** (Cross boundary transfer), are considered to have the potential to introduce new above ground infrastructure, with a possible negative effect identified for SEA Objective 13 (Landscape). For one of the options: **N7** (Enhanced operational maintenance), negative effects are additionally identified for SEA Objectives 8 (Economic and Social Wellbeing) and 9 (Human Health), associated with the potential for disturbance from active survey and monitoring operations. All of the potential negative effects during the operation stage are considered to be of minor significance due to the limited scale of the impacts.
- 5.2.17 In each case, the operation of the Combined and Foul Sewer Systems options has been assessed as potentially having a minor positive effect on SEA Objectives 1 (Biodiversity), 3 (Water Quality), 4 (Flood Risk), 7 (Climate Change Resilience), 8 (Economic and Social Wellbeing), 9 (Human Health) and 10 (Water Resources).
- 5.2.18 For SEA Objective 1 (Biodiversity) operational activities for the options have been assessed as potentially having a positive effect on water dependent designated conservation sites (if present) and biodiversity, which is based on a positive effect determined for SEA Objective 3 (Water Quality), associated with the potential for improvement on the quality of receiving water during operation.
- 5.2.19 Both of the SEA Objectives 4 (Flood Risk) and 7 (Climate Change Resilience) are considered to experience potential positive effects. This is associated with operational activities leading to optimisation of network capacity and a reduction in the frequency and severity of flooding that could affect communities, so increasing resilience to the effects of climate change.
- 5.2.20 In the case of SEA Objective 6 (Greenhouse Gas Emissions), a negative effect has been identified for options where there may potentially be a requirement for additional energy use for increased frequency of pump operations and control equipment, and associated carbon emissions.
- 5.2.21 With respect to SEA Objective 8 (Economic and Social Wellbeing) and 9 (Human Health), improved operation of the network would help to reduce the frequency of flooding and may help to ensure that surface water and bathing water quality is maintained, which would be a potential positive effect for both objectives.
- 5.2.22 For SEA Objective 10 (Water Resources) optimisation of network capacity may result in a positive effect on network infiltration and subsequently reducing the frequency and severity of flooding.
- 5.2.23 Where negative effects are identified on SEA Objective 13 (Landscape) for options **N8** and **N10**, this is associated with the possibility of introducing new above ground infrastructure (e.g. storage tanks or pumping stations), although there is uncertainty regarding the type and location of infrastructure that may be required.
- 5.2.24 The operation stage for the option is not expected to require additional land take, vehicle movements, or use of material resources and associated waste generation, so no effects (positive or negative) have been identified for SEA Objectives 2 (Soils, Geodiversity and Land Use), 5 (Air Quality), 11 (Waste and Materials) or 12 (Historic Environment).

Customer Side Management Options

- 5.2.25 The options assessed for the customer side management area are outlined in **Table 5.4**.

Table 5.4 DWMP Customer Side Management Options

Management Area	Option Ref	DWMP Generic Option	Description
Customer Side Management	CM1	Water efficient appliances	Supplying customers with household appliances which are designed to reduce water consumption. Reduced consumption can also benefit the wastewater system by reducing the dry weather flow to be conveyed through the sewer network and through the STWs
	CM2	Water efficiency measures	Water efficiency measures can be installed within buildings with the purpose of reducing water consumption. Reduced consumption can also benefit the wastewater system by reducing the dry weather flow to be conveyed through the sewer network and through the STWs
	CM3	Rainwater harvesting	Removing surface water from the system and making it available to re-use. By installing measures which collect and store the rainfall before it lands and is lost as runoff. Rainwater harvesting reduces the amount of flow that needs to be conveyed through the sewer network during a storm, thus reducing the likelihood of sewer flooding or spills to watercourse.
	CM4	Customer incentives	Financially rewarding customers who sign up to a range of programs which are designed to help customers make smart choices in managing and/or utilising water and wastewater services. This for example could include use of metering/smart metering along with different tariff designs.
	CM5	Domestic and business customer education	A roll out of an education programme to improve understanding of the importance of reduced flows and mis-use of the system, and the impact this has on the environment and sewerage system.
	CM6	Greywater treatment and reuse	Install systems to treat and re-use household water (foul) for flushing toilets and gardening use. Either at property level or larger scale to reduces both flow and load to the system. The treatment levels considered vary from treatment for potable use to pre-treatment for discharge into the combined or foul sewer network.
	CM7	Charging and bill incentives	Reduction on bills or adapting charging e.g. for surface water removal

5.2.26 Generic assessments of each of these options were undertaken and are summarised in **Table 5.5**, with commentary on the likely effects of each option provided below. Detailed versions of the generic assessments of each option are contained at **Appendix E**.

Table 5.5 Generic Assessment of the Effects of the Customer Side Management Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
		CM1	Construction (negative)	0	0	0	0	-/?	-/?	0	0	0	0	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	++/?	+/?	+/?	+/?	++/?	0	0	0
CM2	Construction (negative)	0	0	0	0	-/?	-/?	0	0	0	0	-/?	0	0
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	0	0	+/?	+/?	+/?	+/?	+/?	0	0	0
CM3	Construction (negative)	-/?	-/?	0	0	-/?	-/?	0	0	-/?	0	-/?	0	0
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0
CM4	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0
CM5	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0
CM6	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	-/?	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0
CM7	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	0	0	+/?	+/?	+/?	0	+/?	0	0	0

Construction effects

- 5.2.27 Construction activities would be expected for implementation of the following proposed Customer Side Management options: **CM1** (Water efficient appliances), **CM2** (Water efficiency measures), **CM3** (Rainwater harvesting) and **CM6** (Greywater treatment and reuse), that would involve retrofitting or installation of new equipment, which may be internal and external to properties. The remaining options are focussed on influencing customer behaviour through incentives or education, so it is assumed that no construction would directly arise from the implementation of options **CM4** (Customer incentives), **CM5** (Domestic and business customer education) and **CM7** (Charging and bill incentives).
- 5.2.28 For each of the four Customer Side Management options with a construction element, potential negative effects are identified on SEA Objectives 5 (Air Quality), 6 (Greenhouse Gas Emissions) and 11 (Waste and Materials). Due to the likelihood for external installation indicated for options **CM3** and **CM6** there is also the possibility of negative effects on SEA Objectives 1 (Biodiversity), 2 (Soils, Geodiversity and Land Use) and 9 (Human Health). Additionally, for option **CM6**, given the possibility for more extensive construction, potential negative effects are identified for 4 (Flood Risk), 7 (Climate Change Resilience), 12 (Historic Environment) and 13 (Landscape). For each option the potential negative effect on SEA Objectives is assessed to be of minor significance.
- 5.2.29 Construction has been assessed as potentially having a minor positive effect for SEA Objective 8 (Economic and Social Wellbeing) and 11 (Waste and Materials) for each option with a construction element. For options **CM3** and **CM6** the construction activities are considered to have the potential for minor positive effects on 2 (Soils, Geodiversity and Land Use), and also 1 (Biodiversity) for option **CM3**.
- 5.2.30 The negative effects identified for SEA Objectives in the construction stage are in line with those described in the previous section for the Combined and Foul Sewer Systems options. For example, the installation of new equipment or infrastructure requiring the use of machinery, materials and transport, and depending on location, potential exposure to flood risk, works on greenfield land, or disturbance of biodiversity, humans and designated assets.
- 5.2.31 Similarly, positive effects during the construction stage cover the same SEA Objectives identified for the Combined and Foul Sewer Systems options, which relate to the potential for capital expenditure (for SEA Objective 8: Economic and Social Wellbeing) and waste reduction (for SEA Objective 11: Waste and Materials). However, for the Customer Side Management options, positive effects are also identified for objectives 1 (Biodiversity) and 2 (Soils, Geodiversity and Land Use), which is associated with the possibility for habitat enhancement and improvement of previously developed land or existing properties.

Operation effects

- 5.2.32 Customer Side Management options primarily relate to a reduction in water entering the drainage and wastewater network, with subsequent effects anticipated from changes to operation of the sewer network and treatment facilities.
- 5.2.33 Potential negative effects are identified for three of the options **CM1** (Water efficient appliances), **CM2** (Water efficiency measures) and **CM6** (Greywater treatment and reuse). For options **CM1** and **CM2** minor negative effects relate to the possibility of additional energy use and associated carbon emissions required to operate newly installed appliances or equipment in customer properties, impacting SEA Objective 6 (Greenhouse Gas Emissions). For option **CM6** minor negative effects are identified for objectives 11 (Waste and Materials) and 13 (Landscape), associated with the anticipated use of resources (e.g. raw materials/chemicals) for the treatment of greywater, and the possibility that the option would introduce new above ground infrastructure, with subsequent visual impacts. No negative effects are identified for the other four options: **CM3** (Rainwater

harvesting), **CM4** (Customer incentives), **CM5** (Domestic and business customer education) and **CM7** (Charging and bill incentives).

- 5.2.34 For all of the Customer Side Management options potential positive effects have been identified on SEA Objectives 1 (Biodiversity), 3 (Water Quality), 7 (Climate Change Resilience), 8 (Economic and Social Wellbeing), and 10 (Water Resources). For the majority of the options the potential for positive effects during operation are also determined for objectives 4 (Flood Risk), 6 (Greenhouse Gas Emissions) and 9 (Human Health); the exceptions are option **CM3** (Rainwater harvesting), which is considered to be neutral with respect to carbon emissions, and option **CM7** (Charging and bill incentives), which is assessed to be neutral in terms of effects on flood risk and human health.
- 5.2.35 The type of positive effects during operation are in keeping with the benefits identified for SEA Objectives for the Combined and Foul Sewer Systems options, albeit that improvements are brought about indirectly through a reduction in demand for water resources and the quantity of wastewater that needs to be managed. Positive effects are generally considered to be of minor significance. However, in the case of option **CM1** (Water efficient appliances), the effects for objectives 6 (Greenhouse Gas Emissions) and 10 (Water Resources), are determined to be of moderate significance, which takes into account the potential scale of energy savings (and related carbon emissions) associated with the treatment and pumping of water and wastewater, along with a reduction in demand for potable water and a reduction in wastewater generation.

Indirect Measures Options

- 5.2.36 The options assessed for the indirect measures management area are outlined in **Table 5.6**.

Table 5.6 DWMP Indirect Measures Options

Management Area	Option Ref	DWMP Generic Option	Description
Indirect measures	IM1	Influencing policy	Influencing national and local policy for example around growth and planning, surface water management etc.to provide benefit to the delivery drainage and wastewater services
	IM2	Investigate and monitor	Improve understanding of root cause and risk relating to issues identified through BRAVA prior to implementing solutions
	IM3	Future technology	Need to await or develop technology or approach

- 5.2.37 Generic assessments of each of these options were undertaken and are summarised in **Table 5.7**, with commentary on the likely effects of each option provided below. Detailed versions of the generic assessments of each option are contained at **Appendix E**.

Table 5.7 Generic Assessment of the Indirect Measures Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
IM1	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0
IM2	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0
IM3	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction effects

5.2.38 The options for Indirect Measures relate to investigative programmes and the development of policy and future technologies. It is assumed that no direct activities would arise from the implementation of the options during the construction stage, therefore, a neutral effect has been determined against the SEA Objectives for each of the three options.

Operation effects

5.2.39 For the operational stage, options for Indirect Measures options may result in policy changes and the introduction of new operating practices or technologies, that would influence the way water resources and wastewater systems are managed.

5.2.40 Given the indirect character and future dependency of the options there is inherent uncertainty regarding effects on the SEA Objectives. However, the assessment considers there is potential for minor positive effects on objectives 1 (Biodiversity), 3 (Water Quality), 4 (Flood Risk), 6 (Greenhouse Gas Emissions), 7 (Climate Change Resilience), 8 (Economic and Social Wellbeing), 9 (Human Health) and 10 (Water Resources). This is primarily attributed to the expectation that policy measures, investigations and future technologies would seek to enhance operation of the wastewater network and treatment facilities, with a subsequent reduction in detrimental effects,

such as incidents of flooding or pollution, and would contribute to more efficient use of water resources and wastewater systems.

5.2.41 No negative effects are identified for the options during the operational stage.

Sludge Options

5.2.42 The options assessed for the sludge management area are outlined in **Table 5.8**

Table 5.8 DWMP Sludge Options

Management Area	Option Ref	DWMP Generic Option	Description
Sludge	B1	Resource recovery	Utilising technology to recycle valuable resources within sludge
	B2	Sludge centre rationalisation	Close localised on-site sludge treatment and transfer for treatment at a central sludge centre.
	B3	Sludge centre decentralisation	Remove flows from a central treatment centre and create smaller localised treatment options
	B4	Increase treatment capacity	Increase the efficient use of the existing capacity with the existing assets, or invest on new assets to provide additional capacity within site footprint.

5.2.43 Generic assessments of each of these options were undertaken and are summarised in **Table 5.9**, with commentary on the likely effects of each option provided below. Detailed versions of the generic assessments of each option are contained at **Appendix E**.

Table 5.9 Generic Assessment of the Sludge Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
B1	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	0	-/?	0	0	0	-/?
	Operation (positive)	0	0	0	0	+/?	+/?	0	+/?	0	0	++/?	0	0
B2	Construction (negative)	-/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	0	0	+/?	0	0
B3	Construction (negative)	--/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	--/?	--/?

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	+/?	+/?	0	+/?	0	0	0	0	0
B4	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	+/?	0	+/?	0	0	+/?	0	+/?	+/?	0	+/?	0	0

Construction effects

- 5.2.44 Each of the proposed Sludge options are likely to involve construction activities, either from the development of new infrastructure and assets, or changes made to existing infrastructure.
- 5.2.45 For all the options, with the exception of SEA Objectives 3 (Water Quality), 8 (Economic and Social Well-being) and 10 (Water Resources), potential negative effects have been determined for each objective during the construction phase. For most of the options the effects are considered to be of minor significance. However, for both option **B2** (Sludge centre rationalisation) and **B3** (Sludge centre decentralisation), the potential for moderate negative effects have been identified for specific SEA Objectives, which is based on the possible scale of development required for sludge treatment facilities under these options. In the case of option **B2**, the moderate negative effects are identified for objectives 6 (Greenhouse Gas Emissions) and 11 (Waste and Materials). In the case of option **B3**, moderate negative effects are additionally identified for objectives 1 (Biodiversity), 12 (Cultural Heritage) and 13 (Landscape), where the potential for multiple locations and scale of construction activities may have significant effects on designated assets.
- 5.2.46 For each of the Sludge options the potential for positive effects during the construction stage have been identified for objectives 2 (Soils, Geodiversity and Land Use), 8 (Economic and Social Wellbeing) and 11 (Waste and Materials). The effects are generally considered to be of minor significance, although as mentioned previously, given the potential scale of development required for facilities under options B2 and B3, and the associated capital expenditure, the positive effects attributed to SEA Objective 8 (Economic and Social Wellbeing) are considered to be of moderate significance. Positive effects are also identified for SEA Objective 2 (Soils, Geodiversity and Land Use), where there is potential that development would be carried out on previously developed land.

Operation effects

- 5.2.47 Operational activities for the Sludge options are expected to involve various forms of sludge treatment, with requirements for operation of process equipment, material inputs and transport, along with opportunities for more efficient management and recovery of resources.

- 5.2.48 For each of the options potential negative effects have been identified for SEA Objectives 4 (Flood Risk), 5 (Air Quality), 6 (Greenhouse Gas Emissions), 7 (Climate Change Resilience), 9 (Human Health) and 13 (Landscape). Negative effects at the operational stage have been determined for objectives 4 (Flood Risk) and 7 (Climate Change Resilience) due to the possibility that sludge treatment or recovery facilities would be located in locations at risk of flooding, which may affect process operations. Negative effects are identified for objectives 5 (Air Quality) and 6 (Greenhouse Gas Emissions), as there may be a requirement for additional transport of sludge to treatment facilities and emissions from possible sludge incineration for options **B1** and **B4**. Similarly, disturbance from sludge transportation and possible sludge incineration are identified as negative effects with respect to SEA Objective 9 (Human Health). As for the earlier section on Combined and Foul Sewer Systems options, the potential for new above ground infrastructure for each of the Sludge options is identified as a negative effect for SEA Objective 13 (Landscape).
- 5.2.49 For the options that include sludge treatment operations (**B2**, **B3** and **B4**), potential negative effects are identified for SEA Objective 11 (Waste and Materials), as there may be a requirement for additional raw material/chemical inputs. For options **B3** and **B4** the assessment considers there is potential either for adverse effects on biodiversity due to operational noise from new assets, and in the case of option **B3**, the possibility that some decentralised sites would be located in proximity to designated biodiversity sites.
- 5.2.50 A variety of potential positive effects have been identified for the Sludge options during the operational stage, which reflect the nature of the options proposed. Common to each option are positive effects for SEA Objective 8 (Economic and Social Wellbeing), due to possible employment opportunities, and SEA Objective 6 (Greenhouse Gas Emissions), associated with more efficient operational practices (for options **B2**, **B3** and **B4**) and the potential for energy recovery for sludge treatment (for options **B1** and **B4**).
- 5.2.51 In the case of options **B1**, **B2**, and **B4**, the potential for positive effects are also identified for SEA Objective 11 (Waste and Materials), which is considered to be of moderate significance for option **B1** that seeks to recover valuable resources from sludge, and minor significance for options **B2** and **B4**, where centralisation and efficient use of existing assets could contribute to a reduction in resource use.
- 5.2.52 Although the assessment has identified some negative effects for the Sludge options in relation to SEA Objective 5 (Air Quality), the potential for positive effects are also identified for options **B1** and **B3**. These are associated with a reduction in odour resulting from sludge stabilisation and recovery (for option **B1**), and a possible reduction in transport emissions if new sludge treatment facilities are located on existing wastewater treatment works sites (for option **B3**).
- 5.2.53 Additional positive effects are identified for option **B4** during the operational stage on objectives 1 (Biodiversity), 3 (Water Quality) and 9 (Human Health), where increased treatment capacity is expected to improve water quality through a reduction in concentrations of nutrients being discharged into water courses, with benefits in line with those identified previously for the Combined and Foul Sewer Systems options,

Surface Water Management Options

- 5.2.54 The options assessed for the surface water management area are outlined in **Table 5.10**.

Table 5.10 DWMP Surface Water Management Options

Management Area	Option Ref	DWMP Generic Option	Description
Surface Water Management	SW1	Surface water source control measures	Managing surface water and maximising its potential for re-use. Opportunities for large-scale source control installation such as retrofitting in highways and around buildings, as well as aligning with ongoing programmes like local authority highway upgrades or major opportunity area developments.
	SW2	Surface water pathway interception measures	The need to provide safe conveyance (as opposed to storage) for floodwater during an extreme rainfall event (when the capacity of the sewer network is exceeded). Could, significantly mitigate the risk of considerable damage to public and private property and even loss of life that could result from an extreme rainfall event
	SW3	Attenuation	Regional level surface water management.

5.2.55 Generic assessments of each of these options were undertaken and are summarised in **Table 5.11**, with commentary on the likely effects of each option provided below. Detailed versions of the generic assessments of each option are contained at **Appendix E**.

Table 5.11 Generic Assessment of the Surface Water Management Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
SW1	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	+/?
SW2	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	-/?	-/?	0	-/?	0	-/?	0	-/?	0	0	0	0	-/?
	Operation (positive)	+/?	+/?	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	+/?
SW3	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	+/?



Construction effects

- 5.2.56 The proposed Surface Water Management options would require construction activities ranging from the installation of various forms of SuDS and blue/green infrastructure, to works for separating surface water and foul water networks.
- 5.2.57 Based on the type of construction activities anticipated for the Surface Water Management options the assessment of negative and positive effects are in keeping with those identified previously for the Combined and Foul Sewer Systems options. However, given the likelihood that development for SuDS, blue/green infrastructure and new pipework would take place on areas of greenfield land or in proximity to sensitive habitats, the potential for additional negative effects have been identified for objectives 1 (Biodiversity) and 2 (Soils, Geodiversity and Land Use). The installation of infrastructure for each option has also been identified as a potential positive effect for SEA Objective 2 (Soils, Geodiversity and Land Use), if construction is carried out on previously developed land.

Operation effects

- 5.2.58 The operational stage for the Surface Water Management options is assumed to require limited on site operational activity, although there may be some requirement for remote operation of control equipment, and operations may involve a change to existing land management practices.
- 5.2.59 For each of the options potential negative effects have been identified for SEA Objective 6 (Greenhouse Gas Emissions), based on the potential for increased energy use for equipment operation and associated carbon emissions, and objective 13 (Landscape), based on the potential requirement for new above ground infrastructure. Additionally, for option **SW2**, the potential for negative effects during the operational stage have been identified on SEA Objectives 1 (Biodiversity), 2 (Soils, Geodiversity and Land Use), 4 (Flood Risk) and 8 (Economic and Social Wellbeing). These negative effects are determined based on the potential for a change in land-use or agricultural practices for this option, which depending on location may adversely affect habitats, soil quality and structure, flood events and economic returns.
- 5.2.60 For each of the options, potential positive effects are identified for objectives 1 (Biodiversity), 3 (Water Quality), 4 (Flood Risk), 7 (Climate Change Resilience), 8 (Economic and Social Wellbeing), 9 (Human Health) and 10 (Water Resources), which are in line with the type of benefits identified for the Combined and Foul Sewer Systems options during the operation stage. For the Surface Water Management options, positive effects are also identified for SEA Objective 6 (Greenhouse Gas Emissions), associated with the diversion of surface water from the wastewater network and a subsequent reduction in energy use for pumping and treatment, and for SEA Objective 13 (Landscape), where SuDS and blue-green infrastructure may be considered to enhance the landscape, particularly if this is in an urban environment. For option **SW2** a potential positive effect has also be identified on SEA Objective 2 (Soils, Geodiversity and Land Use), where operational practices may provide benefits through improved land management or less intensive use.

Wastewater Treatment Options

- 5.2.61 The options assessed for the surface water management area are outlined in **Table 5.12**.

Table 5.12 DWMP Wastewater Treatment Options

Management Area	Option Ref	DWMP Generic Option	Description
Wastewater treatment	W1	Treat or pre-treat wastewater in the network	Chemical dosing prior to flow reaching the treatment works to relieve the load transferred to the STW or to remove contaminants.
	W2	Increase treatment capacity	Increase the efficient use of the existing capacity with the existing assets, or invest on new assets to provide additional capacity within site footprint.
	W3	Intelligent treatment works operation	Optimising the site to improve efficiency
	W4	Treatment works rationalisation	Close smaller treatment works and transfer flows to a larger one
	W5	Treatment works de-centralisation	Remove flows from a treatment works and create localised treatment works
	W6	Modification of consent / permits	Review the permit with the Environment Agency and agree new permit conditions.
	W7	Catchment management initiatives	These options are concerned with treating either diffuse or point-source non-domestic elements of wastewater before they enter the sewer system, or by treating and controlling the other contributors to the environment. This includes working with Environment Agency and other stakeholders on nutrient balancing and other integrated catchment solutions.
	W8	Effluent reuse	Recycle wastewater treatment works flow within the catchment

5.2.62 Generic assessments of each of these options were undertaken and are summarised in **Table 5.13**, with commentary on the likely effects of each option provided below. Detailed versions of the generic assessments of each option are contained at **Appendix E**.

Table 5.13 Generic Assessment of the Wastewater Treatment Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
W1	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	0	0	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	0	0	+/?	+/?	0	0	0	0
W2	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0



Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
	Operation (negative)	0	0	0	-/?	0	-/?	-/?	?	-/?	0	-/?	0	-/?
	Operation (positive)	+/?	0	0	0	0	+/?	0	+/?	+/?	0	0	0	0
W3	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	0
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	0	-/?	-/?	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0
W4	Construction (negative)	-/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	0	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	+/?	0	0
W5	Construction (negative)	--/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	--/?	--/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	0	-/?	-/?	0	0	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	0	0	0
W6	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	-/?	0	0
	Operation (positive)	+/?	0	+/?	0	0	0	0	+/?	+/?	0	0	0	0
W7	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	-/?	0	0	-/?	0	-/?
	Operation (positive)	+/?	0	+/?	0	0	0	0	+/?	+/?	0	0	0	0
W8	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction effects

- 5.2.63 With the exception of option **W6** (Modification of consent / permits) each of the Wastewater Treatment options would be likely to involve construction activities, associated with the development of new infrastructure, modifications to existing infrastructure, or installation of process and control equipment. Given that option **W6** relates to reviewing permits, it is assumed that no construction would directly arise from its implementation; therefore, a neutral effect has been determined for all of the SEA Objectives.
- 5.2.64 For the remaining Wastewater Treatment options potential negative effects are identified in each case for objectives 1 (Biodiversity), 4 (Flood Risk), 5) Air Quality, 6 (Greenhouse Gas Emissions), 7 (Climate Change Resilience), 9 (Human Health) and 11 (Waste and Materials). Negative effects on the relevant SEA Objectives are consistent with those identified for construction activities reported in the earlier DWMP option categories, such as the possibility of works in proximity to designated sites; adverse effects from noise, emissions and use of resources; or at locations at risk of flooding. With the exception of option **W3** (Intelligent treatment works operation), potential negative effects are also identified for objectives 2 (Soils, Geodiversity and Land Use), 12 (Cultural Heritage) and 13 (Landscape); in the case of option **W3** it is assumed that any construction activities would be minor in scale and contained within existing treatment facilities. The potential for negative effects are also identified for options **W7** (Catchment management initiatives) and **W8** (Effluent reuse) on objective 8 (Economic and Social Well-being), which is attributed to the possibility of disruption and delays if construction for these options involves works within the local road network.
- 5.2.65 Negative effects for the Wastewater Treatment options are generally considered to be of minor significance, however, for options **W4** (Treatment works rationalisation) and **W5** (Treatment works de-centralisation), due to the potential scale of development moderate negative effects are identified for both options with respect to objectives 6 (Greenhouse Gas Emissions) and 11 (Waste and Materials). In the case of option **W5**, moderate negative effects are also identified for objectives 1 (Biodiversity), 12 (Cultural Heritage) and 13 (Landscape), where the location and scale of construction activities could potentially have significant effects on designated assets.
- 5.2.66 For each of the options with construction elements potential positive effects are identified for objectives 8 (Economic and Social Wellbeing) and 11 (Waste and Materials), which are in line with the type of effects identified previously for these objectives in other DWMP option categories. Again, due to the possible scale of development for options **W4** and **W5**, and related capital expenditure, the positive effects are considered to be of moderate significance on SEA Objective 8 (Economic and Social Wellbeing). With the exception of option **W8** potential positive effects are also identified for SEA Objective 2 (Soils, Geodiversity and Land Use), where the options may include development of previously developed land or existing treatment sites.

Operation effects

- 5.2.67 During the operational stage the proposed Wastewater Treatment options are expected to involve various treatment processes and operational controls, which, as with the Sludge options, would require equipment operation, transport and use of material inputs, and opportunities for efficient management and resource recovery. Operation effects are identified for option **W6**, based on consents and permits driving a change in treatment operations.
- 5.2.68 For the majority of the options potential negative effects are identified for objectives 4 (Flood Risk), 6 (Greenhouse Gas Emissions), 7 (Climate Change Resilience), 11 (Waste and Materials) and 13 (Landscape), with comparable effects to those attributed to operational activities for earlier DWMP option categories. Where there are differences, these relate to options that do not include a locational aspect or have limited above ground presence (options **W3** and **W6**); have the potential

to enhance capacity within the wastewater network (option **W8**); or are not expected to generate additional waste or significant use of resources (options **W3** and **W8**).

- 5.2.69 Potential negative effects are identified for SEA Objective 1 (Biodiversity), where the location of new operations may disturb wildlife and sensitive habitats (options **W4** and **W5**). Similarly, negative effects are identified for SEA Objective 9 (Human Health), which is attributed to the possibility for disturbance from noise from increased or concentrated treatment operations (options **W2** and **W4**). In the case of option **W7**, additional negative effects from operations are identified on objectives 5 (Air Quality) and 8 (Economic and Social Wellbeing), due to possible requirements at a catchment level for increased transport and potential changes to land-use or agricultural practices.
- 5.2.70 For each of the Wastewater Treatment options positive effects are identified for SEA Objective 8 (Economic and Social Wellbeing), due to possible employment opportunities, and SEA Objective 9 (Human Health), due to anticipated improvements in the quality of effluent discharges and receiving watercourses. Other positive effects are identified linked to improved quality of watercourses (SEA Objective 3: Water Quality) and the potential for subsequent enhancement of wildlife habitats (SEA Objective 1: Biodiversity), resulting from operations attributed to options **W2**, **W3**, **W6**, **W7** and **W8**.
- 5.2.71 For options **W3** and **W8** positive effects are identified for objectives 4 (Flood Risk), 7 (Climate Change Resilience) and 10 (Water Resources), where it is considered that the options for treatment optimisation and effluent re-use may reduce the impacts of flooding and improve the availability of water resources. In the case of options **W2**, **W3**, **W4** and **W5**, positive effects are identified for objective 6 (Greenhouse Gas Emissions), which is associated with improved efficiency of operations and the potential for a reduction in energy use and carbon emission for these options. Efficient use of resources brought about by rationalisation of treatment operations under option **W4**, is also considered to have a positive effect on objective 11 (Waste and Materials).

5.3 Assessment of locational options

- 5.3.1 UUW has identified 403 options for the 26 strategic or complex Tactical Planning Unit (TPU) catchments. There a small number of TPUs which have not been assessed and will therefore be included between draft and final DWMP. For each of the 22 strategic and complex TPU catchments that have been assessed, a legal obligation to 'increase treatment capacity' option has been identified; each of these options have been screened in for assessment. An additional screening was undertaken for the remaining options using the option information available. Based on the scale of their estimated embodied and operational carbon emissions and CAPEX, in line with the SEA assessment thresholds for significance, an additional 11 options across 7 of the strategic or complex TPU catchments were screened in, all of which are surface water source control measure options, which have also been assessed. Each of these options include significant embodied carbon whilst three also include significant operational carbon.
- 5.3.2 **Table 5.14** identifies the 22 TPU catchments which are identified as strategic or complex and the number of options within each of the 22 TPU catchments that have been assessed to identify, describe and evaluate their likely significant environmental effects. There are a small number of TPUs which have not been assessed and will therefore be included between draft and final DWMP.

Table 5.14 Options Screened in for Assessment

TPU Catchment	Number of options screened in for assessment
Altrincham	Increase treatment capacity - 1
Blackburn	Increase treatment capacity - 1 Surface water source control measures -1
Bromborough	Increase treatment capacity - 1
Burscough	Increase treatment capacity - 1
Carlisle	Increase treatment capacity - 1
Carnforth	Increase treatment capacity - 1
Davyhulme	Increase treatment capacity - 1 Surface water source control measures -1
Ellesmere Port	Increase treatment capacity - 1
Fleetwood	Increase treatment capacity - 1 Surface water source control measures -1
Hillhouse	Increase treatment capacity - 1
Knutsford	Increase treatment capacity - 1
Lancaster	Increase treatment capacity - 1
Macclesfield	Increase treatment capacity - 1
Partington	Increase treatment capacity - 1
Penrith	Increase treatment capacity - 1 Surface water source control measures -1
Preston	Increase treatment capacity - 1 Surface water source control measures - 3
Sale	Increase treatment capacity - 1
Salford	Increase treatment capacity - 1
Stretford	Increase treatment capacity - 1
Whitehaven	Increase treatment capacity - 1 Surface water source control measures -2
Wigan	Increase treatment capacity - 1 Surface water source control measures -2
Workington	Increase treatment capacity - 1
Total	33

5.3.3 The effects of the options are identified in this section. Detailed assessments of each option summarised are contained at **Appendix E**

5.3.4 A key to the meaning of the symbols used in the assessment matrices for locational options is presented in **Table 5.15**.

Table 5.15 Qualitative Scoring System

Score	Description	Symbol
Major/Significant Positive Effect	Significant positive effect of the option on this objective	+++
Moderate Positive Effect	Moderate positive effect of the option on this objective	++
Minor Positive Effect	Minor positive effect of the option on this objective	+
Neutral	Neutral effect of the option on this objective	0
Minor Negative Effect	Negative effect of the option on this objective	-
Moderate Negative Effect	Moderate effect of the option on this objective	--
Major/Significant Negative Effect	Significant negative effect of the option on this objective	---
Uncertain	The option has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?

Altrincham

5.3.5 **Table 5.16** summarises the option that is proposed for Altrincham.

Table 5.16 Altrincham Option

Option Id	Option Type
ALTRI-ALTRI_001_Std-W2.n	Increase treatment capacity

5.3.6

5.3.7 **Table 5.17** summarises the effects arising from the option that is proposed for Altrincham.

Table 5.17 Assessment of the Effects of Altrincham Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
ALTRI-ALTRI_001_Std-W2.n	Construction (negative)	-	0	-	--	--	--	-	0	--	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction effects

5.3.8 No significant effects have been identified during the assessment of option ALTRI-ALTRI_001_Std-W2.n for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the proposed scheme.

Operational effects

5.3.9 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option ALTRI-ALTRI_001_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.

5.3.10 No other significant effects have been identified during the assessment of the Altrincham option for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the scheme.



Blackburn

5.3.11 **Table 5.18** summarises the options that are proposed for Blackburn.

Table 5.18 Blackburn Options

Option Id	Option Type
BLACK-BLACK_001_Std-W2.n	Increase treatment capacity
BLACK-Blackburn-1-SW1.3.2	Surface water source control measures

5.3.12 **Table 5.18** summarises the effects arising from the options that are proposed for Blackburn.

Table 5.19 Assessment of the Effects of Blackburn Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
BLACK-BLACK_001_Std-W2.n	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0
BLACK-Blackburn-1-SW1.3.2	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

5.3.13 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option BLACK-Blackburn-1-SW1.3.2, associated with the requirement for materials with significant quantities of embodied carbon.

5.3.14 No other significant effects have been identified during the assessment of the Blackburn options for construction. In the case of BLACK-BLACK_001_Std-W2.n, this is because the option would not require any construction activities to take place and as such all objectives are scored as neutral during construction. For option BLACK-Blackburn-1-SW1.3.2, however, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the scheme. For option BLACK-Blackburn-1-SW1.3.2 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.

Operational effects

- 5.3.15 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option BLACK-BLACK_001_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.
- 5.3.16 No other significant effects have been identified during the assessment of the Blackburn options for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the minor and moderate scales of the schemes. For option BLACK-Blackburn-1-SW1.3.2 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.

Bromborough

5.3.17 **Table 5.20** summarises the option that is proposed for Bromborough.

Table 5.20 Bromborough Option

Option Id	Option Type
BROMB-BROMB_001_Std-W2.n	Increase treatment capacity

5.3.18 **Table 5.21** summarises the effects arising from the option that is proposed for Bromborough.

Table 5.21 Assessment of the Effects of Bromborough Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
BROMB-BROMB_001_Std-W2.n	Construction (negative)	-	0	-	0	---	--	0	0	--	0	---	0	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	-	---	0	0	0	0	---	0	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0

Construction effects

5.3.19 A likely significant negative effect has been identified against SEA Objective 5 (Air Quality) for the assessment of option BROMB-BROMB_001_Std-W2.n, arising from the significant number of vehicle movements anticipated (for example, to transport materials to/from the proposed site) and the use of plant/machinery that would be required during construction, reflecting the scale of the scheme.

5.3.20 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) for the assessment of option BROMB-BROMB_001_Std-W2.n associated with the significant capital expenditure that the construction of the scheme would involve, and which would be expected to generate benefits in respect of the supply chain and local employment opportunities.

5.3.21 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option BROMB-BROMB_001_Std-W2.n associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.

5.3.22 No other significant effects have been identified during the assessment of the Bromborough option for construction. However, a range of minor positive and minor and moderate negative effects have been identified and assessed.



Operational effects

- 5.3.23 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option BROMB-BROMB_001_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.
- 5.3.24 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option BROMB-BROMB_001_Std-W2.n, reflecting the scale of the scheme and corresponding significant increase in the wastewater treatment capacity provided to the community.
- 5.3.25 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option BROMB-BROMB_001_Std-W2.n associated with the likely requirement for significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, reflecting the scale of the scheme.
- 5.3.26 No other significant effects have been identified during the assessment of the Bromborough option for operation. However, minor negative effects have been identified and assessed.

Burscough

5.3.27 **Table 5.22** summarises the option that is proposed for Burscough.

Table 5.22 Burscough Options

Option Id	Option Type
BURSC-BURSC_001_Std-W2.n	Increase treatment capacity

5.3.28 **Table 5.23** summarises the effects arising from the option that is proposed for Burscough.

Table 5.23 Assessment of the Effects of Burscough Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
BURSC-BURSC_001_Std-W2.n	Construction (negative)	-	0	-	0	--	--	0	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	-	--	0	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

5.3.29 No significant effects have been identified during the assessment of the Burscough option. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the moderate scale of the proposed scheme.

Carlisle

5.3.30 **Table 5.24** summarises the option that is proposed for Carlisle.

Table 5.24 Carlisle Options

Option Id	Option Type
CARLI-CARLI_001_Std-W2.n	Increase treatment capacity

5.3.31 **Table 5.25** summarises the effects arising from the option that is proposed for Carlisle.

Table 5.25 Assessment of the Effects of Carlisle Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
CARLI-CARLI_001_Std-W2.n	Construction (negative)	-	0	0	---	--	-	--	0	--	0	--	---	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	---	--	0	0	0	--	--	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction effects

- 5.3.32 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option CARLI-CARLI_001_Std-W2.n, as the wastewater treatment works site is located almost entirely within Flood Zone 3, and so could be subject to flooding during construction.
- 5.3.33 A likely significant negative effect has been identified against SEA Objective 12 (Historic Environment) during the assessment of option CARLI-CARLI_001_Std-W2.n, due to the scale of works and associated potential for works to affect the setting of a World Heritage Site and Scheduled Monument (which cross the wastewater treatment works site).
- 5.3.34 No other significant effects have been identified during the assessment of the Carlisle option for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the option.



Operational effects

- 5.3.35 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option CARLI-CARLI_001_Std-W2.n, as the wastewater treatment works site is located almost entirely within Flood Zone 3, and so could be subject to flooding during operation.
- 5.3.36 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option CARLI-CARLI_001_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.
- 5.3.37 No other significant effects have been identified during the assessment of the Carlisle option for operation. However, a range of minor and moderate negative and moderate positive effects have been identified and assessed, reflecting the moderate scale of the scheme.

Carnforth

5.3.38 **Table 5.26** summarises the option that is proposed for Carnforth.

Table 5.26 Carnforth Options

Option Id	Option Type
CRNFT-CRNFT_001_Std-W2.n	Increase treatment capacity

5.3.39 **Table 5.27** summarises the effects arising from the option that is proposed for Carnforth.

Table 5.27 Assessment of the Effects of Carnforth Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
CRNFT-CRNFT_001_Std-W2.n	Construction (negative)	-	0	0	--	--	--	-	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

5.3.40 No significant effects have been identified during the assessment of the Carnforth option. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the moderate scale of the proposed scheme.



Davyhulme

5.3.41 **Table 5.28** summarises the options that are proposed for Davyhulme.

Table 5.28 Davyhulme Options

Option Id	Option Type
DAVYH-DAVYH_001_Std-W2.n	Increase treatment capacity
DAVYH-Davyhulme-1-SW1.3.2	Surface water source control measures

5.3.42 **Table 5.29** summarises the effects arising from the options that are proposed for Davyhulme.

Table 5.29 Assessment of the Effects of Davyhulme Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
DAVYH-DAVYH_001_Std-W2.n	Construction (negative)	-	0	-	--	---	---	-	0	--	0	---	-	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	--	---	-	0	0	0	---	-	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0
DAVYH-Davyhulme-1-SW1.3.2	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

5.3.43 A likely significant negative effect has been identified against SEA Objective 5 (Air Quality) for the assessment of option DAVYH-DAVYH_001_Std-W2.n, arising from the significant number of vehicle movements anticipated (for example, to transport materials to/from the proposed site) and the use of plant/machinery that would be required during construction, reflecting the scale of the scheme and that the wastewater treatment works site is situated partially within/adjacent to an AQMA and additionally the roads that would likely be used to access the site are situated partially within the same AQMA.

5.3.44 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of options DAVYH-DAVYH_001_Std-W2.n and DAVYH-Davyhulme-1-



SW1.3.2 associated with the requirement for materials with significant quantities of embodied carbon.

- 5.3.45 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) for the assessment of option DAVYH-DAVYH_001_Std-W2.n associated with the significant capital expenditure that the construction of the scheme would involve, and which would be expected to generate benefits in respect of the supply chain and local employment opportunities.
- 5.3.46 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option DAVYH-DAVYH_001_Std-W2.n associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.
- 5.3.47 No other significant effects have been identified during the assessment of the Davyhulme options for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed. For option DAVYH-Davyhulme-1-SW1.3.2 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.

Operational effects

- 5.3.48 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option DAVYH-DAVYH_001_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.
- 5.3.49 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option DAVYH-DAVYH_001_Std-W2.n, reflecting the scale of the scheme and corresponding significant increase in the wastewater treatment capacity provided to the community.
- 5.3.50 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option DAVYH-DAVYH_001_Std-W2.n associated with the likely requirement for significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, reflecting the scale of the scheme.
- 5.3.51 No other significant effects have been identified during the assessment of the Davyhulme options for operation. However, a range of minor positive and minor and moderate negative effects have been identified and assessed. For option DAVYH-Davyhulme-1-SW1.3.2 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.

Ellesmere Port

5.3.52 **Table 5.30** summarises the option that is proposed for Ellesmere Port.

Table 5.30 Ellesmere Port Option

Option Id	Option Type
ELLES-ELLES_001_Std-W2.n	Increase treatment capacity

5.3.53 **Table 5.31** summarises the effects arising from the option that is proposed for Ellesmere Port.

Table 5.31 Assessment of the Effects of Ellesmere Port Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
ELLES-ELLES_001_Std-W2.n	Construction (negative)	-	0	-	--	--	--	-	0	-	0	--	-	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	--	---	-	0	0	0	--	-	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction effects

5.3.54 No significant effects have been identified during the assessment of option ELLES-ELLES_001_Std-W2.n for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the proposed scheme.

Operational effects

5.3.55 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option ELLES-ELLES_001_Std-W2.n associated with the significant operational carbon emissions that this option would result in.

5.3.56 No other significant effects have been identified during the assessment of the Ellesmere Port option for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the scheme.



Fleetwood

5.3.57 **Table 5.32** summarises the options that are proposed for Fleetwood.

Table 5.32 Fleetwood Options

Option Id	Option Type
FLEET-FLEET_001_Std-W2.n	Increase treatment capacity
FLEET-Fleetwood-1-SW1.3.2	Surface water source control measures

5.3.58 **Table 5.33** summarises the effects arising from the options that are proposed for Fleetwood.

Table 5.33 Assessment of the Effects of Fleetwood Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
FLEET-FLEET_001_Std-W2.n	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	-	---	0	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0
FLEET-Fleetwood-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

5.3.59 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option FLEET-Fleetwood-1-SW1.3.2, associated with the requirement for materials with significant quantities of embodied carbon.

5.3.60 No other significant effects have been identified during the assessment of the Fleetwood options for construction. In the case of FLEET-FLEET_001_Std-W2.n, this is because the option would not require any construction activities to take place and as such all objectives are scored as neutral during construction. For option FLEET-Fleetwood-1-SW1.3.2, however, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the scheme. For option FLEET-Fleetwood-1-SW1.3.2 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.

Operational effects

- 5.3.61 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option FLEET-FLEET_001_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.
- 5.3.62 No other significant effects have been identified during the assessment of the Fleetwood options for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the minor scale of the schemes. For option FLEET-Fleetwood-1-SW1.3.2 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.

Hillhouse

5.3.63 **Table 5.34** summarises the option that is proposed for Hillhouse.

Table 5.34 Hillhouse Option

Option Id	Option Type
HILLH-HILLH_001_Std-W2.n	Increase treatment capacity

5.3.64 **Table 5.35** summarises the effects arising from the option that is proposed for Hillhouse.

Table 5.35 Assessment of the Effects of Hillhouse Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
HILLH-HILLH_001_Std-W2.n	Construction (negative)	-	0	-	---	--	--	--	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	---	--	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction effects

5.3.65 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option HILLH-HILLH_001_Std-W2.n, as the wastewater treatment works site is located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2, and so could be subject to flooding during construction.

5.3.66 No other significant effects have been identified during the assessment of the Hillhouse option for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the proposed scheme.

Operational effects

5.3.67 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option HILLH-HILLH_001_Std-W2.n, as the wastewater treatment works site is located (>40%) within Flood Zone 3 and partially within Flood Zone 2, and so could be subject to flooding during operation.

5.3.68 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option HILLH-HILLH_001_Std-W2.n associated with the significant operational carbon emissions that this option would result in.



5.3.69

No other significant effects have been identified during the assessment of the Hillhouse option for operation. However, a range of minor and moderate negative and moderate positive effects have been identified and assessed, reflecting the moderate scale of the scheme.

Knutsford

5.3.70 **Table 5.36** summarises the option that is proposed for Knutsford.

Table 5.36 Knutsford Options

Option Id	Option Type
KNUTF-KNUTF_001_Std-W2.n	Increase treatment capacity

5.3.71 **Table 5.37** summarises the effects arising from the option that is proposed for Knutsford.

Table 5.37 Assessment of the Effects of Knutsford Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
KNUTF-KNUTF_001_Std-W2.n	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	---	-	--	--	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

Construction effects

5.3.72 No significant effects have been identified during the assessment of the Knutsford option for construction. This is because the option would not require any construction activities to take place and as such all objectives are scored as neutral during construction.

Operational effects

5.3.73 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option KNUTF-KNUTF_001_Std-W2.n, as the wastewater treatment works site is located almost entirely within Flood Zone 3, and so could be subject to flooding during operation.

5.3.74 No other significant effects have been identified during the assessment of the Knutsford option for operation. However, a range of minor and moderate negative and minor positive effects have been identified and assessed, reflecting the minor scale of the scheme.



Lancaster

5.3.75 **Table 5.38** summarises the option that is proposed for Lancaster.

Table 5.38 Lancaster Option

Option Id	Option Type
LANCA-LANCA_001_Std-W2.n	Increase treatment capacity

5.3.76 **Table 5.39** summarises the effects arising from the option that is proposed for Lancaster.

Table 5.39 Assessment of the Effects of Lancaster Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
LANCA-LANCA_001_Std-W2.n	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	?	+	+	0	0	0	0

5.3.77 No significant effects have been identified during the assessment of the Lancaster option. However, a range of minor and moderate negative and minor positive effects have been identified and assessed during the operational phase of the option, reflecting the minor scale of the scheme (it is noted that the option would not require any construction activities to take place and as such all objectives are scored as neutral during construction).



Macclesfield

5.3.78 **Table 5.40** summarises the option that is proposed for Macclesfield.

Table 5.40 Macclesfield Option

Option Id	Option Type
MACCL-MACCL_001_Std-W2.n	Increase treatment capacity

5.3.79 **Table 5.41** summarises the effects arising from the option that is proposed for Macclesfield.

Table 5.41 Assessment of the Effects of Macclesfield Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
MACCL-MACCL_001_Std-W2.n	Construction (negative)	-	0	-	--	--	0	-	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction effects

5.3.80 No significant effects have been identified during the assessment of option MACCL-MACCL_001_Std-W2.n for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the proposed scheme.

Operational effects

5.3.81 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option MACCL-MACCL_001_Std-W2.n associated with the significant operational carbon emissions that this option would result in.

5.3.82 No other significant effects have been identified during the assessment of the Macclesfield option for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the scheme.



Partington

5.3.83 **Table 5.42** summarises the option that is proposed for Partington.

Table 5.42 Partington Option

Option Id	Option Type
PARTI-PARTI_001_Std-W2.n	Increase treatment capacity

5.3.84 **Table 5.43** summarises the effects arising from the option that is proposed for Partington.

Table 5.43 Assessment of the Effects of Partington Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
PARTI-PARTI_001_Std-W2.n	Construction (negative)	-	0	-	--	--	-	-	0	--	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

5.3.85 No significant effects have been identified during the assessment of the Partington option. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the moderate scale of the proposed scheme.



Penrith

5.3.86 **Table 5.44** summarises the options that are proposed for Penrith.

Table 5.44 Penrith Options

Option Id	Option Type
PENRT-PENRT_002_Std-W2.n	Increase treatment capacity
PENRT-Penrith-1-SW1.2.1	Surface water source control measures

5.3.87 **Table 5.45** summarises the effects arising from the option that are proposed for Penrith.

Table 5.45 Assessment of the Effects of Penrith Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
PENRT-PENRT_002_Std-W2.n	Construction (negative)	-	0	0	--	--	--	-	0	0	0	--	-	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	--	-	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0
PENRT-Penrith-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

5.3.88 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option PENRT-Penrith-1-SW1.2.1, associated with the requirement for materials with significant quantities of embodied carbon.

5.3.89 No other significant effects have been identified during the assessment of the Penrith options for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the schemes. For option PENRT-Penrith-1-SW1.2.1 there remains some uncertainty across a number of these effects as the exact location of the option is currently not specified.



Operational effects

- 5.3.90 No likely significant effects have been identified during the assessment of the Penrith options for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the minor scale of the schemes.

Preston

5.3.91 **Table 5.46** summarises the options that are proposed for Preston.

Table 5.46 Preston Options

Option Id	Option Type
PREST-PREST_001_Std-W2.n	Increase treatment capacity
PREST-Preston-1-SW1.1.3	Surface water source control measures
PREST-Preston-1-SW1.2.1	Surface water source control measures
PREST-Preston-1-SW1.3.2	Surface water source control measures

5.3.92 **Table 5.47** summarises the effects arising from the options that are proposed for Preston.

Table 5.47 Assessment of the Effects of Preston Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
PREST-PREST_001_Std-W2.n	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	---	-	---	--	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0
PREST-Preston-1-SW1.1.3	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?
PREST-Preston-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	---	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?
PREST-Preston-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0



Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

- 5.3.93 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option PREST-Preston-1-SW1.1.3, PREST-Preston-1-SW1.2.1 and PREST-Preston-1-SW1.3.2, associated with the requirement for materials with significant quantities of embodied carbon.
- 5.3.94 No other significant effects have been identified during the assessment of the Penrith options for construction. In the case of PREST-PREST_001_Std-W2.n, this is because the option would not require any construction activities to take place and as such all objectives are scored as neutral during construction. For the remaining options however, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the minor and moderate scales of the schemes. For options PREST-Preston-1-SW1.1.3, PREST-Preston-1-SW1.2.1 and PREST-Preston-1-SW1.3.2, there remains some uncertainty across a number of these effects as the exact location of the options is currently not specified.

Operational effects

- 5.3.95 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option PREST-PREST_001_Std-W2.n, as the wastewater treatment works site is located partially (>40%) within Flood Zone 3 (in addition, other areas of the site are located within Flood Zone 2), and so could be subject to flooding during operation.
- 5.3.96 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of options PREST-PREST_001_Std-W2.n and PREST-Preston-1-SW1.2.1, associated with the significant operational carbon emissions that these options would result in.
- 5.3.97 No other significant effects have been identified during the assessment of the Preston options for operation. However, a range of minor positive and minor and moderate negative effects have been identified and assessed, reflecting the minor and moderate scales of the schemes. For options PREST-Preston-1-SW1.1.3, PREST-Preston-1-SW1.2.1 and PREST-Preston-1-SW1.3.2, there remains some uncertainty across a number of these effects as the exact location of the options is currently not specified.

Sale

5.3.98 **Table 5.48** summarises the option that is proposed for Sale.

Table 5.48 Sale Option

Option Id	Option Type
SALEZ-SALEZ_002_Std-W2.n	Increase treatment capacity

5.3.99 **Table 5.49** summarises the effects arising from the option that is proposed for Sale.

Table 5.49 Assessment of the Effects of Sale Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
SALEZ-SALEZ_002_Std-W2.n	Construction (negative)	-	0	-	-	---	--	-	0	--	0	---	0	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	-	-	---	-	0	0	0	---	0	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0

Construction effects

5.3.100 A likely significant negative effect has been identified against SEA Objective 5 (Air Quality) for the assessment of option SALEZ-SALEZ_002_Std-W2.n, arising from the significant number of vehicle movements anticipated (for example, to transport materials to/from the proposed site) and the use of plant/machinery that would be required during construction, reflecting the scale of the scheme and that roads that would likely be used to access the site are situated partially within an AQMA.

5.3.101 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) for the assessment of option SALEZ-SALEZ_002_Std-W2.n associated with the significant capital expenditure that the construction of the scheme would involve, and which would be expected to generate benefits in respect of the supply chain and local employment opportunities.

5.3.102 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option SALEZ-SALEZ_002_Std-W2.n associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.

5.3.103 No other significant effects have been identified during the assessment of the Sale option for construction. However, a range of minor positive and minor and moderate negative effects have been identified and assessed.



Operational effects

- 5.3.104 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option SALEZ-SALEZ_002_Std-W2.n, associated with the significant operational carbon emissions that this options would result in.
- 5.3.105 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option SALEZ-SALEZ_002_Std-W2.n, reflecting the scale of the scheme and corresponding significant increase in the wastewater treatment capacity provided to the community.
- 5.3.106 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option SALEZ-SALEZ_002_Std-W2.n associated with the likely requirement for significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, reflecting the scale of the scheme.
- 5.3.107 No other significant effects have been identified during the assessment of the Sale option for operation. However, a range of minor negative effects have been identified and assessed.

Salford

5.3.108 **Table 5.50** summarises the option that is proposed for Salford.

Table 5.50 Salford Option

Option Id	Option Type
SALFO-SALFO_002_Std-W2.n	Increase treatment capacity

5.3.109 **Table 5.51** summarises the effects arising from the option that is proposed for Salford.

Table 5.51 Assessment of the Effects of Salford Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
SALFO-SALFO_002_Std-W2.n	Construction (negative)	-	0	0	0	---	--	0	0	--	0	---	0	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	--	---	0	0	0	0	---	0	-
	Operation (positive)	?	0	0	0	0	?	0	+++	+++	0	0	0	0

Construction effects

5.3.110 A likely significant negative effect has been identified against SEA Objective 5 (Air Quality) for the assessment of option SALFO-SALFO_002_Std-W2.n, arising from the significant number of vehicle movements anticipated (for example, to transport materials to/from the proposed site) and the use of plant/machinery that would be required during construction, reflecting the scale of the scheme and that the wastewater treatment works site is situated partially within/adjacent to an AQMA and additionally the roads that would likely be used to access the site are situated partially within the same AQMA.

5.3.111 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) for the assessment of option SALFO-SALFO_002_Std-W2.n, associated with the significant capital expenditure that the construction of the scheme would involve, and which would be expected to generate benefits in respect of the supply chain and local employment opportunities.

5.3.112 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option SALFO-SALFO_002_Std-W2.n associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.



- 5.3.113 No other significant effects have been identified during the assessment of the Salford option for construction. However, a range of minor positive and minor and moderate negative effects have been identified and assessed.

Operational effects

- 5.3.114 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option SALFO-SALFO_002_Std-W2.n, associated with the significant operational carbon emissions that this option would result in.
- 5.3.115 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option SALFO-SALFO_002_Std-W2.n, reflecting the scale of the scheme and corresponding significant increase in the wastewater treatment capacity provided to the community.
- 5.3.116 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option SALFO-SALFO_002_Std-W2.n associated with the likely requirement for significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, reflecting the scale of the scheme.
- 5.3.117 No other significant effects have been identified during the assessment of the Sale option for operation. However, minor and moderate negative effects have been identified and assessed.

Stretford

5.3.118 **Table 5.52** summarises the option that is proposed for Stretford.

Table 5.52 Stretford Option

Option Id	Option Type
STRET-STRET_001_Std-W2.n	Increase treatment capacity

5.3.119 **Table 5.53** summarises the effects arising from the option that is proposed for Stretford.

Table 5.53 Assessment of the Effects of Stretford Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
STRET-STRET_001_Std-W2.n	Construction (negative)	-	0	-	---	--	-	--	0	--	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	--	--	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction effects

5.3.120 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option STRET-STRET_001_Std-W2.n, as the wastewater treatment works site is located almost entirely within Flood Zone 3, and so could be subject to flooding during construction.

5.3.121 No other significant effects have been identified during the assessment of the Stretford option for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the moderate scale of the proposed scheme.

Operational effects

5.3.122 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option STRET-STRET_001_Std-W2.n, as the wastewater treatment works site is located almost entirely within Flood Zone 3, and so could be subject to flooding during operation.

5.3.123 No other significant effects have been identified during the assessment of the Stretford option for operation. However, a range of minor and moderate negative and moderate positive effects have been identified and assessed, reflecting the moderate scale of the proposed scheme.



Whitehaven

5.3.124 **Table 5.54** summarises the option that is proposed for Whitehaven.

Table 5.54 Whitehaven Options

Option Id	Option Type
WHTHA-WHTHA_001_Std-W2.n	Increase treatment capacity
WHTHA-Whitehaven-1-SW1.2.1	Surface water source control measures
WHTHA-Whitehaven-1-SW1.3.2	Surface water source control measures

5.3.125 **Table 5.55** summarises the effects arising from the options that are proposed for Whitehaven.

Table 5.55 Assessment of the Effects of Whitehaven Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
WHTHA-WHTHA_001_Std-W2.n	Construction (negative)	-	0	-	---	--	-	--	0	-	0	--	--	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	--	--	0	0	0	--	-	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0
WHTHA-Whitehaven-1-SW1.2.1	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?
WHTHA-Whitehaven-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

5.3.126 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option WHTHA-WHTHA_001_Std-W2.n, as the wastewater treatment works site is



located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2, and so could be subject to flooding during construction.

- 5.3.127 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of options WHTHA-WHTHA_001_Std-W2.n and WHTHA-WHTHA_001_Std-W2.n, associated with the requirement for materials with significant quantities of embodied carbon.
- 5.3.128 No other significant effects have been identified during the assessment of the Whitehaven options for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the minor and moderate scales of the proposed schemes. For options WHTHA-Whitehaven-1-SW1.2.1 and WHTHA-Whitehaven-1-SW1.3.2, there remains some uncertainty across a number of these effects as the exact location of the options is currently not specified.

Operational effects

- 5.3.129 A likely significant negative effect has been identified against SEA Objective 4 (Flood Risk) for the assessment of option WHTHA-WHTHA_001_Std-W2.n, as the wastewater treatment works site is located (>40%) within Flood Zone 3 and partially within Flood Zone 2, and so could be subject to flooding during operation.
- 5.3.130 No other significant effects have been identified during the assessment of the Whitehaven options for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the minor and moderate scales of the proposed schemes. For options WHTHA-Whitehaven-1-SW1.2.1 and WHTHA-Whitehaven-1-SW1.3.2, there remains some uncertainty across a number of these effects as the exact location of the options is currently not specified.

Wigan

5.3.131 **Table 5.56** summarises the option that is proposed for Wigan.

Table 5.56 Wigan Options

Option Id	Option Type
WIGAN-WIGAN_001_Std-W2.n	Increase treatment capacity
WIGAN-Wigan-1-SW1.2.1	Surface water source control measures
WIGAN-Wigan-1-SW1.3.2	Surface water source control measures

5.3.132 **Table 5.57** summarises the effects arising from the options that are proposed for Wigan.

Table 5.57 Assessment of the Effects of Wigan Options

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
WIGAN-WIGAN_001_Std-W2.n	Construction (negative)	-	0	-	--	---	---	-	0	--	0	---	-	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	---	-	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0
WIGAN-Wigan-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	---	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?
WIGAN-Wigan-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction effects

5.3.133 A likely significant negative effect has been identified against SEA Objective 5 (Air Quality) for the assessment of option WIGAN-WIGAN_001_Std-W2.n, arising from the significant number of vehicle



movements anticipated (for example, to transport materials to/from the proposed site) and the use of plant/machinery that would be required during construction, reflecting the scale of the scheme.

- 5.3.134 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of options WIGAN-WIGAN_001_Std-W2.n, WIGAN-Wigan-1-SW1.2.1 and WIGAN-Wigan-1-SW1.3.2, associated with the requirement for materials with significant quantities of embodied carbon.
- 5.3.135 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) for the assessment of option WIGAN-WIGAN_001_Std-W2.n, associated with the significant capital expenditure that the construction of the scheme would involve, and which would be expected to generate benefits in respect of the supply chain and local employment opportunities.
- 5.3.136 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option WIGAN-WIGAN_001_Std-W2.n, associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.
- 5.3.137 No other significant effects have been identified during the assessment of the Wigan options for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed. For options WIGAN-Wigan-1-SW1.2.1 and WIGAN-Wigan-1-SW1.3.2, there remains some uncertainty across a number of these effects as the exact location of the options is currently not specified.

Operational effects

- 5.3.138 A likely significant negative effect has been identified against SEA Objective 6 (Greenhouse Gas Emissions) for the assessment of option WIGAN-WIGAN_001_Std-W2.n and WIGAN-Wigan-1-SW1.2., associated with the significant operational carbon emissions that these options would result in.
- 5.3.139 A likely significant positive effect has been identified against SEA Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option WIGAN-WIGAN_001_Std-W2.n, reflecting the scale of the scheme and corresponding significant increase in the wastewater treatment capacity provided to the community.
- 5.3.140 A likely significant negative effect has been identified against SEA Objective 11 (Waste and Materials) during the assessment of option WIGAN-WIGAN_001_Std-W2.n associated with the likely requirement for significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, reflecting the scale of the scheme.
- 5.3.141 No other significant effects have been identified during the assessment of the Wigan options for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed. For options WIGAN-Wigan-1-SW1.2.1 and WIGAN-Wigan-1-SW1.3.2, there remains some uncertainty across a number of these effects as the exact location of the options is currently not specified.

Workington

5.3.142 **Table 5.58** summarises the option that is proposed for Workington.

Table 5.58 Workington Option

Option Id	Option Type
WORKI-WORKI_001_Std-W2.n	Increase treatment capacity

5.3.143 **Table 5.59** summarises the effects arising from the option that is proposed for Workington.

Table 5.59 Assessment of the Effects of Workington Option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Historic Environment	13. Landscape
WORKI-WORKI_001_Std-W2.n	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	-	--	0	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

5.3.144 No significant effects have been identified during the assessment of the Workington option. However, a range of minor and moderate negative and minor positive effects have been identified and assessed during the operational phase of the option, reflecting the minor scale of the scheme (it is noted that the option would not require any construction activities to take place and as such all objectives are scored as neutral during construction).



Summary

5.3.145 **Table 5.60** summarises the effects arising for each of the TPU catchment from those options screened for assessment.

Table 5.60 Summary of the Assessment Findings

TPU Catchment	Number of options screened in	Likely significant effects identified	Comments
Altrincham	1	☑	One proposed scheme with likely significant negative effects against one SEA objective during operation.
Blackburn	2	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction. One proposed scheme with likely significant negative effects against one SEA objective during operation
Bromborough	1	☑	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Burscough	1	☒	No likely significant effects identified.
Carlisle	1	☑	One proposed scheme with likely significant negative effects against two SEA objectives during construction. In operation, likely significant negative effects against two SEA objectives.
Carnforth	1	☒	No likely significant effects identified.
Davyhulme	2	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction. One proposed scheme with likely significant negative effects against three SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Ellesmere Port	1	☑	One proposed scheme with likely significant negative effects against two SEA objectives during construction. In operation, likely significant negative effects against two SEA objectives.
Fleetwood	2	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction and one proposed scheme with likely significant negative effects against one SEA objective during operation.
Hillhouse	1	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction. In operation, likely significant negative effects against two SEA objectives.
Knutsford	1	☑	One proposed scheme with likely significant negative effects against one SEA objective during operation.

TPU Catchment	Number of options screened in	Likely significant effects identified	Comments
Lancaster	1	<input checked="" type="checkbox"/>	No likely significant effects identified.
Macclesfield	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against one SEA objective during operation.
Partington	1	<input checked="" type="checkbox"/>	No likely significant effects identified.
Penrith	2	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against one SEA objective during construction.
Preston	4	<input checked="" type="checkbox"/>	Three proposed schemes with likely significant negative effects against one SEA objective during construction, one of which also includes a likely significant negative effect against one SEA objective during operation. One proposed scheme with likely significant negative effects against two SEA objectives during operation.
Sale	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Salford	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives.
Stretford	1	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against one SEA objective during construction and likely significant negative effects against one SEA objective during operation.
Whitehaven	3	<input checked="" type="checkbox"/>	Three schemes with likely significant negative effects against one SEA objective during construction, one of which also includes a likely significant negative effect against one SEA objective during operation.
Wigan	3	<input checked="" type="checkbox"/>	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant negative effects against two SEA objectives and likely significant positive effects against two SEA objectives. Two proposed schemes with likely significant negative effects against one SEA objective during construction, one of which also includes a likely significant negative effect against one SEA objective during operation.
Workington	1	<input checked="" type="checkbox"/>	No likely significant effects identified.
	33		

Assessment of the transfer options

5.3.146 UUW has identified two effluent transfer options in the draft DWMP, which have been assessed as part of the SEA:

- Askham to Sockbridge;
- Mowpen Brow to High Legh.

5.3.147 These options involve the transfer of effluent for treatment from a small wastewater treatment works to a larger wastewater treatment works. The effects of the options are identified in this section. Detailed assessments of each option summarised are contained at **Appendix E** with the effects summarised in **Table 5.61**.

Table 5.61 Assessment of Askham to Sockbridge transfer option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Askham to Sockbridge Transfer	Construction (negative)	--/?	--/?	-	--/?	-/?	-/?	-/?	0	-	0	-/?	---/?	--
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	-/?	0	-/?	0	-
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	+/?	0	0

5.3.148

Construction effects

5.3.149 A significant negative uncertain effect has been identified against SEA Objective 12 (Historic Environment) during the assessment of the Askham to Sockbridge Transfer option, due to the associated potential for works to affect the setting of a World Heritage Site (which approximately half of the pipeline route would be situated within). However, it is noted that there remains some uncertainty as the exact route of the pipeline is currently unknown and the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change.

5.3.150 No other significant effects have been identified during the assessment of the Askham to Sockbridge Transfer option for construction. However, a range of minor positive and minor and moderate negative effects have been identified and assessed. It is noted however, that across a number of objectives there remains some uncertainty reflecting the preliminary routing of the pipeline (which could be subject to change following detailed design/engineering processes) and additionally, because there is a lack of detail regarding the scale of the option (in terms of CAPEX value and associated material requirements, embodied carbon, etc.).

Operation effects

5.3.151 No significant effects have been identified during the assessment of the Askham to Sockbridge Transfer option for operation. However, a range of minor positive and negative effects have been



identified and assessed. It is noted however, that across a number of objectives there remains some uncertainty due to a lack of detail regarding the scale of the option (in terms of operational energy/materials/chemical requirements, operational carbon emissions, discharge volumes etc.).

Table 5.62 Assessment of Mowpen Brow to High Legh transfer option

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Well-being	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Mowpen Brow to High Legh Transfer	Construction (negative)	-/?	-/?	0	0	-/?	-/?	0	0	-	0	-/?	-	-
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	-/?	0	-/?	0	-
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	+/?	0	0

5.3.152 No significant effects have been identified during the assessment of the Mowpen Brow to High Legh transfer option. However, a range of minor positive and negative effects for construction and operation have been identified and assessed. It is noted however, that across a number of objectives there remains some uncertainty as the exact route of the pipeline is currently unknown and the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change and additionally, because there is a lack of detail regarding the scale of the option (in terms of CAPEX value and associated material requirements and embodied carbon, operational energy/materials/chemical requirements, operational carbon emissions, discharge volumes etc.).



5.4 Secondary, Cumulative and Synergistic Effects

- 5.4.1 The SEA Regulations require that the cumulative impact of a plan and programme are taken into account. This SEA considers cumulative effects in terms of:
- The potential cumulative impact of options within a TPU catchment (summarised in **Section 5.3** above);
 - The potential cumulative impact of the DWMP programme as a whole; and
 - The cumulative impacts of the draft DWMP in combination with other plans and programmes.

Overview of the Cumulative effects of the Draft DWMP programme

- 5.4.2 The extent to which the draft DWMP options can act cumulatively is dependent on a number of variables. These include the nature, location and timing of option implementation, the number of options that are ultimately implemented either within a TPU drainage area, a Strategic Planning Area catchment or across the network area, and the interaction of these options with other plans or programmes. The effects are also dependent on the sensitivity of receptors, their extent and the receiving environment to the effects of the proposed options whether operating alone, or cumulatively.
- 5.4.3 Construction activity, unless of significant scale and concentrated in specific localities and occurring concurrently is unlikely to lead to cumulative significant effects on receptors, as it is anticipated that the effects of the options can be managed through the application of the mitigation hierarchy and a range of construction mitigation practices (see **Section 5.6**). However, for some of the schemes, as they represent significant engineering works and capital investment, there will be individual and cumulatively significant positive and negative effects in terms of SEA Objectives 6 'Greenhouse Gas Emissions', 8 'Economic and Social Wellbeing' and 11 'Waste and resources'.
- 5.4.4 Operationally, the schemes seek to reduce wastewater entering the sewerage network through policy and demand management measures and increase treatment capacity across the UUW area (with any increase in discharge volumes associated with the operation of TPU options to increase treatment capacity at wastewater treatment works assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality). Therefore, they should at minimum do no harm to the water environment or communities in which they are located, and preferably make a (significant) contribution to enhancing the quality of each locality, by reducing the adverse effects arising from flooding and poor water quality.
- 5.4.5 There may be specific instances where at present, due to uncertainty of scheme design or location, the operational effects may be considered uncertain, and potentially negative; however, as proposed schemes are still evolving, there is further opportunity to complete investigation and refine scheme design as well as consider further assessment (whether scheme specific or linked to the NEP).
- 5.4.6 In **Table 5.63**, an overview of the potential for cumulative effects for the DWMP programme and with other plans and programmes is presented against the thirteen SEA objectives in the assessment framework.

Table 5.63 General Commentary on the Potential for Cumulative Effects

Proposed SEA Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with Other Plans and Programmes?
<p>1. To protect, restore and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species, enhanced ecosystem resilience, habitat connectivity and creation and contribute to the sustainable management of natural habitats and ecosystems.</p>	<p>Cumulative effects are most likely where options are located within the same TPU area of the Strategic Planning Area catchment with the more schemes that are implemented within an area, the greater the potential for disturbance of biodiversity. Even where located in separate catchments, there is the potential for cumulative effects on receptors such as coastal designated sites into which rivers from a number of catchments may flow (e.g. Mersey Estuary Ramsar and SPA). However, none of the options within the TPU catchments have been identified as having effects on the features recognised within designated sites.</p> <p>The TPU schemes seek to increase treatment capacity at wastewater treatment works or address surface water control measures. Given increase in discharge volumes associated with the operation of the options is assumed to be consented (in terms of volumes and concentrations of pollutants) the impact on biodiversity is largely assumed to be neutral for the scheme options although there is potential for some localised positive effects on water dependent designated conservation sites (if present) and biodiversity through improvements to water quality.</p>	<p>Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.</p>
<p>2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the appropriate and efficient use of land.</p>	<p>Many of the options for combined and foul sewer works, surface water management and wastewater treatment options, and increased treatment at wastewater treatment works within the TPU areas, will require works within urban settings, with activities on existing developed areas and previously developed land (e.g. relaying/resizing of pipes/sewers) and relative to many other plans for new infrastructure will be more compatible with the SEA objective (both individually and cumulatively) for the preferential use of previously developed land. Where greenfield sites are affected, these are likely to be urban fringe sites, typically with poor soil quality, which the creation of new habitats associated with SUDs schemes, may help, over time to improve.</p>	<p>Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.</p>
<p>3. To protect and enhance the quality and quantity of surface and groundwater resources.</p>	<p>Cumulative effects are most likely where measures are located within same TPU drainage area or Strategic Planning Area catchment.</p> <p>Many of the options for combined and foul sewer works, wastewater treatment, and customer side management have associated potential for improvement on the quality of receiving water during operation.</p> <p>In many instances, from the operation of the schemes, the cumulative effects of operating the schemes will be positive on water quality and quantity (by increasing infiltration and residence time of water within the catchment). Any increase in discharge volumes associated with the operation of TPU options to increase treatment capacity at wastewater treatment works is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality</p>	<p>Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.</p>

Proposed SEA Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with Other Plans and Programmes?
	cumulatively. However, due to the lack of information on discharge volumes, there remains some uncertainty.	
4. To reduce or manage flood risk.	A number of the TPU options to increase treatment schemes have been identified as being fully or partially located at wastewater treatment works within Flood Zone 3. However, overall it is not considered that the schemes would cumulatively add to flood risk elsewhere due the type of intervention and potential for mitigation measures to be employed. Other measures in the DWMP related to combined foul and sewer management, customer side management, and surface water management would actively seek to reduce the risk of flooding. Cumulative positive effects are therefore likely.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
5. To minimise emissions of pollutant gases and particulates and enhance air quality.	Cumulative effects will occur within each TPU drainage area with the more schemes that are implemented within an area, the greater the potential for emissions, associated with construction of the proposed schemes. Cumulative effects on air quality will need to take into account the coincidence of proposed activities with locations designated as AQMAs (associated with either NOx or PM10), noting that for some locations the scale of additional vehicle movements may be incompatible with the requirements of the AQMA.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
6. To reduce greenhouse gas emissions.	Effects are additive; the more schemes implemented within an area, the greater the amounts of materials and energy used (and the embodied and operational carbon emitted) and the greater the effects against this SEA objective. Cumulatively, and associated with the scale of future investment, it is estimated that the embodied carbon associated with the new infrastructure is some 465KtCo2e , reflecting the substantial quantities of concrete and steel used. However, for many of the proposed schemes, once in use, it is anticipated that the energy use (and the associated operational carbon emissions) is likely to be relatively modest, (within the context of U UW's current energy use).	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
7. To adapt and improve resilience to the threats of climate change.	Climate change is likely to increase the frequency and intensity of future rainfall events and are likely to be associated with greater overland flows and less time to infiltrate into the ground. This would then be exacerbated by the effects of urban creep. The Draft DWMP sets out how U UW intends to extend, improve and maintain a robust and resilient drainage and wastewater system. It will take a long-term view, setting out a planning period covering 25 years. This long term view has included taking into account flood risk resilience as part of the Risk Based Catchment Screening. Many of the scheme options seek to reduce the incidences of flooding through approaches to combined and foul sewer systems and surface water management which will cumulatively support a positive effect on addressing the threats of climate change.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.	The DWMP covers a 25 year period. Cumulatively if all TPU schemes are implemented this would have a very significant cumulative capex value, exceeding many times the threshold of significance for this assessment. In consequence, it represents a significant investment in essential infrastructure which would, given its	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.

Proposed SEA Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with Other Plans and Programmes?
	longevity create long term economic benefits and employment opportunities in the water and construction sectors across the North West. Direct, indirect and induced employment opportunities, given the focused areas of investment could also be beneficial to the communities in each TPU area.	
9. To protect and enhance human health and well-being.	Many of the scheme options seek to reduce the incidences of flooding through approaches to combined and foul sewer systems and surface water management which will cumulatively support human health and wellbeing within the UUW area. A number of the TPU schemes which seek to increase treatment capacity have been identified as being fully or partially located at wastewater treatment works within Flood Zone 3. However, overall it is not considered that the schemes would cumulatively add to flood risk elsewhere due the type of intervention and potential for mitigation measures to be employed. Therefore they are not considered to have a cumulatively negative effect on health and wellbeing.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
10. To promote and enhance the sustainable and efficient use of resilient water resources.	The DWMP includes a range of measures aimed at reducing water entering the wastewater network. These include policy and demand management measures that seek to maximise the efficient use of water resources. By including schemes that seek to maximise infiltration and increase the resident time of water within a catchment, there are also opportunities for water to contribute to surface and ground water flows, increasing resilience of the water resources available. TPU specific schemes seek to increase surface water source control measures which are also considered to support resilient water resources.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
11. To minimise waste, promote resource efficiency and move towards a circular economy.	Effects are additive; the more measures implemented within an area, the greater the amounts of materials and energy used and the greater the effects against this SEA objective.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.	There is potential for cumulative effects on heritage assets where measures are located in close proximity to each other.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
13. To conserve, protect and enhance landscape and townscape character and visual amenity.	There is potential for cumulative effects where measures are located in close proximity to each other. Effects will be greater for measures requiring new infrastructure in sensitive landscapes (AONB, National Parks).	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.

Cumulative Effects of the Draft DWMP In-combination with Other Plans and Programmes

- 5.4.7 The development of the DWMP incorporates a number of assumptions that will take into account the effects the key drivers of other future plans, for example:
- The predicted local and regional growth when identifying risk areas and potential solutions, based (inter alia) on Local Plans and population growth models.
 - The effects of climate change (under a number of scenarios) when predicting future spills / flooding (etc.).

- 5.4.8 In consequence, cumulative effects with respect to land-use and flood risk management plans are therefore inherently considered and accounted for as part of the DWMP option development process and are therefore not considered further here to avoid duplication. Taking this into account, the following subsections consider the cumulative effects of the draft DWMP in-combination with other plans and programmes including:
- United Utilities Final Water Resources Management Plan 2019 and water resource demand (which will be updated with WRMP24);
 - Water Resources West Regional Plan (emerging);
 - National Policy Statements (NPS) and Nationally Significant Infrastructure Projects (NSIPs).
- 5.4.9 The cumulative effects of the draft DWMP in-combination with other plans and programmes are difficult to accurately assess given the inherent uncertainties concerning (inter alia): future changes to baseline environmental conditions; changing water resource plans; future population and economic growth; and the deliverability of some NSIPs (and the potential for new NSIPs to be brought forward). As such, it will be necessary to keep under review these factors as the DWMP is implemented to ensure that the latest and most up to date information is taken into account.
- 5.4.10 It is also recognised that there are several challenges relating to water quality at the moment, particularly when considering the cumulative effects on receiving waters of wastewater treatment works discharges and storm overflow spills 'in combination' with agricultural inputs and nutrient neutrality. There is opportunity for U UW, building on the learning from completing this first DWMP, to undertake a review of wastewater treatment works consents, focused on the effects of discharges on receiving waters, taken into account the consequences of implementing interventions that go beyond current planning objectives and existing and planned wastewater treatment works capacity.

U UW's Water Resources Management Plans

- 5.4.11 U UW published its current Water Resources Management Plan (WRMP) in August 2019. U UW has started working towards the preparation of the WRMP24. U UW's WRMP explicitly accounts for growth forecasts when calculating future water demand (and hence areas with potential deficits). This means that 'in combination' effects with growth promoted by other plans or projects are considered and accounted for during the WRMP development process. The preparation of WRMP24 will therefore take into such factors.
- 5.4.12 There is commonality between some of the schemes considered in the DWMP and those within the WRMP. Both include measures to aimed at reducing domestic and business water use through a variety of education and behavioural measures, albeit that the WRMP19 is seeks to reduce per capita water use, whereas the DWMP is seeking to reduce water entering the wastewater network and increase treatment capacity. WRMP24 will develop further schemes WRMP19 includes demand management measures for water resource zones (WRZs) that include some of those TPU drainage areas identified in the DWMP, and in consequence there will be cumulative effects identified where the plans work together to reduce future demand. It is envisaged that WRMP24 may include further WRZs that coincide with TPU areas identified in the DWMP.

Water Resources West Regional Plan

- 5.4.13 Water Resources West is one of five regional groups established to develop regional water resources plans, to ensure the continuous provision of resilient, efficient and sustainable water supplies for the future. The requirement was established by the National Framework for Water Resources. Water Resources West comprises four water companies (United Utilities Water, Severn Trent Water, South Staffs Water and Welsh Water). The Regional Plan focuses on demand

management and supply options to address water supply deficits. Similarly to the WRMP24, there is likely to be overlap between likely measures that will be forthcoming within the Regional Plan and the DWMP and therefore likely to be cumulative effects where the plans work together to support effective management of water resources.

National Policy Statements and Nationally Significant Infrastructure Projects

- 5.4.14 The Planning Act 2008 introduced a procedure to streamline the decision-making process for NSIPs. Under the Act, a developer wishing to construct a NSIP must first apply to the Secretary of State for development consent. National Policy Statements (NPSs) establish the need for specific types of infrastructure and provide planning guidance for promoters of NSIPs, and the basis for the examination by the Examining Authority and decisions by the Secretary of State on development consent order applications. A number of NPSs have been published which set out the definition, and in some cases the location, of NSIPs. The current status of NPSs is set out in **Table 5.64**.

Table 5.64 Current Status of National Policy Statements

National Policy Statement (NPS)	Status	Are Potential Locations of NSIPs included in the NPS?
Overarching Energy EN-1²³	Designated July 2011	No
Fossil Fuel Electricity Generating Infrastructure EN-2	Designated July 2011	No
Renewable Energy Infrastructure EN-3	Designated July 2011	No
Gas Supply Infrastructure and Oil and Gas Pipelines EN-4	Designated July 2011	No
Electricity Networks Infrastructure EN-5	Designated July 2011	No
Nuclear Power Generation EN-6	Designated July 2011	Yes
Ports	Designated January 2012	No
Waste Water Infrastructure	Designated March 2012	Yes
Hazardous Waste Infrastructure	Designated June 2013	No
National Networks	Designated January 2015	No
Airports NPS: new runway capacity and infrastructure at airports in the South East of England	Designated June 2018	Yes
Water Resources Infrastructure	Draft published November 2018	No
Geological Disposal Infrastructure	Designated July 2019	No

- 5.4.15 The Draft DWMP is not expected to have any adverse cumulative effects in-combination with the NPSs listed above. This is because the NPS are either not site specific or because specific NSIP proposals are unlikely to affect, or be affected by, the measures that comprise the Draft DWMP.

²³ A revised draft National Policy Statement for Energy (and for EN2 to EN5) was published by the Government for consultation in September 2021.

- 5.4.16 The Nuclear Power NPS (EN-6) sets out eight potentially suitable sites for the deployment of new nuclear power stations in England and Wales. Of these sites, two are located within the UUW DWMP area: Heysham and Sellafield. Work on proposals for a new nuclear build at Sellafield (known as NuGen's Moorside Project) underwent pre-application but this is no longer being taken forward and has been formerly withdrawn from consideration as a NSIP whilst National Grid's North West Coast Connections Project, a 400kV electricity transmission connection from proposed new nuclear generating station at Moorside to the existing transmission system in Cumbria/Lancashire, underwent pre-application but has also been withdrawn from consideration. Wylfa (Isle of Anglesey) is also identified for the deployment of a new nuclear power station but is also not currently being progressed.
- 5.4.17 Given these schemes are not progressing (whilst Wylfa is also located some distance from the UUW DWMP area) no significant cumulative effects in-combination with the implementation of the Draft DWMP are predicted.
- 5.4.18 Two NSIPs are set out in the Waste Water Treatment NPS; however, both of these are located in London and are not expected to have any effect on drainage and waste water management within the UUW Draft DWMP area. Similarly, the Airports NPS concerns runway capacity in the South East of England only.
- 5.4.19 Defra has consulted on a draft NPS for water resources. This will set out the need for NSIPs related to water resources, and the Government's policies to deliver them. Whilst this NPS will not be site specific, implementation of the draft DWMP is likely to be compatible with those objectives of the NPS for improving water supply resilience.

5.5 Contribution of the Draft DWMP to Wales' Well-being Goals and the Objective for SMNR

- 5.5.1 As set out in **Section 1.7**, the Well-being of Future Generations (Wales) Act 2015 places a duty on public bodies including UUW to carry out sustainable development, aimed at achieving the seven well-being goals for Wales. The well-being goals established by the Act are as follows:
- A prosperous Wales;
 - A resilient Wales;
 - A healthier Wales;
 - A more equal Wales;
 - A Wales of cohesive communities;
 - A Wales of vibrant culture and thriving Welsh language; and
 - A globally responsible Wales.
- 5.5.2 The Environment (Wales) Act 2016, meanwhile, has established an objective for the sustainable management of natural resources (SMNR) "to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing—
- (a) meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and
 - (b) contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015".

- 5.5.3 Through the assessment presented in **Section 5.3**, and taking account of the DWMP objectives (of compliance) and the resultant assumption that any changes to wastewater treatment works discharges would be consented, no adverse effects on designated sites within Wales have been identified and in consequence, there are considered to be no adverse effects on communities and locations in Wales. Therefore, in this case, it is concluded that the draft DWMP would have no effects against the well-being goals.

5.6 Mitigation and Enhancement

- 5.6.1 The potential effects of the draft DWMP are described in the sections above. In some cases, there is an opportunity to reduce some of the potential negative effects identified, subject to further investigation. The detail of this mitigation needs to be considered during the planning phases of each of the individual measures if and when they are taken forward for implementation.

Species Specific Measures and Biodiversity

- 5.6.2 Most species-specific avoidance or mitigation measures can only be determined at the scheme level, following scheme-specific surveys, and 'best-practice' mitigation for a species will vary according to a range of factors that cannot be determined at this stage. In addition, some general 'best-practice' measures may not be relevant or appropriate to the interest features of the European sites concerned (for example, clearing vegetation over winter is usually advocated to avoid impacts on nesting birds; however, this is unlikely to be necessary to avoid effects on some SPA species (such as overwintering estuarine birds) and the winter removal of vegetation might actually have a negative effect on these species through disturbance).
- 5.6.3 However, the following general measures should be followed where possible to minimise the potential for impacts on species that are European site interest features unless project-level environmental studies or HRA indicate that they are not required or not appropriate, or that alternative or additional measures are more appropriate / necessary:
- scheme design will aim to minimise the environmental effects by 'designing to avoid' potential habitat features that may be used by species that are European site interest features when outside the site boundary (e.g. linear features such as hedges or stream corridors; large areas of scrub or woodland; mature trees; etc.) through scheme-specific routing studies;
 - the works programme and requirements for each measure will be determined at the earliest opportunity to allow investigation schemes, surveys and mitigation to be appropriately scheduled and to provide sufficient time for consultations with NRW;
 - night-time working, or working around dusk / dawn, should be avoided to reduce the likelihood of negative effects on nocturnal species;
 - any lighting required (either temporary or permanent) will be designed with an ecologist to ensure that potential 'displacement' effects on nocturnal animals, particularly SAC bat species, are avoided;
 - all compounds / pipe stores etc. will be sited, fenced or otherwise arranged to prevent vulnerable SAC species from accessing them;
 - all materials will be stored away from commuting routes / foraging areas that may be used by species that are European site interest features;
 - all excavations will have ramps or battered ends to prevent species becoming trapped; and

- pipe-caps must be installed overnight to prevent species entering and becoming trapped in any laid pipe-work.

5.6.4 Specific enhancement measures will relate to the potential for the creation of new wetland habitats associated with SuDs schemes, which may provide opportunities for a variety of species and which if well integrated with existing sites, could extend habitat connectivity and diversity. This will need to take into account, initial design, landscaping and habitat creation, plant and shrub species selection, planting regime (and timing) and resultant wetland water levels and quality (and their maintenance) to ensure water dependent species are not lost during periods of low rainfall. As with any other aspect of the drainage and wastewater network, clear commitments will also need to be given to ongoing maintenance of these newly created assets to ensure that they continue to perform effectively and support the gain in biodiversity envisaged.

Scheme Design and Planning

5.6.5 All measures will be subject to project-level environmental assessment, which will include assessments of their potential to affect European sites during their construction or operation. These assessments will consider or identify (inter alia):

- opportunities for avoiding potential effects on European sites through design (e.g. alternative pipeline routes; micro-siting; etc);
- construction measures that need to be incorporated into scheme design and or planning to avoid or mitigate potential effects – for example, ensuring that sufficient space is available for pollution prevention measures to be installed, such as sediment traps; and
- operational regimes required to ensure no adverse effects occur (e.g. maintain minimal flows – although note that these measures can only be identified through detailed investigation schemes).

Pollution Prevention

5.6.6 The habitats of European sites are most likely to be affected indirectly, through construction-site derived pollutants, rather than through direct encroachment. There is a substantial body of general construction good-practice which is applicable to all of the proposed measures and can be relied on (at this level) to prevent significant or adverse effects on a European site occurring as a result of construction site-derived pollutants. The following guidance documents detail the current industry best-practices in construction that are relevant to the proposed schemes:

- Defra's Pollution prevention for businesses (<https://www.gov.uk/guidance/pollution-prevention-for-businesses>)
- Venables R. et al. (2000) Environmental Handbook for Building and Civil Engineering Projects. 2nd Edition. Construction Industry Research and Information Association (CIRIA), London.

5.6.7 The best-practice procedures and measures detailed in these documents will be followed for all construction works derived from the draft DWMP as a minimum standard, unless scheme-specific investigations identify additional measures and / or more appropriate non-standard approaches for dealing with potential site-derived pollutants.

Effects on Human Health and Social and Economic Well-being

5.6.8 Construction activities should be undertaken so as to minimise short term adverse effects on recreational areas, such as footpaths, and on landscape and biodiversity. Noise, traffic disruption and visual impacts should also be considered. UJW and its contractors are enrolled in the

Considerate Constructors Scheme, a voluntary scheme which commits those contractors in the Scheme to be considerate and good neighbours, as well as clean, respectful, safe, environmentally conscious, responsible and accountable. Care should also be taken during construction regarding the potential for contaminants such as silt, concrete or fuel oil to pollute water courses via surface run off. This can be mitigated by undertaking all construction activities in accordance with relevant best practice pollution prevention guidance.

- 5.6.9 To maximise economic benefits in the U UW area, it is recommended that, where possible, work is carried out by local firms and contractors or by those with a policy for training and skills development that could help contribute to the local economy and meet employment needs.

Effects Climate Change and Resource Use

- 5.6.10 Where temporary pumping or treatment infrastructure is located in rural or remote areas, it is likely that generators will be required. In such circumstances, it is unlikely to be possible to use on-site energy generation or renewable sources of energy. However, the use of low emission plant could be used where feasible.
- 5.6.11 Where significant raw materials are required for options, this can be mitigated by utilising recycled and locally sourced materials. Construction and operational wastes should also be reused/recycled where appropriate.

Effects on Cultural Heritage and Landscape

- 5.6.12 The potential for adverse impacts of the settings of cultural heritage assets should be considered early in the design process and any adverse effects minimised, for example through micrositing/ alternative pipeline routes to avoid designated sites.
- 5.6.13 Proposed DWMP schemes could have a negative effect on landscape if new infrastructure is required, particularly where development cannot be located on previously developed land and/or where schemes are located within landscapes recognised for their importance and special qualities (National Parks and AONBs). In order to minimise such effects, new structures could be located close to existing structures or hedgerows and trees to provide some screening with the potential to utilise local building styles or incorporate landscaping schemes (e.g. tree/ hedge planting).

6. Next Steps

6.1 Consultation on this Environmental Report

- 6.1.1 This Environmental Report is being issued for consultation. We would welcome views on any aspect of this report.
- 6.1.2 Please provide your comments by the **Thursday 22nd September 2022**.
- 6.1.3 Please e-mail your responses to **DWMPConsultation@uuplc.co.uk**.

6.2 Next Steps

- 6.2.1 The draft DWMP and accompanying documents including this Environmental Report has been published for consultation. Following consultation, U UW will prepare a Statement of Response to the representations received during the consultation period setting out how and why the draft plan has or has not been revised to take account of the consultation responses. U UW will amend the draft plan and the final DWMP will be published and implemented accordingly. In conjunction with publishing the final DWMP, a Post Adoption Statement will also be issued (to meet the requirements of SEA regulation 16 (4)). This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final plan.

6.3 How Environmental Effects will be Considered During Plan Implementation

- 6.3.1 Once the draft DWMP has been adopted, the selected schemes for managing drainage and wastewater contained in it will need to be implemented through specific projects. As part of this process, each project may be subject to further assessment to understand and manage its potential environmental and social impacts. These assessments, which may include HRA and EIA, will take account of the issues discussed in this report but will also be informed by the greater detail available as the work progresses about construction techniques, building materials, and agreed locations and routes.

6.4 Monitoring the Effects of the DWMP

- 6.4.1 U UW will continue to develop its final DWMP in consultation with stakeholders. U UW expects to publish the final DWMP in 2023.
- 6.4.2 If the DWMP is implemented and specific options deployed, its effects on the environment and people will need to be taken into account. In this regard, it is a requirement of the SEA Regulations to establish how the significant effects of the DWMP will be monitored. Monitoring can help to answer questions such as:
- Were the SEA predictions of effects accurate?
 - Are mitigation measures performing as well as expected?
 - Are there any adverse effects? Are these within acceptable limits, or is remedial action desirable?

- 6.4.3 It is not necessary to monitor everything or monitor an effect indefinitely. Instead monitoring should be focussed on:
- significant effects that may give rise to irreversible damage, with a view to identifying trends before such damage is caused; and
 - significant effects where there was uncertainty in the SEA and where monitoring would enable preventative or mitigation measures to be undertaken.
- 6.4.4 UUW expects to monitor the effects of the DWMP alongside the other impacts of its operations, and as such, is likely to rely on existing sources of information that are collected either by UUW or by other relevant organisations such as the Environment Agency, Natural England or Natural Resources Wales. For example, UUW already collects certain data for an annual review process (the Annual Performance Report) that is submitted to the Office of Water Services (Ofwat) and their own environmental reporting.
- 6.4.5 **Table 6.1** indicates some of the issues currently monitored or which could be monitored in future, and how they relate to the SEA objectives used in the SEA of the draft DWMP. This list is provisional and indicative only; monitoring proposals will be considered further and a final monitoring framework that satisfies the requirements of the SEA Directive will be presented in the Post Adoption Statement.

Table 6.1 Potential Indicators for Monitoring Effects

SEA Objective	Indicator	Source of Information	Commentary
1. To protect, restore and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species, enhanced ecosystem resilience, habitat connectivity and creation and contribute to the sustainable management of natural habitats and ecosystems.	Condition of specific protected sites (e.g. SACs, SPAs, SSSIs)	United Utilities Water (UUW), Environment Agency, Natural England (NE), Natural Resources Wales (NRW)	Additionally, open communication between Environment Agency, NE and UUW results in up-to-date information and identification of any potential issues. NRW included, given the potential to consider sites in Wales.
	Biological monitoring (macroinvertebrates, macrophytes, fisheries, bird surveys)	UUW, Environment Agency, NRW	Monitoring/investigations support this indicator.
2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the appropriate and efficient use of land.	Area of previously undeveloped land used during construction	UUW	UUW could record the area of previously undeveloped land that is built on as a result of the DWMP scheme, linked to biodiversity net gain/resilience assessment completed.

SEA Objective	Indicator	Source of Information	Commentary
	Condition of sites designated for geological interest (e.g. geological SSSIs) on water industry land holdings	UUW, NE, NRW	Previous studies may also be used to inform monitoring and assessment. NRW included, given the potential to consider sites in Wales.
3. To protect and enhance the quality and quantity of surface and groundwater resources.	River flows, river levels, lake and reservoir levels. Water quality of surface waters. Groundwater levels, recharge characteristics and abstracted groundwater quality	UUW, Environment Agency	Previous studies may also be used to inform monitoring and assessment.
4. To reduce or manage flood risk.	Internal Sewer Flooding External Sewer Flooding Outcomes from the Catchment System Thinking (CaST) which provides a mechanism to understand the vulnerability of the sewer catchment to flooding as a result of an extreme wet weather event.	UUW,	UUW measure the number of incidents per year and keep a record of all flooding incidents per year.
5. To minimise emissions of pollutant gases and particulates and enhance air quality.	Nitrogen Oxide (NOx) per unit of renewable energy generated from bioresources	UUW	UUW measure NOx generated through digestion processes used to treat sewage sludge from wastewater treatment.
	Number of vehicle movements/distance travelled	UUW	UUW could considered recording the number of vehicle movements and distance travelled as an indicator of air quality impacts during implementation.
6. To reduce greenhouse gas emissions.	Quantity of greenhouse gas emissions per megalitre of water supplied.	UUW	UUW energy managers can use company data, and guidance from the UKWIR greenhouse gas workbook and BEIS (Department for Business, Energy & Industrial Strategy) conversion factors to derive this information.
	Energy use used in the operation of options.	UUW	UUW should hold and record energy consumption data e.g. via accounts / invoices.
	Renewable energy generated or purchased.	UUW	UUW should record renewable energy generation data, in addition to data on renewable energy purchased e.g. via accounts / invoices.
7. To adapt and improve resilience to the threats of climate change.	Internal Sewer Flooding External Sewer Flooding Outcomes from the Catchment System Thinking (CaST) which provides a mechanism to understand the vulnerability of the sewer catchment to flooding as a	UUW, Environment Agency	UUW measure the number of incidents per year and keep a record of all flooding incidents per year.

SEA Objective	Indicator	Source of Information	Commentary
	result of an extreme wet weather event.		
8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.	Number of UUW sites with public access which provide sporting, recreational and leisure resources and number of visits per year.	UUW	UUW hold information on the number of annual visitors to sites where specific visitor facilities are provided. These could be analysed to determine effects of operation on visitor use.
	Planned residential new development (informing predicted growth forecast to target catchments requiring investigations for potential future capacity constraints).	UUW	UUW examine information on planned growth and forecasts across LPA within the area.
9. To protect and enhance human health and well-being.	Compliance with drinking water standards at customers' taps (%).	UUW	UUW reports these data to Ofwat as part of the statutory returns process (Annual Performance Report) and to the Drinking Water Inspectorate.
	Compliance with water quality standards under the EC Bathing Waters Directive.	Environment Agency	Environment Agency monitors the compliance of bathing waters and report this annually.
	Number of nuisance-related complaints e.g. noise, dust.	UUW	UUW could record the number of nuisance-related complaints made in relation to implementation of the DWMP.
	Pollution Incidents Internal Sewer Flooding External Sewer Flooding Sewer Collapses Sewer Blockages	UUW, Environment Agency	UUW measure the number of pollution incidents per year and keep a record of all flooding incidents per year and maintain a list of intermittent discharges.
10. To promote and enhance the sustainable and efficient use of resilient water resources.	Leakage Water saved through demand management/ water efficiency measures	UUW	UUW report these data to Ofwat as part of the annual returns process.
11. To minimise waste, promote resource efficiency and move towards a circular economy.	Amount of recycled / reused materials used	UUW (contractors/consultants)	Information on the use of recycled / reused materials should be held by construction managers and accounts (contractors / consultants accounts, waste or procurement records).
	Proportion of waste sent to landfill	UUW (services data)	Information on waste disposal to landfill should be held by UUW.
	Chemicals Use in Water Treatment	UUW (services data)	Information (quantities, composition) on chemical use should be held in accounts.

SEA Objective	Indicator	Source of Information	Commentary
12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.	Loss / damage or discovery / protection of cultural, historic and industrial heritage features.	UUW, Historic England	Historic England monitor the condition of all statutorily protected monuments.
13. To conserve, protect and enhance landscape and townscape character and visual amenity.	Loss or damage to landscape character and features of designated sites.	UUW	UUW could record the number and size of infrastructure built within designated landscape sites.

DWMP Annual Review

6.4.6 UUW is also required to publish a specific annual review of the DWMP in line with the requirements outlined in the national framework.²⁴ Where evidence is sufficient to alter the direction of the DWMP or the direction of the government it will trigger the production of a new plan. This annual review will:

- Collate information on any material changes in the area, arising from new evidence or expert knowledge that changes our forecasts.
- Consider the progress of any projects, or other expected information to support the next iteration of the plan.
- Assess whether the material changes or the anticipated progress on initiatives will influence the conclusions of the published plan.

²⁴ Water UK (2018) A framework for the production of Drainage and Wastewater Management Plans. Available online via: <https://www.water.org.uk/wp-content/uploads/2018/12/Water-UK-DWMP-Framework-Report-Main-Document.pdf>

Appendix A

Schedule of Scoping Consultation Responses

Consultation on the UUW Drainage and Wastewater Management Plan (DWMP) environmental assessment methodologies took place between the 5th November and the 10th December 2021.

To support the consultation, a series of method statements for the proposed approaches to undertaking the environmental assessments of the respective plans were issued and comments invited. These were for:

- Strategic Environmental Assessment (SEA) – SEA Scoping Report;
- Habitats Regulations Assessment (HRA) – HRA Method Statement;
- Water Framework Directive (WFD) Assessment – WFD Assessment Methodology Statement.

The method statements were issued to the Environment Agency, Historic England (HE), Natural England (NE), Cadw, Natural Resources Wales (NRW), Welsh Government, Scottish Environment Protection Agency (SEPA), NatureScot and Historic Environment Scotland (HES).

A workshop was held on the 6th December 2021 to discuss the approaches to which all consultees were invited.

Responses were received to the SEA Scoping Report and the HRA Method Statement. No responses were received to the WFD Assessment Methodology Statement.

No response was received from HE and Welsh Government.

NRW responded to confirm that as "*United Utilities don't have any wastewater operations within Wales, NRW won't be responding as part of this consultation*".

Comments from the remaining bodies are summarised in this note.

Table A1.1 presents a summary of the responses to the SEA Scoping Report.

Table A1.1 Responses to consultee comments on the SEA Scoping Report

Consultee	Comments	Consultation Response
Environment Agency (EA1)	Please find attached the EA response to your DWMP SEA Scoping Report consultation, as per my previous email. Please note this is a general response setting out EA expectations and does not focus on the detail of your SEA scoping report.	Noted.
EA2	Other relevant stakeholders (such as local planning authorities, lead local flood authorities, other water companies, interested environmental groups, etc), beyond the SEA statutory consultation bodies ¹ should be consulted as the SEA process is progressed. This may present opportunities to, for example, optimise information collection processes, support the identification of key effects, and allow input to the development and assessment of reasonable alternatives prior to the next statutory consultation stage (i.e. on the draft DWMP and SEA Environmental Report).	<p>UUW recognise that the success of the DWMP relies heavily on sustained engagement and partnership working.</p> <p>As part of the preparation of the DWMP, UUW has facilitated workshops to discuss shared aims for the North West, attended various Catchment Based Approach (CaBA) meetings to facilitate collaborative catchment management and are working with stakeholders across local authorities, businesses, local communities and farmers.</p> <p>As the DWMP develops, UUW is now moving into the creation of 14 Strategic Planning Groups (SPGs) which invite potential stakeholders to help facilitate, develop and deliver collaborative solutions to tackle shared risks such as reducing flooding and improving water quality.</p> <p>Engagement on the findings of the SEA (and other environmental assessments) will be shared with stakeholders, to help inform the consultation on the draft DWMP.</p>
EA3	Where DWMPs are cross border or have potential for cross border effects the relevant SEA statutory consultation bodies for Wales and Scotland should be consulted.	The SEA Scoping Report identified that the DWMP could have the potential for effects in England, in Wales (on the Dee Estuary) and in Scotland (on the Solway Firth Estuary). In consequence, the scoping consultation included all the relevant SEA statutory consultation bodies for England, Wales and Scotland. Responses were received from the Environment Agency, Natural England, Cadw, NRW, NatureScot and HES.
EA4	The SEA Scoping Report should set the scope of the SEA for the DWMP and seek to focus attention to those issues that have the potential to be significant.	Section 4.2 presented the scope of the assessment reflecting the topics to be included, the geographic scope and timescales. Table 3.1 of Section 3 and Appendix C of the Scoping Report presented the key issues of relevance to the SEA, following an analysis of plans, programmes and strategies and baseline information.

Consultee	Comments	Consultation Response
EA5	<p>We would expect the items outlined in Table 1 below to be covered within the SEA Scoping Report, whilst keeping the report proportionate in length. Table 1 identifies the following requirements:</p> <ul style="list-style-type: none"> • Background to the DWMP, key objectives and alternatives • Set the study area for the Strategic Environmental Assessment • The relationship of the DWMP with other plans, programmes and policies should be established and used to help inform the key issues and opportunities identified. Please see attached list of key PPPs that the Environment Agency feel are relevant to the DWMP and should be considered. These are not exhaustive. • We also recommend engaging other stakeholders in the development of DWMPs to ensure all relevant plans, policies and programmes have been identified. • The environmental characteristics of the areas likely to be affected should be described. The current state of the environment and how this is likely to evolve in the absence of the DWMP should be given. <p>We would expect consideration to be given to resilience, climate adaptation, climate change effects, flood risk, natural capital, biodiversity net gain, water resources and WFD Regulations requirements. Also, likely future pressures on these from things like natural hazards and growth and development pressures</p> <p>Where are the valued features / sites?</p>	<p>Section 1.3 provided background to the DWMP, presents the planning objectives and outlines the approach to option development.</p> <p>Section 4.2, paragraphs 4.2.4 to 4.2.6 outlined the geographic extent of the SEA reflecting the study area.</p> <p>A review of related plans and programmes is contained at Appendix B and summarised in Section 2 of the Scoping Report. Key issues identified through a review of relevant plans and programmes (Section 2) and analysis of baseline conditions (Section 3 and Appendix C) have informed the development of the assessment framework presented (Section 4.3).</p> <p>The SEA Scoping Report was issued to the Environment Agency, HE, NE, Cadw, NRW, Welsh Government, SEPA, NatureScot and HES.</p> <p>Appendix C of the Scoping Report characterised the current environmental baseline conditions, along with how these are likely to change in the future. Appendix C of the Scoping Report presented this contextual information for the U UW operational area although it was noted that at scoping and until the plan measures were determined, it was not possible to determine with certainty the specific locations likely to be most affected by the plan.</p> <p>Section 3 and Appendix C presented the contextual information for the following topics:</p> <ul style="list-style-type: none"> • Biodiversity, Flora and Fauna; • Geology Land use and Soils; • Water (including flood risk); • Air Quality; • Climatic Factors; • Population and Human Health; • Material Assets and Resource Use;

Consultee	Comments	Consultation Response
	<p>Consideration should also be given to:</p> <ul style="list-style-type: none"> • Where are the valued features / sites? Where are the pressures and/or problem locations? What is the nature of the problem? How resilient is the area to this issue? • Are there particularly sensitive or important elements of the receiving environment that could be affected, e.g. vulnerable social groups, non-renewable resources, endangered species, rare habitats? • When considering future baseline trends – where have we come from and how is it likely to develop if the DWMP was not in place? • What are the opportunities for improvement? • Are there data gaps and uncertainties? How could these be addressed? 	<ul style="list-style-type: none"> • Cultural Heritage; and • Landscape. <p>The Climatic Factors section includes baseline information on carbon emissions and the evolution of the baseline present a summary of the effects including reference to the 2017 UK Climate Change Risk Assessment and evidence report. The Water section includes a subsection on flood risk, including reference to areas at risk of flooding in the UUW operational area. Information presented in the Biodiversity section is also relevant to BNG and natural capital, including the SCaMP and CaST programmes for integrated catchment management delivering lasting benefits to communities and the environment. The Water section outlines water resources and CAMS, whilst also providing information on WFD status in the water quality subsection.</p> <p>Appendix C of the Scoping Report characterised the current environmental baseline conditions, along with how these are likely to change in the future. This included designated features and sites presented in figures across the topics covered in the report. Where relevant, pressures and problems were identified in specific topics, along with any special or sensitive features.</p> <p>Section 3.3 of the Scoping Report described limitations of the data and the assumptions made.</p>
EA6	<p>We particularly draw your attention to the need to design an SEA methodology that effectively influences the production of the DWMP and allows for the robust assessment of reasonable alternatives. It is important that</p>	<p>Section 4.4 of the Scoping Report identified that the effects of the draft DWMP would be assessed in a staged process, complementary to the development of the plans, and reflecting the decision-making requirements, as follows:</p>

Consultee	Comments	Consultation Response
	<p>the justification for the preferred solutions within the DWMP is captured fully and the decision making rationale is given, especially where environmentally preferred options are not taken forward. Cumulative effects should be carefully considered for the DWMP, in particular because of other water plans being produced concurrently namely Water Resource Management Plans, Regional Water Plans, and Drought Plans. Strategic Resource Options should also be considered fully for cumulative and in combination effects. Water Company Pollution Incident Reduction Plans and Infiltration Reduction Plans should also be considered. Other strategic plans prepared by stakeholders other than the water companies will also be relevant, such as River Basin Management Plans, Flood Risk Management Plans and strategic spatial planning documents like local plans. A list of relevant plans, policies and programmes (PPPs) for consideration is attached to this letter</p>	<ul style="list-style-type: none"> • High-level interventions to address planning objective per drainage area will be considered with environmental constraints identified, assessed and implications for mitigation identified, drawing where appropriate from other assessments (such as the WRMP24 where interventions are common between plans, e.g., behavioural change). • Preferred programme of interventions per identified drainage area, combining generic and location specific options with a particular focus on the complex and strategic locations. This will ensure that the effects of the draft Plan have been identified, described and evaluated. • Alternative Plan assessments: if alternative plans or plan pathways are identified for the draft DWMPs, the cumulative effects will be identified, described and evaluated for consideration along with the preferred plan. It is assumed that the alternative plans will comprise alternative selections of options that have already been assessed. <p>Paragraph 4.4.13 states "The SEA Regulations require that the cumulative effects of the draft DWMPs are assessed. In addition to the assessments of the preferred programme of option, this would also include the cumulative effects of the draft DWMP <u>in-combination</u> with other plans and programmes.</p>
EA7	<p>The DWMP should undertake an assessment under the Habitats Regulations as appropriate.</p>	<p>A separate HRA of the DWMP is being undertaken.</p> <p>Its findings have been used, as appropriate in the completion of the SEA, notably when considering the effects on biodiversity.</p>
EA8	<p>The requirements of the WFD Regulations together with the opportunities to deliver the improvements set out in the River Basin Management Plans should be assessed as part of the development of the DWMP and be fed into the SEA.</p>	<p>A separate WFD assessment is being undertaken to demonstrate that DWMP will not cause a deterioration in respect of baseline conditions and identified water body objectives and for those water bodies that are not currently attaining good status, UUW must be able to confirm that it would not preclude the delivery of measures to facilitate the improvements needed to attain good status.</p> <p>A draft WFD Assessment Methodology Statement was issued as part of the scoping consultation. No comments were received on the draft methodology.</p>

Consultee	Comments	Consultation Response
Natural England (NE1)	<p>Q1. Do you think that this Scoping Report sets out sufficient information to establish the context for the SEA of the draft DWMP in terms of the review of plans and programmes and baseline evidence and analysis? If not, which areas do you think have been missed and where is information on these topics available from?</p> <p>No Response</p>	<p>The WFD assessment findings will be used, as appropriate in the completion of the SEA, notably when considering the effects on water.</p> <p>No action.</p>
NE2	<p>Q2. Do you agree that the main economic, social and environmental issues identified are relevant to the SEA of the draft DWMP? If not, which issues do you think need to be included or excluded?</p> <p>The main environmental issues identified within the SEA are relevant to the draft DWMP. Natural England would further advise the following.</p> <p>Table NTS.1. Advise strengthening the wording - Water - The potential effects of climate change and the need to build climate change resilience into the water environment and water management. To The need to mitigate the potential effects of climate change and the need to build climate change resilience into the water environment and water management.</p>	<p>Noted.</p> <p>Table NTS1 presented the key environmental, social and economic issues relevant to the Draft DWMP. Under climatic factors, this included</p> <ul style="list-style-type: none"> the need to reduce greenhouse gas emissions arising from implementation of the DWMP; the need to take into account, and where possible adapt to, the potential effects of climate change; the need to increase environmental resilience to the effects of climate change. <p>Under water, this also included the <i>“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 water and groundwaters”</i>. Whilst the specific issue identified in the comment are missing from those presented in the SEA Scoping Report, the opportunities for mitigation and enhancement are captured in the proposed SEA objectives.</p>

Consultee	Comments	Consultation Response
NE3	<p>Additionally, for Table NTS.1, advise having a specific point for the 'Biodiversity, Flora and Fauna' which explicitly recognises the need to ensure biodiversity is resilient to a changing climate.</p>	<p>Table NTS1 included the following issue <i>"The need to recognise the importance of allowing wildlife to adapt to climate change"</i>, which has been amended to <i>"The need to recognise the importance of ensuring biodiversity is resilient to the effects of climate change, including allowing adaptation."</i></p>
	<p>Q3. Do you agree with the proposed approach to the SEA of the draft DWMP? Do the SEA objectives and guide questions that comprise the assessment framework cover a sufficient range of environmental, social and economic topics? If not, which objectives/guide questions should be amended and which other objectives/guide questions do you believe should be included?</p>	
	<p>Natural England supports the proposed approach to the SEA of the dDWMP and additionally would advise the following:</p>	Noted.
	<p>Table 2.2. The Natural Environment and Rural Communities Act should also be included as a Key source for 'Biodiversity Flora and Fauna - Conservation and enhancement of the levels and variety of biodiversity, including designated sites, priority species and habitats'. The Habitats Directive, the Wildlife & Countryside Act & the Conservation of Habitats & Species Regulations should also be a key source for 'Water – Protection and enhancement of all water supplies and resources'</p>	<p>Table 2.2 will be revised to include The Natural Environment and Rural Communities Act and the proposed amendments to the legislation identified for 'Water – Protection and enhancement of all water supplies and resources'.</p>
	<p>For the proposed objectives for 'Biodiversity, Flora and Fauna' & 'Water – Quantity and Quality' an objective which recognises the need to ensure legislative & policy targets for biodiversity protection & enhancement are achieved should be included. This will strengthen the objective to 'protect, restore and enhance biodiversity' and 'protect and enhance the quality and quantity of surface and groundwater resources' by having an outcome orientated objective which can be measured against.</p>	<p>Noted.</p> <p>Typically, SEA objectives tend not to state direct compliance, as they are <i>"a statement of what is intended, specifying a desired direction of change"</i> [ODPM et al (2005), <i>A Practical Guide to the SEA Directive</i>] reflecting the contextual information gathered, analysed and key issues identified. The definitions and thresholds of significance presented in Appendix D, detail the measurable outcomes which will be used to assess the effects.</p>

Consultee	Comments	Consultation Response
	<p>Table 4.2 – Draft Assessment Framework - Proposed Guide Questions</p> <p>For the proposed guide questions for the Topic 'Biodiversity, Flora & Fauna' advise additionally asking - Will it support the achievement of applicable environmental objectives set out in the relevant environmental policy and legislation including the 25 Year Environment Plan, Habitats Regulations & the Wildlife & Countryside Act? Also advise including a question relating to biodiversity resilience to climate change, for example - Will it promote climate change resilience of both designated and non-designated sites?</p> <p>For 'Water - quantity and quality' – additionally propose for water quality asking whether - Will it support the achievement of the Habitat Directive protected area objectives? & Will it support the achievement of relevant environmental objectives set out in the Site Improvement Plans for Habitat Sites?</p>	<p>Section 2 and Appendix B presented the review of plans and programmes, including reference to the 25 Year Environment Plan, Habitats Regulations and the Wildlife & Countryside Act. This has identified the relevant objectives which are reflected and summarised in Table 2.2, which in turn informs the SEA assessment objectives. The definitions and thresholds of significance presented in Appendix D, detail the measurable outcomes which will be used to assess the effects.</p> <p>The guide questions for 'Biodiversity, Flora and Fauna' will be revised to include the additional suggested question "<i>Will it promote climate change resilience of both designated and non-designated sites?</i>".</p> <p>The HRA will provide an assessment of the DWMP against the requirements of the Habitats Regulation 63 (and, if applicable, Regulation 64). This will determine whether there will be any 'likely significant effects' on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects) and, if so, provide an appropriate assessment of the implications for the site in view of that site's conservation objectives to ensure that there are no 'adverse effects on site integrity'. No change is proposed to the guide questions to avoid unintended duplication with the HRA; however, the findings of the HRA will be used, as appropriate in the completion of the SEA notably when identifying, describing and evaluating the likely significant effects of the DWMP on biodiversity.</p>
	<p>Table 4.3 – Include space to provide comment on the likely significant effects of the option alone – as well as the in-combination effects comment section already included.</p>	<p>Noted. Table 4.3 was presented as an example of the assessment matrix. A separate matrix will be provided to record the cumulative, synergistic and secondary effects.</p>
<p>Cadw (C1)</p>	<p>Q1. Do you think that this Scoping Report sets out sufficient information to establish the context for the SEA of the draft DWMP in terms of the review of plans and programmes and baseline evidence and analysis? If not,</p>	<p>Noted.</p> <p>The additional identified plans will be included in the review of plans and programmes summarised in Section 2 of the Scoping Report, and also presented in Appendix B.</p>

Consultee	Comments	Consultation Response
	<p>which areas do you think have been missed and where is information on these topics available from?</p> <p>No. There is a need to add the following to the list: National Assembly for Wales (2016) Historic Environment (Wales) Act National Assembly for Wales (2021) Future Wales: The National Plan 2040</p>	
C2	<p>Q2. Do you agree that the main economic, social and environmental issues identified are relevant to the SEA of the draft DWMP? If not, which issues do you think need to be included or excluded?</p> <p>Yes</p>	Noted.
C3	<p>Q3. Do you agree with the proposed approach to the SEA of the draft DWMP? Do the SEA objectives and guide questions that comprise the assessment framework cover a sufficient range of environmental, social and economic topics? If not, which objectives/guide questions should be amended and which other objectives/guide questions do you believe should be included?</p> <p>Yes</p>	Noted.
SEPA	<p>We will not be providing detailed comments on your scoping report; instead we refer you to our SEA topic guidance notes www.sepa.org.uk/environment/land/planning/strategic-environmental-assessment/ which provide advice in regard to the scope and level of detail to be included in environmental reports in respect of our main areas of interest (air, water, soil, human health, material assets and climatic factors).</p>	Noted.

Consultee	Comments	Consultation Response
NatureScot	We note that the Plan will apply only to England and we support the recognition that there is potential for a cross border effect with Scotland. We note that the review of key plans, policies, programmes and legislation includes references applicable within Scotland.	Noted
Historic Environment Scotland (HES1)	We note that the historic environment has been scoped into the assessment and on the basis of our interests and the information provided, we are content with this approach and are satisfied with the scope and level of detail proposed for the assessment.	Noted.
HES2	While no consultation time period is specified in the report we would normally advise a minimum of 6 weeks	Noted.

Appendix B

Review of Plans and Programme



International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMP and the SEA
The Bonn Convention (or CMS) (1979) <i>The Convention on the Conservation of Migratory Species of Wild Animals</i>	
<p>The Convention on the Conservation of Migratory Species of Wild Animals (also known as the Bonn Convention or CMS) is an intergovernmental treaty under the United Nations Environment Programme. The convention was signed in 1979 ratified in the UK in 1985.</p> <p>The convention aims to ensure contracting parties work together to conserve terrestrial, marine and avian migratory species and their habitats (on a global scale) by providing strict protection for endangered migratory species.</p> <p>Overarching objectives set for the Parties are:</p> <ul style="list-style-type: none"> • Should promote, co-operate in and support research relating to migratory species; • Shall endeavour to provide immediate protection for migratory species; • Shall endeavour to conclude Agreements covering the conservation and management of migratory species included in Appendix II. <p>Setting targets is the responsibility of member states.</p>	<p>The DWMP should take into account the habitats and species that have been identified under this directive, and should include provision for their protection, preservation and improvement. The SEA assessment framework should include biodiversity, incorporating the importance of conserving migratory species.</p>
Council of Europe (1979) <i>The Convention on the Conservation of European Wildlife and Natural Habitats (The Bern Convention)</i>	
<p>The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979, and came into force in 1982.</p> <p>The principal objectives are:</p> <ul style="list-style-type: none"> • To conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States; • To promote such co-operation. Particular emphasis is given to endangered and vulnerable species, including endangered and vulnerable migratory species; • In order to achieve this the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species. <p>Targets for Contracting Parties are:</p> <ul style="list-style-type: none"> • Promoting national policies for the conservation of wild flora, wild fauna and natural habitats, with particular attention to endangered and vulnerable species, especially endemic ones, and endangered habitats, in accordance with the provisions of this Convention; • Undertaking in its planning and development policies, and in its measures against pollution, to have regard to the conservation of wild flora and fauna; <p>Promoting education and disseminating general information on the need to conserve species of wild flora and fauna and their habitats.</p>	<p>The DWMP should take into account the habitats and species that have been identified under the Convention, and should include provision for the preservation, protection and improvement of the quality of the environment as appropriate. The SEA assessment framework should incorporate the conservation provisions of the Convention particularly the protection of wild flora, fauna and natural habitats.</p>
Council of Europe (1985) <i>The Convention for the Protection of the Architectural Heritage of Europe (The Granada Convention)</i>	
<p>The main purpose of the convention is to reinforce and promote policies for the conservation and enhancement of Europe's heritage and to foster closer European co-operation in defence of heritage. Recognition that conservation of heritage is a cultural purpose and integrated conservation of heritage is an important factor in the improvement of quality of life.</p>	<p>The SEA assessment framework should include an objective on the conservation and enhancement of heritage and decision making criteria on architectural heritage.</p>
Council of Europe (1992) <i>Convention on the Protection of Archaeological Heritage (The Valetta Convention)</i>	
<p>Agreement that the conservation and enhancement of an archaeological heritage is one of the goals of urban and regional planning policy. It is concerned in particular with the need for co-operation between archaeologists and planners to ensure optimum conservation of archaeological heritage.</p>	<p>The SEA assessment framework should include an objective on the conservation and enhancement of heritage and decision making criteria on archaeological heritage.</p>

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMP and the SEA
Council of Europe (2000), <i>The European Landscape Convention (The Florence Convention)</i> (became binding March 2007)	
<p>The European Landscape Convention was adopted on 20 October 2000 in Florence and came into force on 1 March 2004 (Council of Europe Treaty Series no. 176). It is open for signature by member states of the Council of Europe and for accession by the European Community and European non-member states. The UK Government signed the European Landscape Convention in 2006 and it became binding from March 2007.</p> <p>The aims of the Convention are to promote landscape protection, management and planning, and to organise European co-operation on landscape issues.</p> <p>Responsibility for implementation has been deferred to the signatories. Articles 5 (general measures) and 6 (specific measures) set out measures that the signatories will undertake, e.g. integrating landscape into policies with possible direct or indirect impact on landscape and to introduce instruments aimed at protecting, managing and/or planning the landscape.</p>	<p>The DWMP should take landscape into account.</p> <p>The SEA assessment framework should include an objective on landscape.</p>
Council of Europe (2003) <i>European Soils Charter</i>	
<p>Sets out common principles for protecting soils across the European Union area.</p>	<p>The DWMP should take soils into account.</p> <p>The SEA assessment framework should include an objective on soils.</p>
European Commission (1991) <i>The Nitrates Directive 91/676/EEC</i>	
<p>The Nitrates Directive is designed to reduce water pollution caused by nitrate from agriculture. The directive requires Defra and the Welsh Government to identify surface or ground waters that are, or could be high in nitrate from agricultural sources.</p> <p>Once a water body is identified as being high in nitrate all land draining to that water is designated a Nitrate Vulnerable Zone. Within these zones, farmers must observe an action programme of measures which include restricting the timing and application of fertilisers and manure and keeping accurate records.</p>	<p>The DWMP should be consistent with the aim to reduce water pollution caused by nitrates from agriculture.</p> <p>The SEA assessment framework should include water quality.</p>
European Commission (1991) <i>Urban Waste Water Treatment Directive 1991/271/EEC</i>	
<p>The aim of the Urban Waste Water Directive is to protect the environment from the adverse effects of waste water discharges. It sets out guidelines and legislation for the collection, treatment and discharge of urban waste water. The Directive was adopted by member states in May 1991 and is transposed into law in England and Wales by The Urban Waste Water Treatment (England & Wales) Regulations 1994 (as amended*). The Regulations require that all significant discharges are treated to at least secondary treatment. They also set standards and deadlines for the provision of sewage systems, the treatment of sewage according to the size of the community served by the sewage treatment works and the sensitivity of receiving waters to their discharges.</p>	<p>The DWMP will need to reflect the guidelines and legislation set out in the directive.</p> <p>The SEA assessment framework should include water quality.</p>
European Commission (1992) <i>The Habitats Directive 1992/43/EEC</i>	
<p>The Habitats Directive seeks to conserve natural habitats. Conservation of natural habitats requires member states to identify special areas of conservation and to maintain where necessary landscape features of importance to wildlife and flora.</p> <p>It is required that each Member State propose a list of sites indicating which natural habitat types and which species the sites host. The information would include a map of the site, its name, location and its extent. The Commission will then establish, in agreement with each Member State, a draft list of sites of Community importance drawn from the Member States' lists identifying those which host one or more priority natural habitat types or priority species.</p>	<p>The DWMP should take into account the habitats and species that have been identified under this Directive, and include provision for the preservation, protection and improvement of the quality of the environment as appropriate.</p> <p>The SEA assessment framework should incorporate sites protected for their nature conservation importance.</p>
European Commission (1998) <i>Drinking Water Directive 1998/83/EC</i>	

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMP and the SEA
<p>The Drinking Water Directive (DWD) concerns the quality of water intended for human consumption. The objective of the DWD is to protect the health of the consumers in the EU and to make sure the water is wholesome and clean. To do this, the DWD sets standards for 48 (microbiological and chemical) parameters that can be found in drinking water. The parameters must be monitored and tested regularly. In principle WHO guidelines for drinking water are used as a basis for the standards in the DWD. While translating the DWD into their own national legislation (transposition of the DWD), the Member States of the European Union can include additional requirements e.g. regulate additional substances that are relevant within their territory or set higher standards. However, Member States are not allowed to set lower standards as the level of protection of human health should be the same within the whole EU. Member States have to monitor the quality of the drinking water supplied to their citizens and of the water used in the food production industry. Member States report at three yearly intervals the monitoring results to the European Commission.</p> <p>Standards constitute legal limits. Sets limits for microbiological and chemical parameters in drinking water. Also gives indicator parameters.</p>	<p>The DWMP should seek to ensure the continuity of a safe and secure drinking water supply and protect or improve drinking water quality where possible.</p> <p>The SEA assessment should consider the effects on water and human health.</p>
European Commission (1999) Directive on the Landfill of Waste 99/31/EC	
<p>The Directive aims at reducing the amount of waste landfilled; promoting recycling and recovery; establishing high standards of landfill practice across the EU, and preventing the shipping of waste from one Country to another.</p> <p>The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment (in particular on surface water, groundwater, soil, air and human health) from the land-filling of waste, by introducing stringent technical requirements for waste and landfills.</p> <p>The Directive requires the reduction of the amount of biodegradable municipal waste sent to landfill to 75% of the total generated in 1995 by 2006, 50% by 2009 and 35% by 2016.</p>	<p>The DWMP should take the effects on waste to landfill into account.</p> <p>The SEA assessment should consider the effects on water, soil, air, human health and waste</p>
European Commission (2000) The Water Framework Directive 2000/60/EC	
<p>The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater and to achieve good qualitative and quantitative status of all water bodies (including marine waters up to one nautical mile from shore). The framework aims to:</p> <ul style="list-style-type: none"> • Protect any further deterioration and enhance the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems; • Promote sustainable water use based on a long-term protection of available water resources; • Enhance protection and improvement of the aquatic environment, inter alias, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances; • Ensure the progressive reduction of pollution of groundwater and prevent its further pollution; • Contribute to mitigating the effects of floods and droughts. <p>Key targets and indicators relevant to the DWMP and SEA are:</p> <ul style="list-style-type: none"> • Achievement of good ecological status and good surface water chemical status by 2015 unless alternative objectives have been identified; • Achievement of good ecological potential and good surface water chemical status for heavily modified water bodies and artificial water bodies; 	<p>The DWMP needs to consider the implication of the Directive in terms of sustainable water use, protection and improvement of the aquatic environment, reducing and preventing pollution and mitigating the effects of flood and droughts.</p> <p>The SEA assessment framework should include water quality, water resources, sustainable water use, and biodiversity.</p>

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMP and the SEA
<ul style="list-style-type: none"> Prevention of deterioration, including of each element, from one status class to another; Achievement of water-related objectives and standards for protected areas; Achievement of good groundwater quantitative and chemical status by 2015; Reversal of any significant and sustained upward trends in pollutant concentrations and prevent or limit input of pollutants to groundwater; Achievement of water related objectives and standards for protected areas and contributes to mitigating the effects of flood and droughts. 	
European Commission (2001) Directive on the Assessment of the Effects of Certain Plans and Programmes on the Environment (The SEA Directive) 2001/42/EC	
<p>The objective of the SEA Directive 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 and programmes with a view of contributing towards sustainable development".</p> <p>Throughout the course of the development of the plan, policy or programme, the aim of SEA is to identify the potential impact of options proposed in the plan in terms of their environmental, economic and social effects. If any adverse effects are identified, these options can then be avoided or proposals modified to manage or mitigate adverse effects.</p>	<p>This directive is the driver for SEA. All topics identified in the SEA Directive should be considered within the scope of the assessment. Need to ensure that the subsequent Environmental Report meets the requirements of Annex I of the SEA Directive.</p>
European Commission (2002) Directive on the Energy Performance of Buildings 2002/91/EC	
<p>The European Union Energy Performance of Buildings Directive was published in the Official Journal on the 4th January 2003. The overall objective of the Directive is to <i>promote the improvement of energy performance of buildings within the Community taking into account outdoor climate and local conditions as well as indoor climate requirements and cost effectiveness</i>.</p> <p>The Directive highlights how the residential and tertiary sectors, the majority of which are based in buildings, accounts for 40% of EU energy consumption.</p>	<p>The SEA should highlight any opportunities for new buildings associated with the DWMP to contribute to improved energy performance.</p>
European Commission (2002) The Environment Noise Directive (END) 2002/49/EC	
<p>The END aims to "define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to the exposure to environmental noise". For that purpose several actions are to be progressively implemented. It furthermore aims at providing a basis the harmful effects, including annoyance, due to the exposure to environmental noise". For that purpose several actions are to be progressively implemented. It furthermore aims at providing a basis for developing EU measures to reduce noise emitted by major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery.</p> <p>The underlying principles of the Directive are similar to those underpinning other overarching environment policies (such as air or waste), i.e.:</p> <ul style="list-style-type: none"> Monitoring the environmental problem; by requiring competent authorities in Member States to draw up "strategic noise maps" for major roads, railways, airports and agglomerations, using harmonised noise indicators Lden (day-evening-night equivalent level) and Lnight (night equivalent level). These maps will be used to assess the number of people annoyed and sleep-disturbed respectively throughout Europe. Informing and consulting the public about noise exposure, its effects, and the measures considered to address noise, in line with the principles of the Aarhus Convention. Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain environmental noise quality where it is good. The directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities. 	<p>The DWMP will need to have regard to the requirements of the END.</p> <p>The SEA assessment framework should include for the protection against excessive noise.</p>

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMP and the SEA
<ul style="list-style-type: none"> Developing a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source. With this respect, the Commission has made a declaration concerning the provisions laid down in article 1.2 with regard to the preparation of legislation relating to sources of noise. 	
European Commission (2004) Environmental Liability Directive 2004/35/EC	
The Directive establishes a framework for environmental liability based on the "polluter pays" principle, with a view to preventing and remedying environmental damage.	The SEA should take account of the need to ensure that proposals in the DWMP avoid causing direct or indirect damage to the aquatic environment or contamination of land that creates a significant risk to human health.
European Commission (2005) Thematic Strategy on Air Pollution	
This strategy supplements legislation. It sets out objectives for air pollution and proposes measures for achieving them by 2020.	The DWMP should be in accordance with the requirements of the strategy. The SEA should take into account the need to improve air quality.
European Commission (2006) The Bathing Waters Directive 2006/7/EC	
<p>The Bathing Waters Directive applies to surface waters that can be used for bathing except for swimming pools and spa pools, confined waters subject to treatment or used for therapeutic purposes and confined waters artificially separated from surface water and groundwater. The Directive is intended to:</p> <ul style="list-style-type: none"> Be based on scientific knowledge on protecting health and the environment, as well as environmental management experience, Provide better and earlier information of citizens about quality of their bathing waters, including logos, Move from simple sampling and monitoring of bathing waters to bathing quality management, and Be integrated into all other EU measures protecting the quality of all our waters (rivers, lakes, ground waters and coastal waters) through the Water Framework Directive. <p>Two main parameters for analysis (intestinal enterococci and escherichia coli) are defined, instead of nineteen in the previous Directive. These parameters will be used to monitor and assess the quality of bathing waters and to classify them. Other parameters could be taken into account, such as the presence of cyanobacteria or microalgae.</p> <p>Member States must monitor the bathing waters every year. The monitoring calendar should provide for at least four samples to be taken per season (except where the season is very short or where there are special geographic constraints). The sampling interval should not be longer than one month. Upon the monitoring results gathered in four years, Member States should assess the bathing waters at the end of every season. A shorter period may be acceptable in some cases.</p> <p>The waters are classified according to their level of quality: poor, sufficient, good or excellent, linked to clear numerical quality standards for bacteriological quality. The category "sufficient" is the minimum quality threshold that all Member States should attain by the end of the 2015 season at the latest. Where water is classified as "poor", Member States should take certain management measures, e.g. banning bathing or posting a notice advising against it, providing information to the public, and suitable corrective measures.</p>	<p>The DWMP will need to comply with set limits.</p> <p>The SEA assessment should include a guide question relating to the effects of options on the water quality at designated bathing waters.</p>

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European Commission (2006) Directive on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals 2006/88/EC	
<p>The Directive establishes:</p> <ul style="list-style-type: none"> • Animal health requirements for the placing on the market, importation and transit of aquaculture animals and their products; • Minimum measures to prevent diseases in aquaculture animals; • Minimum measures to be taken in response to suspected or established cases of certain diseases in aquatic animals. 	The SEA should take account of the need to maintain or enhance the quality of habitats and biodiversity.
European Commission (2006) Directive on the protection of groundwater against pollution and deterioration 2006/118EC	
This Directive establishes specific measures as provided for in Article 17(1) and (2) of Directive 2000/60/EC (Water Framework Directive) in order to prevent and control groundwater pollution. This Directive is designed to prevent and combat groundwater pollution.	The SEA should take account of the need to maintain, protect and improve water quality across the DWMP area.
European Commission (2006) Fresh Water Fish Directive 2006/44/EC	
The Directive seeks to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters, it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters. The Directive is designed to protect and improve the quality of rivers and lakes to encourage healthy fish populations.	The SEA should take account of the need to promote the protection of river and lake water quality in order to maintain and develop suitable environments that will sustain freshwater fish populations.
European Commission (2006) Mining Waste Directive 2006/21/EC	
The Directive aims to prevent or reduce as far as possible any adverse effects on the environment, and any resultant risks to human health, brought about as a result of the management of waste from the extractive industries. The Directive covers the management of waste resulting directly from prospecting, extraction, treatment and storage of mineral resources and from quarrying. Operators are required to use Best Available Techniques in the management of waste facilities and the prevention of major accidents.	The DWMP should have regard to the aim to avoid adverse effects from extractive waste. The SEA assessment framework should include consideration of waste.
European Commission (2006) Thematic Strategy for Soil Protection	
<p>The <i>Thematic Strategy for Soil Protection</i> consists of a Communication from the Commission to the other European Institutions, a proposal for a framework Directive (a European law), and an Impact Assessment.</p> <p>It sets out an EU strategy for soil protection with an overall objective of the protection and sustainable use of soil, based on the following guiding principles:</p> <p>(1) Preventing further soil degradation and preserving its functions:</p> <ul style="list-style-type: none"> • when soil is used and its functions are exploited, action has to be taken on soil use and management patterns; and • when soil acts as a sink/receptor of the effects of human activities or environmental phenomena, action has to be taken at source. <p>(2) Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil.</p> <p>The strategy proposes introducing a framework Directive setting out common principles for protecting soils across the EU, with Member States deciding how best to protect soil and how use it in a sustainable way on their own territory.</p>	The DWMP should take potential effects on soil into account. The SEA assessment framework should include soils.
European Commission (2007) The Eel Directive 2007/1100/EC	
The Eel Directive establishes measures for the recovery of the stock of European eel and requires member states to produce Eel management plans for each catchment.	The DWMP should ensure that there are no adverse impacts on eel as a result of drainage and wastewater management measures.

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European Commission (2007) Floods Directive 2007/60/EC	
The Directive's aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive shall be carried out in coordination with the Water Framework Directive, notably by flood risk management plans and river basin management plans being coordinated, and through coordination of the public participation procedures in the preparation of these plans.	The DWMP should take account of the flood risk management plans. The SEA assessment framework should include flood risk.
European Commission (2008) Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC	
The Directive: <ul style="list-style-type: none"> • defines and establishes objectives for ambient air quality to avoid, prevent or reduce harmful effects on human health and the environment as a whole; • assesses the ambient air quality in Member States using common methods and criteria; • obtains information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures; • ensures that such information on ambient air quality is made available to the public; • seeks to maintain air quality where it is good and improving it in other cases; and • promotes increased cooperation between the Member States in reducing air pollution. 	The DWMP should contribute towards achieving air quality standards set out in the Directive. The SEA assessment framework should include air quality.
European commission (2008) Directive on Waste (Directive 75/442/EEC, 2006/12/EC 2008/98/EC as amended)	
The essential objective of all provisions relating to waste management should be the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste. Some key objectives include: <ul style="list-style-type: none"> • The recovery of waste and the use of recovered materials as raw materials should be encouraged; • Member States should, in addition to taking responsible action to ensure the disposal and recovery of waste, take measures to restrict the production of waste; • It is important for the Community as a whole to become self-sufficient in waste disposal and desirable for Member States individually to aim at such self-sufficiency; • Waste management plans should be drawn up in the Member States; • Movements of waste should be reduced; • Ensure a high level of protection and effective control; • Subject to certain conditions, and provided that they comply with environmental protection requirements, some establishments which process their waste themselves or carry out waste recovery may be exempted from permit requirements; • That proportion of the costs not covered by the proceeds of treating the waste must be defrayed in accordance with the 'polluter pays' principle. 	The DWMP should seek to ensure the protection of human health and the environment in relation to waste management. The SEA assessment should include objectives on the protection of human health and the environment.
European Commission (2008) Environmental Quality Standards Directive 2008/105/EC	
The Directive aims to control the concentration of certain substances which pose a risk to the aquatic environment. The 33 'priority substances' addressed by the Directive are defined by the Water Framework Directive (2000/60/EC), including cadmium, lead, mercury, nickel, benzene and polyaromatic hydrocarbons. The Directive sets thresholds of concentration that must not be exceeded, with limits to average values over a year to ensure long-term water quality and maximum allowable concentrations to limit short term pollution peaks. Member States must comply with the water quality standards and record an inventory of emissions and discharges of all substances in the Directive.	The assessment framework should include assessment criteria relating to water quality.
European Commission (2008) Marine Strategy Framework Directive 2008/56/EC	

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<p>The Directive sets out a framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal of the Directive is to achieve 'Good Environmental Status' (GES) by 2020 across Europe's marine environment. The Directive establishes four European Marine Regions, based on geographical and environmental criteria. The North East Atlantic Marine Region is divided into four subregions, with UK waters lying in two of these (the Greater North Sea and the Celtic Seas).</p> <p>Each Member State is required to develop a marine strategy for their waters, in coordination with other countries within the same marine region or subregion. Marine strategies must be implemented to protect and conserve the marine environment, prevent its deterioration, and, where practicable, restore marine ecosystems in areas where they have been adversely affected. The marine strategies must contain:</p> <ul style="list-style-type: none"> • An initial assessment of the current environmental status of that Member State's marine waters; • A determination of what Good Environmental Status means for those waters; • Targets and indicators designed to show whether a Member State is achieving GES; • A monitoring programme to measure progress towards GES; • A programme of measures designed to achieve or maintain GES. <p>The Directive also requires Marine Protected Areas (MPAs) to be established to support the achievement of GES.</p>	<p>The SEA assessment framework should incorporate assessment criteria relating to the quality of the marine environment.</p>
European Commission (2009) Directive on the Conservation of Wild Birds 2009/147/EC (codified version of Council Directive 79/409/EEC as amended)	
<p>The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. The main provisions of the Directive include:</p> <ul style="list-style-type: none"> • The maintenance of the populations of all wild bird species across their natural range (Article 2) with the encouragement of various activities to that end (Article 3). • The identification and classification of Special Protection Areas (SPAs) for rare or vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance (Article 4). (Together with Special Areas of Conservation designated under the Habitats Directive, SPAs form a network of European protected areas known as Natura 2000). • The establishment of a general scheme of protection for all wild birds (Article 5). • Restrictions on the sale and keeping of wild birds (Article 6). • Specification of the conditions under which hunting and falconry can be undertaken (Article 7). (Huntable species are listed on Annex II of the Directive). • Prohibition of large-scale non-selective means of bird killing (Article 8). • Procedures under which Member States may derogate from the provisions of Articles 5-8 (Article 9) — that is, the conditions under which permission may be given for otherwise prohibited activities. • Encouragement of certain forms of relevant research (Article 10 and Annex V). <p>Requirements to ensure that introduction of non-native birds do not threaten other biodiversity (Article 11).</p>	<p>The DWMP should seek to protect and enhance biodiversity, particularly designated sites. The SEA assessment framework should include objectives, indicators and targets that cover biodiversity.</p>
European Commission (2009) Promotion of the use of energy from renewable sources Directive 2009/28/EC	
<p>This Directive establishes a common framework for the use of energy from renewable sources in order to limit greenhouse gas emissions and to promote cleaner transport. It encourages energy efficiency, energy consumption from renewable sources and the improvement of energy supply.</p>	<p>The DWMP should seek to contribute towards increasing the proportion of energy from renewable energy sources.</p>

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<p>The Member States are to establish national action plans which set the share of energy from renewable sources consumed in transport, as well as in the production of electricity and heating, for 2020. These action plans must take into account the effects of other energy efficiency measures on final energy consumption (the higher the reduction in energy consumption, the less energy from renewable sources will be required to meet the target). These plans will also establish procedures for the reform of planning and pricing schemes and access to electricity networks, promoting energy from renewable sources.</p> <p>Each Member State has a target calculated according to the share of energy from renewable sources in its gross final consumption for 2020. The UK is required to source 15 per cent of energy needs from renewable sources, including biomass, hydro, wind and solar power by 2020. From 1 January 2017, biofuels and bioliquids share in emissions savings should be increased to 50%.</p>	<p>The SEA assessment framework should include consideration of use of energy from renewable energy sources.</p>
European Commission (2010) Energy 2020 - A Strategy for Competitive, Sustainable and Secure Energy	
<p>EU energy and climate goals have been incorporated into the Europe 2020 Strategy for smart, sustainable and inclusive growth. The energy strategy includes five priorities for Europe:</p> <ol style="list-style-type: none"> 1. Achieving an energy-efficient Europe; 2. Building a truly pan-European integrated energy market; 3. Empowering consumers and achieving the highest level of safety and security; 4. Extending Europe's leadership in energy technology and innovation; 5. Strengthening the external dimension of the EU energy market. 	<p>The SEA assessment framework should include criteria relating to energy where appropriate</p>
<p>Energy 2020 is part of Resource-Efficient Europe, one of the seven key initiatives of Europe 2020.</p>	
European Commission (2010) Europe 2020 - A Strategy for Smart, Sustainable and Inclusive Growth	
<p>Europe 2020 is the EU's ten-year growth strategy. It aims to change the EU's growth model and create the conditions for growth that is smarter, more sustainable and more inclusive. It contains seven 'flagship initiatives' to provide a framework for innovation, the digital economy, employment, youth, industrial policy, poverty, and resource efficiency.</p> <p>There are also five key target areas for the EU to achieve by 2020:</p> <ol style="list-style-type: none"> 1. Employment: 75% of the 20-64-year-olds to be employed. 2. R&D: 3% of the EU's GDP to be invested in R&D. 3. Climate change and energy sustainability: greenhouse gas emissions 20% (or even 30%, if the conditions are right) lower than 1990; 20% of energy from renewable; 20% increase in energy efficiency. 4. Education: reducing the rates of early school leaving below 10%; at least 40% of 30-34-year-olds completing third level education. 	<p>The SEA assessment framework should include criteria relating to employment, R&D, climate change and poverty where relevant.</p>



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Fighting poverty and social exclusion: at least 20 million fewer people in or at risk of poverty and social exclusion.	
European Commission (2010) Industrial Emissions Directive (integrated pollution prevention and control) 2010/75/EU	
This Directive brings together the IPPC Directive (2008/1/EC) and six other Directives on titanium dioxide, VOCs and waste incineration, with the aim of reducing pollutant emissions. It covers industries with high polluting potential such as energy, production and processing of metals, minerals, chemicals, waste management and rearing of animals. It defines the obligations to be met by industrial activities with a major pollution potential. This includes establishing a permit procedure, requirements for Best Available Techniques (BAT) and setting out requirements for discharges.	The SEA assessment framework should include criteria that ensure the protection of the environment through the prevention of pollution.
European Commission (2011) Directives on Environmental Impact Assessment (Codified Directive 2011/92/EU and Revised Directive 2014/52/EU)	
The Directive, as enacted in 1985, amended, codified in 2011 and revised in 2014, sets out procedural requirements for certain development proposals to undergo an Environmental Impact Assessment (EIA) before being granted consent through the town and country planning or other consenting regimes. The UK Government is obliged to transpose the Revised EIA Directive by May 2017.	The SEA should recognise that certain development proposals require an EIA to be undertaken, resulting in the identification of any likely significant environmental effects and associated mitigation measures.
European Commission (2011) A Resource- Efficient Europe- Flagship Initiative Under the Europe 2020 Strategy, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (COM 2011/21)	
This flagship initiative aims to create a framework for policies to support the shift towards a resource-efficient and low-carbon economy which will help to: <ul style="list-style-type: none"> • Boost economic performance while reducing resource use; • Identify and create new opportunities for economic growth and greater innovation and boost the EU's competitiveness; • Ensure security of supply of essential resources; and • Fight against climate change and limit the environmental impacts of resource use. 	The DWMP should seek opportunities to ensure reductions in resource use. The SEA framework should include objectives relating to resource use.
European Commission (2011) A Roadmap for Moving to a Competitive Low Carbon Economy in 2050	
The EU already has short term targets in place to reduce its emissions to 20% below 1990 levels by 2020; to increase the share of renewable energy to 20%; and to make a 20% improvement in energy efficiency. The 2050 roadmap looks beyond 2020 at longer term objectives. The roadmap suggests that by 2050, the EU should cut its emissions to 80% below 1990 levels through domestic reductions alone. It sets out milestones which form a cost-effective pathway to this goal - reductions of 40% by 2030 and 60% by 2040. It also shows how the main sectors responsible for Europe's emissions - power generation, industry, transport, buildings and construction, as well as agriculture - can make the transition to a low-carbon economy most cost-effectively.	The DWMP should seek to contribute to the reduction of the amount of carbon produced as much as possible and help towards achievement of the carbon reduction objectives. The SEA should have an objective relating to the need to reduce greenhouse gas emissions.
European Commission (2012) Energy Efficiency Directive 2012/27/EU as amended by Directive (EU) 2018/2002	
The 2012 Directive establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to final consumption. Specific measures relate to: <ul style="list-style-type: none"> • energy distributors achieving 1.5% energy savings per year through energy efficiency measures; 	The DWMP should seek to contribute towards targets for energy efficiency. The SEA assessment framework should include consideration of energy consumption and efficiency.



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<ul style="list-style-type: none"> improving the efficiency of heating systems, installing double glazed windows or insulating roofs; purchasing energy efficient buildings, products and services, and performing energy efficient renovations; access to data on consumption; large companies to audit energy consumption (implemented in the UK through the Energy Savings Opportunity Scheme Regulations 2014); national incentives for SMEs to undergo energy audits; and monitoring efficiency levels in new energy generation capacities. <p>The new amending Directive on Energy Efficiency (2018/2002) was agreed to update the policy framework to 2030 and beyond.</p> <p>The key element of the amended directive is a headline energy efficiency target for 2030 of at least 32.5%. The target, to be achieved collectively across the EU, is set relative to the 2007 modelling projections for 2030.</p> <p>In absolute terms, this means that EU energy consumption should be no more than 1273 Mtoe (million tonnes of equivalent) of primary energy and/or no more than 956 Mtoe of final energy. After the UK no longer applies EU law (following its withdrawal from the EU), the equivalent target should be no more than 1128 Mtoe of primary energy and no more than 846 Mtoe of final energy.</p> <p>The directive allows for a possible upward revision in the target in 2023, in case of substantial cost reductions due to economic or technological developments. It also includes an extension to the energy savings obligation in end use, introduced in the 2012 directive. Under the amending directive, EU countries will have to achieve new energy savings of 0.8% each year of final energy consumption for the 2021-2030 period</p> <p>Other elements in the amended directive include:</p> <ul style="list-style-type: none"> stronger rules on metering and billing of thermal energy by giving consumers - especially those in multi-apartment building with collective heating systems - clearer rights to receive more frequent and more useful information on their energy consumption, also enabling them to better understand and control their heating bills requiring Member States to have in place transparent, publicly available national rules on the allocation of the cost of heating, cooling and hot water consumption in multi-apartment and multi-purpose buildings with collective systems for such services monitoring efficiency levels in new energy generation capacities updated primary energy factor (PEF) for electricity generation of 2.1 (down from the current 2.5) a general review of the Energy Efficiency Directive (required by 2024). 	
European Commission (2013) <i>Towards Social Investment for Growth and Cohesion 2014-2020</i>	
<p>The Communication aims to directing Member States' policies towards social investment throughout life, with a view to ensuring the adequacy and sustainability of budgets for social policies. It also provides guidance to help reach the Europe 2020 targets by establishing a link between social policies, the reforms to reach the Europe 2020 targets and the relevant EU funds.</p>	<p>The DWMP should have regard of the Europe 2020 targets.</p>
European Commission (2014) <i>The EU Regulation on invasive alien (non-native) species 1143/2014/EU</i>	



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<p>This Regulation seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimize and mitigate the human health or economic impacts that these species can have.</p>	<p>The SEA assessment framework should include guide questions relating to invasive species</p>
European Commission (2014) <i>Seventh Environmental Action Programme</i>	
<p>The seventh Environmental Action Programme defines environmental priority objectives to be achieved by the EU up to 2020. As part of the programme, the EU aims to protect natural capital; promote resource-efficient and low-carbon growth; and safeguard health and wellbeing linked to pollutants, chemicals and climate change. The nine objectives and actions set out in the programme are:</p>	<p>The SEA assessment framework should, where relevant, reflect the objectives of the proposal for the programme.</p>
European Commission (2014) <i>A Policy Framework for Climate and Energy in the Period from 2020 to 2030</i>	
<p>The 2030 climate and energy framework was adopted in 2014 and builds on the 2020 targets. It sets three key targets for 2030:</p> <ul style="list-style-type: none"> • at least 40% cuts in greenhouse gas emissions (from 1990 levels); • at least 27% share for renewable energy; and • at least 27% improvement in energy efficiency. <p>The greenhouse gas emissions and renewable energy targets are binding, while the energy efficiency target will be reviewed in 2020.</p>	<p>The DWMP should support longer term targets for reducing greenhouse gas emissions, increasing renewable energy and energy efficiency.</p> <p>The SEA assessment framework should include the consideration of energy and greenhouse gas emissions.</p>
European Commission (2015) <i>'Closing the loop - An EU Action Plan for the Circular Economy' policy package</i>	
<p>This document sets out actions to implement the European Commission's long-term vision of significantly reducing waste landfilling and increasing recycling.</p>	<p>The SEA should consider opportunities for the DWMP to contribute/enable the circular economy.</p> <p>The SEA assessment framework should contain an objective/guide question relating to material/resource use and waste.</p>
European Commission (2016) <i>National Emissions reduction Commitments (NEC) Directive 2016/2284/EU</i>	
<p>The National Emission reduction Commitments Directive sets national emission reduction commitments for Member States and the EU for five important air pollutants: nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOCs), sulphur dioxide (SO2), ammonia (NH3) and fine particulate matter (PM2.5).</p> <p>The NEC Directive highlights the importance of Member States regularly reporting air pollutant emission inventories for assessing progress in reducing air pollution in the EU and for ascertaining whether Member States are in compliance with their commitments.</p> <p>The directive introduces a number of new reporting requirements for Member States. These include annual information on emissions of a number of pollutants:</p> <ul style="list-style-type: none"> • the five main air pollutants NOx, NMVOCs, SO2, NH3 and PM2.5 as well as carbon monoxide (CO); • in addition to PM2.5, also PM10 particulate matter and, if available, black carbon (BC) and total suspended particulate matter (TSP); • heavy metals cadmium (Cd), lead (Pb) and mercury (Hg) and, if available, the additional heavy metals arsenic, chromium, copper, nickel, selenium and zinc); <p>persistent organic pollutants (POPs) including selected polycyclic aromatic hydrocarbons (PAHs), dioxins and furans, polychlorinated biphenyls (PCBs) and hexachlorobenzene (HCB).</p>	<p>The DWMP should seek to reduce the emissions of the pollutants listed under the directive, where possible.</p> <p>The SEA assessment framework should include an objective and guide questions relating to air pollution/pollutant emissions.</p>



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European Commission (2020) Proposal for a Decision of the European Parliament and of the Council on a General Union Environment Action Programme to 2030 (Proposal for an 8th Environmental Action Programme)	
<p>The proposal supports the environment and climate action objectives of the European Green Deal.</p> <p>The 8th EAP proposal calls for active engagement of all stakeholders at all levels of governance, to ensure that EU climate and environment laws are effectively implemented. It forms the EU's basis for achieving the United Nation's 2030 Agenda and its Sustainable Development Goals. The proposal for an 8th EAP aims to accelerate the transition to a climate-neutral, resource-efficient and regenerative economy, which gives back to the planet more than it takes. It recognises that human wellbeing and prosperity depend on the healthy ecosystems.</p> <p>Building on the European Green Deal, it has the following six priority objectives:</p> <ul style="list-style-type: none"> • achieving the 2030 greenhouse gas emission reduction target and climate neutrality by 2050 • enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change • advancing towards a regenerative growth model, decoupling economic growth from resource use and environmental degradation, and accelerating the transition to a circular economy • pursuing a zero-pollution ambition, including for air, water and soil and protecting the health and well-being of Europeans • protecting, preserving and restoring biodiversity, and enhancing natural capital (notably air, water, soil, and forest, freshwater, wetland and marine ecosystems) • reducing environmental and climate pressures related to production and consumption (particularly in the areas of energy, industrial development, buildings and infrastructure, mobility and the food system) 	<p>The SEA assessment framework should, where relevant, reflect the objectives of the proposal for the programme.</p>
European Commission (2020) Biodiversity strategy for 2030	
<p>The EU's biodiversity strategy for 2030 is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems. The strategy aims to put Europe's biodiversity on a path to recovery by 2030, and contains specific actions and commitments. The strategy contains specific commitments and actions to be delivered by 2030.</p> <ul style="list-style-type: none"> • Establishing a larger EU-wide network of protected areas on land and at sea • Launching an EU nature restoration plan • Introducing measures to enable the necessary transformative change • Introducing measures to tackle the global biodiversity challenge. 	<p>The DWMP should seek to protect and enhance biodiversity, particularly designated sites. The SEA assessment framework should include objectives, indicators and targets that cover biodiversity.</p>
European Commission (2021) EU strategy on adaptation to climate change	
<p>The strategy sets out how the European Union can adapt to the unavoidable impacts of climate change and become climate resilient by 2050. The Strategy has four principle objectives:</p> <ul style="list-style-type: none"> • to make adaptation smarter; • to make adaption swifter; • to make adaption more systemic, and; • to step up international action on adaptation to climate change. 	<p>The DWMP should seek to contribute towards climate change adaption. The SEA assessment framework should include an objective relating to climate change and consideration of climate change adaption.</p>



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ICOMOS (2011) <i>Guidance on Heritage Impact Assessments for Cultural World Heritage Properties</i>	
<p>This document provides guidance on the process of Commissioning Heritage Impact Assessments (HIAs) for World Heritage properties in order to evaluate effectively the impact of potential development on the Outstanding Universal Value (OUV) of properties. The guidance is addressed at managers, developers, consultants and decision-makers and is also intended to be relevant to the World Heritage Committee and States Parties. The concept of OUV underpins the whole World Heritage Convention and all activities associated with properties inscribed on the List.</p>	<p>The SEA Framework should include an objective on the conservation and enhancement of heritage.</p>
IUCN (2013) <i>World Heritage Advice Note: Environmental Assessment</i>	
<p>This Advice Note provides States Parties and other stakeholders with guidance on how to identify, evaluate, avoid and mitigate potential impacts of development proposals on World Heritage values, before decisions are taken. It provides guidance on integrating natural World Heritage Sites within Environmental Assessments. It includes a set of World Heritage Impact Assessment Principles that can be applied to all types of environmental Assessments, a list of key questions to ask concerning World Heritage during the assessment as well as step-by-step guidance.</p>	<p>The DWMP should seek to contribute towards the protection of World Heritage Sites.</p> <p>The SEA assessment framework should include objectives and guide questions relating to the conservation of World Heritage Sites. The SEA assessment should also reflect/incorporate the principles of the guidance, where relevant.</p>
UNEP (1973) <i>Convention on International Trade in Endangered Species of Wild Fauna and Flora</i>	
<p>CITES is an international agreement between governments which aims to ensure that international trade in wild animals and plants does not threaten their survival. It subjects international trade to certain controls, and all import, export, re-export and introduction (by sea) of species covered by the Convention has to be authorized through a licensing system. Species are listed in three Appendices according to the degree of protection needed, with differing controls for each.</p>	<p>The DWMP should seek to ensure the protection of vulnerable species.</p> <p>The SEA assessment framework should incorporate the protection of animal and plant species.</p>
UNESCO (1971) <i>Ramsar Convention on Wetlands of International Importance</i>	
<p>The Convention on Wetlands of International Importance was signed in Ramsar, Iran in 1971. It is an intergovernmental treaty which provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources, as a means to achieving sustainable development throughout the world.</p> <p>The original emphasis was on the conservation and wise use of wetlands primarily to provide habitat for water birds, however over the years the Convention has broadened its scope to incorporate all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation and for the well-being of human communities.</p> <p>‘The Convention’s mission is the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world’ (Ramsar COP8, 2002).</p> <p>The Fourth Ramsar Strategic Plan 2016-2024 has been adopted to provide guidance on how efforts for implementing the Convention on Wetlands should be focussed. The strategy has three strategic goals and one operational goal:</p> <ul style="list-style-type: none"> • Strategic Goal 1: Addressing the Drivers of Wetland Loss and Degradation • Strategic Goal 2: Effectively Conserving and Managing the Ramsar Site Network • Strategic Goal 3: Wisely Using All Wetlands • Operational Goal 1: Enhancing Implementation 	<p>The DWMP should ensure the protection and wise use of wetlands.</p> <p>The SEA assessment framework should incorporate the protection of wetland sites listed under the Ramsar convention.</p>



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The plan also contains 19 targets which fall under each of the goals. Implementing each of these will also contribute to the achievement of the Sustainable Development Goals (SDGs) and targets.	
UNESCO (1972) Convention Concerning the Protection of the World Cultural and Natural Heritage	
<p>The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. In addition to this, countries are required to:</p> <ul style="list-style-type: none"> • Ensure that measures are taken for the protection, conservation and presentation of cultural and natural heritage • Adopt a general policy that gives cultural and natural heritage a function in the life of the community • Integrate the protection of heritage into comprehensive planning programmes 	<p>The DWMP should seek to protect cultural heritage sites. The SEA assessment framework should include an objective on heritage and archaeological issues.</p>
UNESCO (2001) Convention on the Protection of Underwater Cultural Heritage	
<p>The Convention sets a common standard for the protection of submerged cultural heritage, with a view to preventing its being looted or destroyed. The Convention sets out basic principles for the protection of underwater cultural heritage; provides a detailed State cooperation system; and provides widely recognised practical rules for the treatment and research of underwater cultural heritage. This includes obligations to preserve such heritage, a preference for in situ preservation, and no commercial exploitation.</p>	<p>The DWMP should seek to protect cultural heritage sites. The SEA assessment framework should include an objective relating to cultural heritage.</p>
United Nations (1992) Convention on Biological Diversity (The Rio Convention)	
<p>The Convention on Biodiversity called for the development and enforcement of national strategies and associated action plans to identify, conserve and protect existing biological diversity, and to enhance it wherever possible. In the UK, the UK Biodiversity Action Plan was then established to conserve and enhance biodiversity in the UK through the use of Habitats and Species Action Plans to help the most threatened species and habitats to recover and to contribute to the conservation of global biodiversity.</p>	<p>The DWMP should seek to protect and enhance biodiversity. The SEA assessment framework should include protection and enhancement of biodiversity</p>
United Nations (1997) The Kyoto Protocol to the UN Framework Convention on Climate Change	
<p>The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. It is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for industrialized countries for reducing greenhouse gas (GHG) emissions. These amounted to an average of five per cent against 1990 levels in the first commitment period (2008 to 2012). The Protocol is planned to be extended to 2020 (the Kyoto second commitment period), pending ratification of the Doha Agreement.</p>	<p>The DWMP should aim to reduce greenhouse gas emissions. The SEA assessment framework should include objectives/guide questions related to reducing greenhouse gas emissions.</p>
United Nations Economic Commission for Europe (1998), Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (The Aarhus Convention)	
<p>To contribute to the protection of present and future generations to live in an environment adequate to his or her health and well-being. This will be achieved through each Party subject to the convention guaranteeing the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.</p> <p>To establish and maintain a clear, transparent and consistent framework to implement the provisions of this Convention. This will be achieved through each Party taking the necessary legislative, regulatory and other measures, including measures to achieve compatibility between the provisions implementing the information, public participation and access-to-justice provisions in this Convention, as well as proper enforcement measures. Responsibility for implementation is deferred to the member states.</p>	<p>The development of the DWMP needs to be a transparent process.</p> <p>The SEA should show a strong sense of safeguarding the lives of future generations and ensure that enough time is provided for consultation on the SEA documents in line with the Aarhus convention of establishing and maintaining a transparent clear framework.</p>
United Nations (2002) The World Summit on Sustainable Development	



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<p>The World Summit resulted in the Johannesburg Declaration on Sustainable Development and a Plan of Implementation. The declaration reaffirms principles already agreed upon at the Rio Earth Summit UNCED in 1992 and the UN Millennium Summit in 1999. It recognises that poverty eradication is a key condition for sustainable development and addresses issues such as cultural diversity, patterns of production and consumption, health issues, armed conflicts, the new dimension created by globalisation, gender issues and financing for development.</p> <p>The implementation plan sets out actions to achieve sustainable development such as poverty eradication, changing unsustainable patterns of consumption and production, protecting and managing the natural resource base of economic and social development, sustainable development in a globalizing world and health and sustainable development.</p> <p>Sustainable development in England is delivered through the sustainable development strategy, Securing the Future, and in Wales through One Wales: One Planet, The Sustainable Development Scheme of the Welsh Assembly Government.</p>	<p>The DWMP should promote sustainable development.</p> <p>The SEA should help to deliver sustainable development through the balanced assessment of the DWMP.</p>
United Nations (2016) <i>The Paris Agreement</i>	
<p>The Paris Agreement was adopted at the 2015 UN Climate Change Conference, which aims to limit global temperature rises to 2 degrees, and to pursue efforts to limit the temperature increase even further to 1.5 degrees. It was adopted by 195 countries at the Conference, and came into force in November 2016, following ratification by sufficient parties.</p>	<p>The DWMP should aim to reduce greenhouse gas emissions.</p> <p>The SEA assessment framework should include greenhouse gas emissions.</p>
United Nations Framework Convention on Climate Change (UNFCCC) (2011) <i>The Cancun Agreements</i>	
<p>The Cancun Agreements were a set of significant decisions by the international community to address the long-term challenge of climate change collectively and comprehensively over time, and to take concrete action immediately to speed up the global response to it.</p> <p>The agreements, reached on December 11 in Cancun, Mexico, at the 2010 United Nations Climate Change Conference, represented key steps forward in capturing plans to reduce greenhouse gas emissions, and to help developing nations protect themselves from climate impacts and build their own sustainable futures.</p> <p>The Cancun Agreements' main objectives cover:</p> <ul style="list-style-type: none"> • Mitigation • Transparency of actions • Technology • Finance • Adaptation • Forests • Capacity building 	<p>The DWMP should aim to reduce greenhouse gas emissions and support climate change mitigation and adaption.</p> <p>The SEA assessment framework should include greenhouse gas emissions and climate change.</p>
World Commission on Environment and Development (1987) <i>Our Common Future (The Brundtland Report)</i>	
<p>The Brundtland Report is concerned with the world's economy and its environment. The objective is to provide an expanding and sustainable economy while protecting a sustainable environment. The Report was a call by the United Nations:</p> <ul style="list-style-type: none"> • to propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; • to strengthen co-operation among developing countries and between countries at different stages of economic and social development to achieve common and mutually supportive objectives which take account of the interrelationships between people, resources, environment and development; • to consider ways and means by which the international community can deal more effectively with environment concerns; and • to help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long term agenda for action during the coming decades, and aspirational goals for the world community. 	<p>The SEA and DWMP should seek to contribute to sustainable development.</p>



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World Health Organisation (2004) <i>Children's Environment and Health Action Plan for Europe</i>	
<p>The action plan aims to address the causes of environment-related diseases in children, including the state of the physical environment, socio-economic conditions and behaviour. Key actions include:</p> <ul style="list-style-type: none"> • primary prevention, i.e. policies, programmes and plans aimed at improving the state of the physical environment (air, water, soil, noise), in particular through the integration of children's needs into housing, transport, infrastructure and planning; • equity, i.e. giving priority to protection of children at highest risk, and particularly of children who are neglected, abandoned, disabled, institutionalized or exploited, by improving access to preventive health and social protection services; • poverty reduction, i.e. policies addressing the multidimensional aspects of poverty among children; • health promotion, i.e. actions aimed at preventing and reducing exposures to environmental health hazards by adopting healthy lifestyles, achieving sustainable consumption patterns and helping to create healthy and enabling human settlements. 	<p>The DWMP should have regard to the requirements of the Action Plan.</p> <p>The SEA assessment framework should include for the protection of human health and vulnerable members of the community.</p>



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BEIS (2011) Carbon Plan: Delivering our Low Carbon Future	
<p>The Carbon Plan sets out how the UK will achieve decarbonisation within the framework of energy policy: to make the transition to a low carbon economy while maintaining energy security, and minimising costs to consumers, particularly those in poorer households. It sets out policies for meeting the first four carbon budgets, and includes proposals for energy efficiency, heating, transport and industry.</p> <p>Specific actions relate to secure and low carbon energy, reducing energy in homes and communities, reducing business and industrial emissions, and low carbon transport.</p>	<p>The DWMP should, where possible, contribute towards increasing the proportion of energy from renewable energy sources.</p> <p>The SEA assessment framework should include consideration of the use of energy from renewable energy sources.</p>
BEIS (2011) National Policy Statements for Energy Infrastructure	
<p>The energy National Policy Statements (NPSs) set out national policy against which proposals for major energy projects will be assessed and decided on by the Infrastructure Planning Commission. The following six NPSs have been designated:</p> <ul style="list-style-type: none"> - Overarching NPS for Energy (EN1); - Fossil Fuel Electricity Generating Infrastructure NPS (EN2); - Renewable Energy Infrastructure NPS (EN3) ; - Gas Supply Infrastructure & Gas and Oil Pipelines NPS (EN4); - Electricity Networks Infrastructure NPS (EN5); - Nuclear Power Generation NPS (EN6). <p>The Overarching NPS for Energy sets out that the purpose of the NPSs is to develop a clear, long-term policy framework which facilitates investment in the necessary new infrastructure (by the private sector) and in energy efficiency. The NPS highlights that the construction, operation and decommissioning of this infrastructure can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment. The NPSs expect applicants to undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment.</p> <p>The NPSs reiterate and are underpinned by the target to cut greenhouse gas emissions by at least 80% by 2050, compared to 1990 levels.</p>	<p>The DWMP may need to consider the potential impact of major energy proposals drainage and wastewater management in the plan area.</p> <p>The SEA should consider the cumulative effects of the DWMP and any major energy proposals.</p>
BEIS (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity	
<p>This white paper outlines a package of reforms so that by 2030 there will be a flexible, smart and responsive electricity system, powered by a range of low carbon sources of electricity. This includes engaging with consumers on energy use. Decarbonisation is important in meeting the 2050 targets.</p>	<p>The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The DWMP should also promote the use of renewable energy, where relevant.</p>
BEIS (2011) UK Renewable Energy Roadmap	
<p>The Renewable Energy Roadmap outlines the UK's framework for delivering 15% of energy demand from renewable sources by 2020 (as mandated by the EU Renewable Energy Directive). Although starting from a low-level of renewable generation, eight technologies were identified that have the potential to generate 90% of the renewable target by 2020. These are: onshore wind, offshore wind, marine energy, biomass electricity, biomass heat, ground source and air source heat pumps and renewable transport.</p> <p>The Roadmap includes an indication from the Welsh Government that it has the potential to double the amount of renewable energy consumption by 2025, and to deliver 4GW of power from marine energy.</p>	<p>The DWMP should contribute towards increasing the proportion of energy from renewable energy sources.</p> <p>The SEA assessment framework should include consideration of the use of energy from renewable energy sources.</p>



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<p>The 2013 update highlights that offshore wind and marine energy have the potential to make significant contributions to meeting the UK's future energy needs</p>	
Canal & River Trust (2015) <i>Living Waterways Transform Places & Enrich Lives: Our 10 Year Strategy</i>	
<p>The strategy sets out goals for the organisation for the next ten years. These are themed under:</p> <ul style="list-style-type: none"> • Waterways, including: <i>'To encourage and grow the number of people boating, using and enjoying the waterways'</i> and <i>'To look after the heritage and wildlife on our canals and rivers for people to enjoy now and in the future'</i>; • Place, including: <i>'To provide havens for people to escape to away from the pressures of modern life'</i> and <i>'Enhance wildlife habitats and the natural landscape'</i>; • Prosperity, including: <i>'Our waterways to drive and be a catalyst for regeneration and developments that make a difference to the local area'</i> and <i>'To contribute to local economies and to provide opportunities and livelihoods for local people'</i>; and • People, including: <i>'Communities to feel ownership of, and get involved with caring for, their local waterway'</i> and <i>'To offer something for everyone to enjoy'</i>. <p>These are in addition to goals relating to Influence and Resources.</p>	<p>The DWMP should avoid causing detrimental effects on canals and rivers.</p> <p>The SEA assessment framework should include objectives which take into account the goals of the strategy and the protection of rivers and canals.</p>
Canal and River Trust (2015) <i>Water Resources Strategy 2015 – 2020</i>	
<p>The Strategy sets out the Canal and River Trust's overarching vision for the period 2015 – 2020 for how it intends to manage water resources across the inland waterway network that it manages. The strategy is focused on delivering long-term security of water supply for the Canal & River Trust to achieve its vision of living waterways that transform places and enrich lives.</p>	<p>The DWMP should take into consideration the potential impact on the supply of water to the inland waterway network within the U UW operational area.</p> <p>The SEA should consider the effects of the DWMP on the long-term supply of water to the canal network.</p>
Centre for Environment Fisheries and Aquaculture Science, Environment Agency and Natural Resources Wales (2019) <i>Assessment of Salmon Stocks and Fisheries in England and Wales 2019</i>	
<p>Annual reports on the status of salmon stocks and fisheries in England and Wales have been produced since 1997. These reports present a preliminary assessment for the most recent year to assist the International Council for the Exploration of the Sea (ICES) in providing scientific advice to the North Atlantic Salmon Conservation Organisation (NASCO) and to provide early feedback to fishery managers and anglers.</p>	<p>The DWMP should consider the information on salmon stocks and fisheries and the potential effects of DWMP measures on stocks and fisheries.</p> <p>The SEA should consider the effects of the DWMP on salmon stocks and fisheries and should include objectives and guide questions relating to the protection of salmon stocks and fisheries.</p>
Climate Change Committee (2020) <i>The path to Net Zero and progress on reducing emissions in Wales</i>	
<p>These documents are a series of reports on Wales's net zero carbon targets and ways in which Wales will achieve these targets. The December 2020 Advice Report: The path to a net zero Wales recommends that the Welsh Government revise targets and seek to reduce all greenhouse gas emissions to net zero by 2050.</p>	<p>The DWMP should seek to contribute to the reduction of the amount of carbon produced as much as possible and help towards achievement of net zero</p>



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<p>One of the reports looks into how Wales is progressing against previous requirements to reduce its carbon footprint. Key to achieving these targets is:</p> <ul style="list-style-type: none"> • Adopting low-carbon solutions; • Expanding low-carbon energy supplies; • Reduce demand for high-carbon activities; and • Transforming land away from agriculture. 	<p>greenhouse gas emissions by 2050.</p> <p>The SEA should have an objective relating to sustainable development that references the need to reduce greenhouse gas emissions.</p>
Department for Culture, Media and Sport (DCMS) (2001) <i>The Historic Environment – A Force for the Future</i>	
<p>This strategy outlines the Government's policy regarding the historic environment. The strategy has key aims and objectives that demonstrate the contribution the historic environment makes to the country's economic and social well-being.</p>	<p>The DWMP and the SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.</p>
DCMS and Welsh Government (2007) <i>Heritage Protection for the 21st Century</i>	
<p>The document has three core principles:</p> <ul style="list-style-type: none"> • Developing a unified approach to the historic environment; • Maximising opportunities for inclusion and involvement; and • Supporting sustainable communities by putting the historic environment at the heart of an effective planning system. 	<p>The assessment framework should include objectives which take into account the White Paper's principles.</p>
DCMS (2013) <i>Scheduled Monuments & Nationally Important but Non-Scheduled Monuments</i>	
<p>This policy statement sets out Government policy on the identification, protection, conservation and investigation of nationally important ancient monuments, under the provisions of the Ancient Monuments and Archaeological Areas Act 1979. It includes principles relating to the selection of scheduled monuments and the determination of applications for scheduled monument consent.</p>	<p>The DWMP should seek to avoid adverse impacts on scheduled and non-scheduled monuments.</p> <p>The SEA assessment framework should include specific objectives relating to cultural heritage</p>
DCMS (2016) <i>The Culture White Paper</i>	
<p>This white paper sets out how the government will support the cultural sectors over the coming years and how culture will play an active role in building a fairer and more prosperous nation. It includes four key themes:</p> <ul style="list-style-type: none"> • everyone should enjoy the opportunities culture offers, no matter where they start in life; • the riches of our culture should benefit communities across the country; and • the power of culture can increase our international standing. <p>The white paper includes objectives relating to the development of the historic environment sector, and the protection of world heritage.</p>	<p>The DWMP should seek to protect cultural heritage assets.</p> <p>The SEA assessment framework should include an objective relating to cultural heritage.</p>
Defra (2002) <i>The Strategy for Sustainable Farming and Food – facing the future</i>	
<p>This strategy sets out how industry, Government and consumers could work together to secure a sustainable future for our farming and food industries. The strategy's objectives are to support the viability and diversity of rural and urban economies and communities, respect and operate within the biological limits of natural resources (especially soil, water and biodiversity) and achieve consistently high standards of environmental performance by reducing energy consumption, by minimising resource inputs, and use renewable energy wherever possible.</p>	<p>The implementation of the DWMP may have some indirect links with the food industry, through ensuring the availability of water for food based activities.</p> <p>The SEA should also seek to promote the most effective use of the region's natural resources, including soil, biodiversity and energy resources.</p>



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Defra (2004) Rural Strategy	
<p>The strategy sets out rural and countryside policy, and draws upon from lessons learnt following the rural white paper. Objectives include supporting economic and social regeneration across rural England and enhance the value of the countryside and protect the natural environment for this and future generations.</p>	<p>The implementation of certain Plan options may have an effect upon rural communities and the countryside.</p> <p>The SEA should also seek to ensure that the quality of the region's landscapes, natural resources and biodiversity are maintained or enhanced.</p>
Defra (2004) The First Soil Action Plan for England	
<p>This plan is a comprehensive statement on the state of the UK's soils and how Government and other partners were working together to improve them. Ensure that England's 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.</p>	<p>The SEA should seek to ensure that the quality of the region's land, including soils, is protected or enhanced.</p>
Defra (2005) Making space for water: taking forward a new government strategy for flood and coastal erosion risk management in England	
<p>The programme seeks to embed flood and coastal erosion risk management across a range of Government policies, including planning, urban and rural development, agriculture, transport, nature conservation and conservation of the historic environment.</p> <p>The main objectives of the strategy are:</p> <ul style="list-style-type: none"> • To reduce the threat of flooding to people and their property, and • To deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles. <p>There are no formal targets or indicators.</p>	<p>The DWMP should seek to support the objectives of the strategy, where possible.</p> <p>The SEA should seek to ensure that coastal erosion in the region is not adversely affected by the implementation of the DWMP.</p>
Defra (2006) Shoreline Management Plan Guidance	
<p>A shoreline management plan (SMP) is a coastal defence management tool. It is a large-scale assessment of the risks associated with coastal processes and helps to reduce these risks to people and the developed, historic and natural environment. This guidance document sets out Defra's and the Welsh Government's strategy for managing flooding and coastal erosion. The guidance includes the following objectives:</p> <ul style="list-style-type: none"> • set out the risks from flooding and erosion to people and the developed, historic and natural environment within the SMP area; • identify opportunities to maintain and improve the environment by managing the risks from floods and coastal erosion; • identify the preferred policies for managing risks from floods and erosion over the next century; • identify the consequences of putting the preferred policies into practice; • set out procedures for monitoring how effective these policies are; • inform others so that future land use, planning and development of the shoreline takes account of the risks and the preferred policies; • discourage inappropriate development in areas where the flood and erosion risks are high; and, 	<p>The DWMP should seek to align with the objectives of the guidance where appropriate.</p> <p>The SEA should take into account the effects of the DWMP on areas with a SMP.</p>



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<ul style="list-style-type: none"> meet international and national nature conservation legislation and aim to achieve the biodiversity objectives. 	
Defra (2007) <i>Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt</i>	
The guiding principles described in this document summarise current thinking on how to reduce the impacts of climate change on biodiversity and how to adapt existing plans and projects in the light of climate change. The guidance is intended to inform implementation of the UK Biodiversity Action Plan, taking account of climate change is relevant to the fulfilment of many international agreements and obligations affecting the UK.	The SEA must consider the impacts on biodiversity whilst also taking into account the potential for future climate change.
Defra (2007) <i>The Air Quality Strategy for England, Scotland, Wales and Northern Ireland</i>	
The Air Quality Strategy sets out air quality objectives and policy options to further improve air quality in the UK to benefit public health, quality of life and help to protect our environment. The strategy sets out objectives relating to particles, nitrogen dioxide, ozone, sulphur dioxide, polycyclic aromatic hydrocarbons, benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen oxides and sulphur dioxide.	The DWMP should take account of air quality objectives in the strategy. The SEA should include objectives and guide questions relating to air quality, human health and environmental protection.
Defra (2009) <i>Safeguarding our Soils – A Strategy for England</i>	
The new Soil Strategy for England – Safeguarding our Soils outlines the Government’s approach to safeguarding our soils for the long term. It provides a clear vision to guide future policy development across a range of areas and sets out the practical steps that we need to take to prevent further degradation of our soils, enhance, restore and ensure their resilience, and improve our understanding of the threats to soil and best practice in responding to them. The Government’s vision is that: By 2030, all England’s soils will be managed sustainably and degradation threats tackled successfully. This will improve the quality of England’s soils and safeguard their ability to provide essential services for future generations.	The SEA should seek to ensure that the quality of the region soils and their management is protected or enhanced.
Defra, Department of the Environment (NI), Scottish Government and Welsh Assembly Government (2010) <i>Air Pollution: Action in a Changing Climate</i>	
This document highlights the health benefits that can be achieved through closer integration of air quality and climate change policies. Air pollution often originates from the same activities that contribute to climate change (notably transport and electricity generation), so linkages between these policy areas could help ensure that they are managed most effectively. Air quality/climate change co-benefits can be realised through actions such as promoting low-carbon vehicles and renewable sources of energy that do not involve combustion. The document aims to set ambitious but realistic air quality targets, and to ensure that climate and air quality targets are better aligned in future.	The DWMP should seek to ensure that air quality, climate change and human health are not adversely affected by the options/measures set out in the plan. The SEA should include guide questions relating to the effects of options on human health and the environment.
Defra (2010) <i>Making Space for Nature: A Review of England’s Wildlife Sites and Ecological Network</i>	
This independent review of England’s wildlife sites and the connections between them sets objectives and recommendations to help achieve a healthy natural environment that will allow our plants and animals to thrive.	The SEA should seek to maintain and enhance the quality of habitats and biodiversity, where possible.
Defra (2011) <i>UK National Ecosystem Assessment</i> and Defra (2014) <i>UK National Ecosystems Assessment Follow on, Synthesis of Key Findings</i>	
Ecosystems services from natural capital contribute to the economic performance of the nation. Information and tools to enable decision makers to understand the wider value of ecosystems and their associated services.	For the purposes of the readership integrating an ecosystems services approach into the SEA is not being undertaken. However, it is realised that through the



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	<p>'Objective-led' approach, many of the services relevant to the DWMP can be considered through the objectives and guide questions for example:</p> <ul style="list-style-type: none"> • Provisioning Services: Freshwater • Provisioning Services: Biodiversity • Regulating Services: Water Regulation • Cultural services: Recreation and ecotourism • Cultural services: Cultural heritage values • Cultural services: Aesthetic <p>The SEA should ensure the DWMP affects the related provisioning services in the least damaging way through informing the DWMP formulation and selection of options. In the event of further guidance being issued on incorporating ESA into SEA, the anticipated approach is sufficiently flexible that it should be able to accommodate this (subject to timing).</p>
Defra (2011) <i>Water for Life - Water White Paper</i>	
<p>Water for Life describes a vision for future water management in which the water sector is resilient, in which water companies are more efficient and customer focused, and in which water is valued as the precious and finite resource it is.</p> <p>The White Paper includes several proposals for deregulating and simplifying legislation, to reduce burdens on business and stimulate growth. Ofwat's proposals for reducing its regulatory burdens complement these.</p>	<p>The DWMP should ensure that future drainage and wastewater management is resilient, efficient and customer focused</p> <p>The SEA should consider resilience to climate change and should consider the human environment to ensure the DWMP remains customer focused.</p>
Defra (2011) <i>Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services</i>	
<p>This new biodiversity strategy for England provides a comprehensive picture of how we are implementing our international and EU commitments. It sets out the strategic direction for biodiversity policy for the next decade on land (including rivers and lakes) and at sea.</p> <p>The strategy sets 20 targets across 5 strategic goals:</p>	<p>The DWMP should contribute towards meeting the targets and objectives within the strategy where possible.</p> <p>The SEA should include objectives to improve status of</p>



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<ul style="list-style-type: none"> • Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; • Reduce the direct pressures on biodiversity and promote sustainable use; • Improve status of biodiversity by safeguarding ecosystems, species and genetic diversity; • Enhance the benefits to all from biodiversity and ecosystem services; and <p>Enhance implementation through participatory planning, knowledge management and capacity building.</p>	<p>biodiversity and enhance benefits of biodiversity and its ecosystem services, and reduce pressures on ecosystems.</p>
Defra (2011) Government Review of Waste Policy in England 2011	
<p>The review is guided by the “waste hierarchy”, EU obligations and targets on waste management, carbon impacts, environmental objectives and the costs and benefits of different policy options. The Governments vision include a move beyond the current throwaway society to a “zero waste economy” in which material resources are re-used, recycled or recovered wherever possible, and only disposed of as the option of very last resort.</p>	<p>The DWMP may involve options that involve the generation of waste (e.g. either through construction requirements or operation of options).</p> <p>The SEA should seek to enhance recycling and minimise the amount of waste going to landfill.</p>
Defra (2011) Mainstreaming Sustainable Development	
<p>This document sets out the Government’s vision for mainstreaming sustainable development in relation to the operation of its buildings and estates, including the goods and services that it buys and the policies it makes. It builds on the principles that underpinned the UK’s 2005 sustainable development strategy, and highlights that long term economic growth relies on protecting and enhancing the environmental resources that underpin it, and paying due regard to social needs.</p> <p>It sets out measures to achieve the mainstreaming of sustainable development, which include ministerial leadership and oversight; leading by example; embedding sustainable development in government policy; and transparency and independent scrutiny.</p>	<p>The DWMP should seek to be aligned with the principles of sustainable development.</p> <p>The SEA assessment framework should include objectives relating to the principles of sustainable development, including communities, economy and environment.</p>
Defra (2011) Natural Environment White Paper	
<p>The Natural Environment White Paper (2011) recognises that nationally, the fragmentation of natural environments is driving continuing threats to biodiversity. It sets out the Government’s policy intent to:</p> <ul style="list-style-type: none"> • improve the quality of the natural environment across England; • move to a net gain in the value of nature; • arrest the decline in habitats and species and the degradation of landscapes; • protect priority habitats; • safeguard vulnerable non-renewable resources for future generations; • support natural systems to function more effectively in town, in the country and at sea; and • create an ecological network which is resilient to changing pressures. <p>By 2020, the Government wants to achieve an overall improvement in the status of the UK’s wildlife including no net loss of priority habitat and an increase of at least 200,000 hectares in the overall extent of priority habitats. Under the White Paper, the Government has also put in place a clear institutional framework to support nature restoration which includes Local Nature Partnerships creating new Nature Improvement Areas (NIAs).</p>	<p>The DWMP should reflect the Government’s policy intent set out in the White Paper.</p> <p>The SEA assessment framework should include objectives, indicators and targets that reflect the Government’s policy intent set out in the White Paper.</p>



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Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
Defra (2012) National Policy Statement for Waste Water	
<p>This National Policy Statement (NPS) sets out Government policy for the provision of major waste water infrastructure. It will be used by the Infrastructure Planning Commission (IPC) to guide its decision making on development consent applications for waste water developments that fall within the definition of Nationally Significant Infrastructure Project (NSIP) as defined in the Planning Act 2008. As well as considering the general need for new waste water infrastructure, this NPS covers two NSIPs which have been assessed as required to meet this need although these do not fall within the U UW operational area or neighbouring areas.</p>	<p>The DWMP should be compliant with the policies set out within the National Policy Statement. The DWMP should also consider any unforeseen NSIP proposals that come forward prior to adoption which may affect drainage and wastewater management in U UW area.</p> <p>The SEA should consider the cumulative effects of the DWMP and any unforeseen NSIP proposals that come forward which may affect drainage and wastewater management in the U UW area.</p>
Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report	
<p>This report identifies five themes that form the priorities for adaptation in the UK. These themes are as follows:</p> <ul style="list-style-type: none"> • Agriculture & Forestry; • Business; • Health & Wellbeing; • Buildings & Infrastructure; and • Natural Environment. 	<p>The SEA should take into account the need for climate change adaptation.</p>
Defra (2013) The National Adaptation Programme – Making the Country Resilient to a Changing Climate	
<p>This Programme contains a mix of policies and actions to help adapt successfully to future weather conditions, by dealing with the risks and making the most of the opportunities.</p> <p>It sets out a number of objectives, including:</p> <ul style="list-style-type: none"> • To provide a clear local planning framework to enable all participants in the planning system to deliver sustainable new development, including infrastructure that minimises vulnerability and provides resilience to the impacts of climate change. • To increase the resilience of homes and buildings by helping people and communities to understand what a changing climate could mean for them and to take action to become resilient to climate risks. <p>To ensure infrastructure is located, planned, designed and maintained to be resilient to climate change, including increasingly extreme weather events.</p>	<p>The DWMP should ensure that proposals are resilient to the effects of climate change. Where possible, options should be considered that enhance resilience.</p> <p>The SEA should consider the effects of options on climate change resilience.</p>
Defra (2015) The government’s response to the Natural Capital Committee’s Third State of Natural Capital report	
<p>This provides a number of recommendations such as:</p> <p>Agreement for the development of a 25 year plan for a healthy natural economy. This includes helping organisations understand the economic, social and cultural value the impact their actions have on it and how to use the knowledge for better decisions; identify most important and threatened environmental assets; protection of designated areas; address outstanding monitoring and data issues to enable better decisions about strategic investments in natural capital.</p>	<p>Outputs from the SEA process will help to inform any future potential development by U UW of Natural Capital Accounting (NCA) approaches to assessing environmental asset performance. Government (led by HM Treasury and Defra) is</p>



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<p>Assigning institutional responsibility for monitoring the state of natural capital.</p> <p>Organisations that manage land and water assets should create a register of natural capital for which they are responsible.</p>	<p>increasingly using NCA to support future environmental policy and decision making, and there may be future expectations on water companies to follow suit.</p>
Defra (2016) Guiding principles for water resources planning for water companies operating wholly or mainly in England	
<p>The document sets out the key policy priorities the government expects water resources management plans (WRMP) to address. The four key principles are:</p> <ul style="list-style-type: none"> • Take a long term, strategic approach to protecting and enhancing resilient water supplies; • Consider every option to meet future public water supply needs; • Protect and enhance our environment, acting collaboratively; and • Promote efficient water use and reduce leakage. 	<p>The DWMP should consider the guiding principles.</p>
Defra (2017) Air Quality Plan for Nitrogen Dioxide (NO2) in UK	
<p>This plan sets out how the Government will improve air quality in the UK by reducing nitrogen dioxide emissions in towns and cities. The air quality plans set out targeted local, regional and national measures across 37 zone plans (areas which have identified air quality issues with nitrogen dioxide), a UK overview document and a national list of measures. Measures relate to freight, rail, sustainable travel, low emission vehicles and cleaner transport fuels, among others.</p>	<p>The DWMP should have regard to the air quality plans and specific local measures.</p> <p>The SEA should consider the effects of the DWMP on air quality.</p>
Defra (2020) Drought Plan Direction 2020	
<p>Sets out the timescales for water companies to develop and consult on Drought Plans.</p>	<p>The DWMP SEA will take account of the statutory requirements of this Direction, where relevant.</p>
Defra (2020) Water abstraction plan: Environment	
<p>This document sets out how the government will reform water abstraction management over the coming years and how this will protect the environment and improve access to water.</p> <p>The plan states that the current approach to managing abstraction has three main issues:</p> <ul style="list-style-type: none"> • some older licences allow abstraction that can damage the environment; • the current approach is not flexible enough to cope with the pressures of increasing demand for water and climate change in the long term, or to allow abstractors access to additional water when it is available; and, • the abstraction service is outdated and paper-based. <p>The plan explains how approaches identified to address these issues will be implemented. The Government's approach to addressing these issues has three main elements:</p> <ul style="list-style-type: none"> • making full use of existing regulatory powers and approaches to address unsustainable abstraction and move around 90% of surface water bodies and 77% of groundwater bodies to the required standards by 2021 • developing a stronger catchment focus – bringing together the Environment Agency, abstractors and catchment groups to develop local solutions to existing pressures and to prepare for the future. These local solutions will: <ul style="list-style-type: none"> ○ protect the environment by changing licences to better reflect water availability in catchments and reduce the impact of abstraction 	<p>The DWMP should consider if it can help to address the issues set out in the plan.</p> <p>The SEA should consider the effects of the DWMP on the environment, climate change and the sustainability of options.</p>



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<ul style="list-style-type: none"> ○ improve access to water by introducing more flexible conditions that support water storage, water trading and efficient use • supporting these reforms by modernising the abstraction service, making sure all significant abstraction is regulated and bringing regulations in line with other environmental permitting regimes <p>The supplementary <i>Environment</i> provides further information on the work to address unsustainable abstraction set out in the abstraction plan.</p> <p>The supplementary <i>Catchment Focus</i> document provides further information on proposals set out in the abstraction plan to develop a stronger catchment focus. This is about bringing together the Environment Agency, abstractors and catchment partnerships to identify and implement local solutions to existing pressures and to prepare for the future.</p> <p>The supplementary <i>Abstraction Licencing Service</i> document provides further information on the planned reforms to the abstraction licensing service set out in the abstraction plan.</p>	
Defra (2021) Waste Management Plan for England	
<p>The Waste Management Plan for England is an analysis of the current waste management situation in England. The plan does not introduce new policies or change how waste is managed in England. Its aim is to bring current waste management policies together under one national plan.</p>	<p>The DWMP may involve the generation of waste (e.g. either through construction requirements or operation of options).</p> <p>The SEA should seek to enhance recycling and minimise the amount of waste going to landfill.</p>
Defra, Environment Agency, Natural England, Forestry Commission England (2016) <i>Creating a great place for living</i>	
<p>In 2016 Defra produced a report that set out objects to great a great place for living. The objectives are related to the following topics:</p> <ul style="list-style-type: none"> • Environment – a cleaner, healthier environment, benefiting people and the economy; • Food and farming – a world-leading food and farming industry; • Rural – a thriving rural economy, contributing to national prosperity and wellbeing; • Protection – a nation better protected against floods, animal and plant diseases and other hazards, with strong response and recovery capabilities; • Excellent Delivery – Excellent delivery, on time and to budget with outstanding value for money; <p>An outstanding organisation – an organisation striving to be the best, focused on outcomes and constantly challenging itself.</p>	<p>The SEA must take into account impacts of plan options (construction and operation) on the environment, as well as the population and human health and land use (which will impact on the food and farming and rural objectives).</p>
Defra, Scottish Government, Welsh Government (2015) <i>The Great Britain Invasive Non-native Species Strategy</i>	
<p>The strategy sets out key aims and actions for addressing the threats posed by invasive non-native species, including the prevention of invasive species arriving in Britain, early detection and monitoring, eradication and control. It also aims to:</p> <ul style="list-style-type: none"> • get people to work better together, including the government, stakeholders, land managers and the general public; and • improve co-ordination and co-operation on issues at a European and international level. <p>The strategy covers the period 2015 to 2020.</p>	<p>The DWMP should seek to avoid the spread of invasive species. The SEA should consider the effects of the DWMP on biodiversity.</p>
Defra and Welsh Government (2014) <i>River Basin Planning Guidance</i>	



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<p>Aims to give guidance on practical implementation of the Water Framework Directive (WFD). The river basin planning process involves setting environmental objectives for all groundwater and surface waters (including estuaries and coastal waters) within the river basin district, and devising programmes of measures to meet those objectives.</p>	<p>The DWMP should take into account the contents of this statutory guidance</p>
Environment Agency (2004) Catchment Flood Management Plans: Guidelines – Volume 1 Policy	
<p>These guidelines support the Environment Agency's strategy for flood risk management and work towards achieving the government's strategy for flood and coastal erosion flood risk management. The aims of Catchment Flood Management Planning are:</p> <ul style="list-style-type: none"> • To promote sustainable flood risk management measures • To reduce the sources of flooding and harm to people, and the natural, built and historic environment caused by floods • To support the delivery of the Government's and others' policies and targets, and the Environment Agency's environmental vision. 	<p>The DWMP should seek to support the aims of the plan.</p> <p>The SEA should consider how the DWMP may affect flood risk across the region.</p>
Environment Agency (2007) Soil: A Precious Resource	
<p>The soil strategy identifies the Environment Agency's priorities, sets out their role and says what action is to be taken to protect, manage and restore soil. Damaged soil structure can lead to flooding, water pollution and can affect the landscape and archaeological features. The strategy also outlines the part managing soils can play in mitigating climate change.</p>	<p>The DWMP should ensure the sustainable management of soil resources.</p> <p>SEA objectives should reflect and consider relevant priorities from the Soil: A Precious Resource publication.</p>
Environment Agency (2008) Better Sea Trout and Salmon Fisheries: Our Strategy for 2008-2021	
<p>The strategy has the goal of more sea trout and more salmon in more rivers bringing more benefit. This goal is to be brought about through achieving three broad targets:</p> <ol style="list-style-type: none"> 1. Self-sustaining sea trout and salmon in abundance in more rivers 2. Economic and social benefits optimised for sea trout and salmon fisheries 3. Widespread and positive partnerships, producing benefits <p>There are twelve more detailed targets lying below these broad goals which relate to salmon and fisheries.</p>	<p>The DWMP should take the strategy into account where it may have an effect on salmon and trout, e.g. where an option may involve inserting or removing a barrier to fish.</p> <p>The SEA should include a guide question in relation to the effects of options on recreation (i.e. recreational angling) and also appropriate targets in monitoring proposals.</p>
Environment Agency (2009) Water for People and the Environment - Water Resources Strategy for England and Wales	
<p>Environment Agency's water resources strategy sets out how Environment Agency believe water resources should be managed England and Wales to 2050 and beyond to ensure that there will be enough water for people and the environment. It sets out how water resources should be managed within Defra frameworks in its water strategy for England 'Future Water', and in Wales, the Welsh Government's 'Environment Strategy for Wales'.</p> <p>Objectives in the strategy are set out under four broad themes: adapting to and mitigating climate change; a better water environment; sustainable planning and management of water resources; and, water and the water environment are valued.</p> <p>This strategy sets out the following objectives:</p> <ul style="list-style-type: none"> • Ecology is more resilient to climate change because abstraction pressures have been reduced and a diverse network of habitats has been allowed to develop; • The resilience of supplies and critical infrastructure is increased to reduce the impacts of climate change; 	<p>The objectives for the DWMP should reflect these objectives, where relevant.</p> <p>The SEA should seek to promote the protection and enhancement of water resources and to encourage sustainable management of the resource.</p>



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<ul style="list-style-type: none"> • Flexible and incremental solutions in water resources management allow adaptation to climate change as it happens; • Everyone is able to make more informed decisions and choices about managing water resources, protecting the environment and choosing options to avoid security of supply problems; • Greenhouse gas emissions from using water resources are minimised and properly considered in future decisions; • Measures will be in place to make sure that water bodies achieve Water Framework Directive objectives; • Abstraction is sustainable, the environment is protected and improved, and supplies remain secure; • Environmental problems caused by historic unsustainable abstractions are resolved; • Catchment management is integrated so that impacts on water resources and the water environment are managed together; • The twin track approach of resource development with demand management is adopted in all sectors of water use; • In England, the average amount of water used per person in the home is reduced to 130 litres each day by 2030; • The Environment Agency targets and adapts its approach to reflect the location and timing of pressures on water resources; • In England, water companies implement near-universal metering of households, starting in areas of serious water stress; • Leakage from mains and supply pipes is reduced; • New and existing homes and buildings are more water efficient; • Water resources are allocated efficiently and are shared within regions where there are areas of surplus; • Water pricing for the abstraction and use of water acts as an incentive for the sustainable use of water resources; • Abstractors and users make informed choices to use water more efficiently; • Innovative tariffs are adopted by water companies to maximise savings and minimise issues of affordability; • The needs of wildlife, fisheries, navigation and recreation, as well as the environment and abstractors, are fully taken into account when allocating water resources; • Innovative technology is developed to improve water efficiency by all water users. <p>The strategy includes a number of actions for Environment Agency and others to develop targets for water reduction and efficiency.</p>	
Environment Agency (2010) Water Resources Action Plan for England and Wales	
<p>The strategy has four main aims:</p> <ul style="list-style-type: none"> • Adaptation to and mitigation of climate change; • A better water environment; • Sustainable planning and management of water resources; • People valuing water and the water environment. 	<p>The SEA should seek to ensure that strategy objectives are also reflected in the SEA objectives particularly regarding the sustainable management of water resources and protecting the environment.</p>
Environment Agency (2013) Areas of Water Stress: Final Classification	
<p>The report is the Environment Agency's formal advice on which areas in England are of serious water stress.</p>	<p>The DWMP should seek to contribute to addressing the requirements of water stressed areas.</p> <p>The SEA assessment framework should consider the effects of the DWMP on water resources and</p>



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	the associated socio- economic and environmental receptors.
Environment Agency (2013) <i>Managing Water Abstraction</i>	
Managing Water Abstraction sets out how the Environment Agency manage water resources in England and Wales. It is the overarching document that links together the abstraction licensing strategies. The availability of water resources for abstraction is assessed through a Catchment Abstraction Management Strategy (CAMS) approach.	The SEA should include a guide question relating to the sustainable use of water resources.
Environment Agency (2020) <i>EA2025 creating a better place</i>	
<p>The plan sets out the Environment Agency’s ambition for how they plan to create better places for people, wildlife and the environment, up to 2025.</p> <p>This document includes the Environment Agency’s purpose, priorities, culture and values as well as how they will help to deliver the 25 year environment plan. It includes the metrics that the Environment Agency will be measured against so they know when they are succeeding in our ambitions. The plan sets out 3 long term goals:</p> <ul style="list-style-type: none"> • A nation resilient to climate change • Healthy air, land and water • Green growth and a sustainable future 	The SEA and the DWMP should consider the Environment Agency’s priorities.
Environment Agency (2020) <i>Meeting our future water needs: a national framework for water resources</i>	
<p>The national framework report marks a move to strategic regional planning. It sets out the principles, expectations and challenges for 5 regional groups (including Water Resources West, which the UuW area forms part of) made up of the 17 English water companies and other water users. The framework explores England’s long term water needs for:</p> <ul style="list-style-type: none"> • public water supplies • agriculture • the power and industry sectors • environmental protection <p>For the Water Resources West Region the framework estimates that additional public water supply needs between 2025 and 2050 are 639 MI/d.</p> <p>The framework states that the Water Resources West Region will face pressures in the future. However, it has a significant surplus, the potential to reduce demand further and options to supply more water. The framework states that the options identified in the water company WRMPs are enough to meet the higher need estimate. If greater reductions in water use can be achieved or further options identified, there is potential to transfer more water to other regions.</p> <p>The plan sets out that the regional groups will each produce one plan and states that it must consider how the region will be resilient to a range of uncertainties and future scenarios. It must identify a set of options that provide the best value to customers, society and the environment rather than simply the least cost. Together the 5 plans must meet the national need.</p> <p>The plans need to address the following:</p> <ul style="list-style-type: none"> • Increasing resilience to drought • Greater environmental improvement • Reducing long term water usage 	<p>The DWMP should seek to support the achievement of the aims of the framework.</p> <p>The SEA should include an objective/guide question relating to water resources.</p>



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<ul style="list-style-type: none"> Reducing leakage Reducing the use of drought permits and orders Increasing supplies. <p>The framework states that plans must include:</p> <ul style="list-style-type: none"> an initial resource position – a resource assessment which looks at future scenarios and explores the main challenges and sensitivities a statement of ambition, including the regional policies and principles a list of the options considered – to meet the regional need and contribution to the national need the preferred plan – identifying the best value options to meet all future water needs across multiple sectors and users. <p>The framework also sets out a number of criteria that the plans must fulfil as well as things that the plans should or could achieve or include.</p>	
Environment Agency (2020) National Flood and Coastal Erosion Risk Management Strategy for England	
<p>This strategy describes what needs to be done by all organisations involved in flood and coastal erosion risk management. These include local authorities, internal drainage boards, water and sewerage companies, highways authorities, and the Environment Agency. They all act to reduce the risk of flooding and coastal erosion and manage its consequences.</p> <p>The strategy sets out a statutory framework that will help communities, the public sector and other organisations to work together to manage flood and coastal erosion risk. It supports local decision-making and engagement in FCERM, making sure that risks are managed in a co-ordinated way across catchments and along each stretch of coast. This includes the development of local flood risk management strategies by lead local flood authorities, as well as our strategic overview of all sources of flooding and coastal erosion.</p> <p>This strategy's long-term vision is for: a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100.</p> <p>It has 3 long-term ambitions, underpinned by evidence about future risk and investment needs. They are:</p> <ul style="list-style-type: none"> climate resilient places: working with partners to bolster resilience to flooding and coastal change across the nation, both now and in the face of climate change today's growth and infrastructure resilient in tomorrow's climate: making the right investment and planning decisions to secure sustainable growth and environmental improvements, as well as infrastructure resilient to flooding and coastal change a nation ready to respond and adapt to flooding and coastal change: ensuring local people understand their risk to flooding and coastal change, and know their responsibilities and how to take action. 	<p>The DWMP should be prepared in line with the strategy.</p> <p>The SEA framework should consider flooding and coastal erosion.</p>
Environment Agency (2020) Water Company Drought Plan guideline	
<p>This guidance, written in conjunction with Defra, outlines the legislative requirements for a drought plan. This document also provides a timeline for the drought planning process.</p>	<p>The DWMP and the SEA should consider the guideline, where relevant.</p>
Environment Agency and Natural Resources Wales (2018) Water Resources Planning Guideline: Interim update	
<p>Technical guidelines published jointly by the Welsh Government, NRW, Defra, Environment Agency and Ofwat for the 2019 Water Resource Management Plans for England and Wales.</p> <p>The water resources planning guideline provides a framework for water companies to follow in developing and presenting their water resources plans. It sets out good practice behind the composition of a plan, the approaches to developing a plan and the information that a plan</p>	<p>The DWMP should consider the guideline, where relevant.</p> <p>The SEA should seek to ensure that water supplies and resources are maintained or enhanced in</p>



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should contain. Companies should follow this guideline to ensure that their plans cover the requirements specified by the Water Industry Act 1991.	line with the Water Resources Planning Guidelines.
Environment Agency, OfWAT and Natural Resources Wales (2021) Water Resources Planning Guideline	
<p>The water resources planning guideline provides an update to the framework for water companies to follow in developing and presenting their water resources plans. It sets out good practice behind the composition of a plan, the approaches to developing a plan and the information that a plan should contain.</p> <p>The guideline states that where feasible water and sewerage companies should ensure that their long term planning for wastewater and water supply are aligned. Along with highlighting any linkages and, or interdependencies (or both). The guideline states that water/sewerage companies should consider alignment in their growth forecasts, climate change scenarios and timetable for delivering solutions.</p>	<p>The DWMP should align with the WRMP as suggested in the guideline.</p> <p>The SEA should seek to ensure that water supplies and resources are maintained or enhanced in line with the Water Resources Planning Guidelines.</p>
Environment Agency (undated) Hydroecology: Integration for modern regulation	
This paper describes clear way forward in terms of hydroecology and a strategic direction to its development and application.	The DWMP should ensure relevant ecological considerations are integral to drainage and wastewater management decisions across the range of temporal and spatial scales.
Environment Agency (undated) Restoring Sustainable Abstraction Programme	
Environment Agency note that there is evidence to suggest that unsustainable abstraction of groundwater and surface water could be contributing to environmental damage of rivers and wetlands in England and Wales, including sites of national and international conservation importance. In May 1997, at the Government's Water Summit, a commitment was made to reverse the damage caused by past decisions. Environment Agency investigates where over-abstraction has occurred and work with local people to restore sustainable supplies.	
Environment Agency (undated) WFD River Basin Characterisation Project: Technical Assessment Method - River abstraction and flow regulation	
This paper describes the method used to assess the likelihood of river water bodies achieving the relevant WFD objectives as a result of artificial influences on low river flows.	<p>Implementation of the DWMP may impact river water quality.</p> <p>The SEA should seek to promote the protection and enhancement of biodiversity and river water quality across the region.</p>
English Heritage (2008) Climate Change and the Historic Environment	
Sets out the current thinking on the implications of climate change for the historic environment. It is intended both for the heritage sector and also for those involved in the wider scientific and technical aspects of climate change; in the development of strategies and plans relating to the impact of climate change; or in projects relating to risk assessment, adaptation and mitigation.	The SEA should seek to assess the implications of the DWMP in combination with climate change and the potential impacts on heritage and the historic environment.
English Heritage (2010) Heritage at Risk	
Heritage at Risk is a national project that aims to identify the endangered sites (historic buildings and places with increased risks of neglect and decay) and then help secure them for the future. Regional Heritage at Risk Registers were most recently published in 2017.	The SEA should seek to protect and enhance heritage and landscape and the assessment framework should include an objective relating to cultural heritage.
Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment	
This document provides guidance for addressing the historic environment in Strategic Environmental Assessment or Sustainability Appraisal. It identifies the recommended list of	The SEA should consider the potential effects of the DWMP on



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plans, programmes and policies for review, approach to baseline review, potential sustainability issues.	<p>the historic environment, particularly designated assets and their settings, and to important wetland areas with potential for paleo-environmental deposits.</p> <p>Historic characterisation can supplement information about designations.</p> <p>Sustainability issues, objectives and indicators identified in this document should be taken into account in the SEA.</p>
The Historic Environment Group (2018) <i>Historic Environment and Climate Change Sector Adaption Plan</i>	
The sector adaptation plan (SAP) is a high-level, strategic document intended to identify climate change risks, opportunities and adaptation needs for the historic environment. Its aim is to stimulate action through strategies, programmes and partnerships.	<p>The DWMP should seek to reduce its contribution to climate change and aim to assist in the protection of the historic environment within the operational area.</p> <p>The SEA assessment framework should consider the effects of the DWMP on climate change and associated effects on the historic environment.</p>
HM Government (1975) <i>Salmon and Freshwater Fisheries Act 1975</i>	
The act encompasses fishing regulation, as well as illegal obstruction of migratory pathways and prohibited modes of destroying fish. The act allows the salmon to maintain an environmentally stable population and support the fishing industry.	The SEA and DWMP should consider the protection of salmon and freshwater fish.
HM Government (1975) <i>Reservoirs Act</i>	
<p>The Reservoirs Act 1975 provides a legal framework to ensure the safety against failure of large raised reservoirs.</p> <p>The act applies to reservoirs that hold at least 25,000 cubic metres of water above natural ground level.</p> <p>Safety legislation for reservoirs in the United Kingdom was introduced in 1930 after several reservoir disasters had resulted in loss of life. This law was superseded by the Reservoirs Act 1975.</p> <p>Under the Reservoirs Act 1975 reservoir owners (undertakers) have ultimate responsibility for the safety of their reservoirs.</p> <p>Reservoir owners must appoint a panel engineer (a specialist civil engineer who is qualified and experienced in reservoir safety) to supervise the design and construction of the reservoir, to continuously supervise the reservoir when built (supervising engineer) and to carry out periodic inspections (inspecting engineer).</p>	The DWMP should consider any effects of options on reservoirs capacity, functioning and downstream flows.
HM Government (1979) <i>Ancient Monuments and Archaeological Areas Act 1979</i>	
The Act defines sites that warrant protection as ancient monuments. They can be a Scheduled Monuments or "any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it".	The DWMP should consider if there are ways in which they can contribute to the protection of Scheduled Monuments.



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	The SEA assessment framework should include consideration of Scheduled Monuments.
HM Government (1981) Wildlife and Countryside Act 1981	
<p>The Act makes it an offence (with exceptions) to;</p> <ul style="list-style-type: none"> • Intentionally kill, injure or take any wild bird or their eggs or nests; • Intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5; • Prohibits interference with places used for shelter or protection, or intentionally disturbing animals; and • Pick, uproot, trade in, or possess (for the purposes of trade) and wild plant listed in Schedule 8. <p>The Act also provides for the notification of Sites of Special Scientific Interest (SSSI) and require surveying authorities to maintain up to date definitive maps and statements, for the purpose of clarifying public rights of way.</p>	<p>The DWMP must ensure full compliance with the Act.</p> <p>The SEA should ensure a positive contribution to the wildlife within the operational area.</p>
HM Government (1990) Environmental Protection Act	
<p>The Act defines the legal framework for England, Wales and Scotland regarding environmental protection, including the duty of care for waste, contaminated land, and statutory nuisance. Under the Act, Local Authorities or private individuals may take action to secure abatement of any such nuisance, such as noise, and only one person need be affected for action to be possible. It also specifies offences related to the storage, movement, treatment or disposal of controlled waste, and sets out the regime for identifying and remediating contaminated land.</p>	<p>The DWMP must ensure compliance with the Act.</p> <p>The SEA assessment framework should include waste and nuisance.</p>
HM Government (1990) Planning (Listed Buildings and Conservation Areas) Act 1990	
<p>The Planning (Listed Buildings and Conservation Areas) Act 1990 provides specific protection for buildings and areas of special architectural or historic interest. The Act introduced the listing of buildings for buildings which possess special architectural or historic interest and the designation of conservation areas for areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance.</p>	<p>The DWMP should seek to avoid adverse impacts on cultural heritage assets.</p> <p>The SEA assessment framework should include specific objectives relating to cultural heritage.</p>
HM Government (1990) Town and Country Planning Act 1990	
<p>The Town and Country Planning Act controls and consents development, which is defined as building, engineering, mining or other operations in. on, over or under land, or the making of any material change in the use of any building or land.</p>	<p>The DWMP must ensure full compliance with the Act.</p> <p>The SEA should include objectives and guide questions relating to biodiversity, land use, and landscape.</p>
HM Government (1991 and 1994) Land Drainage Act	
<p>The Land Drainage Act 1991 requires that a watercourse be maintained by its owner in such a condition that the free flow of water is not impeded. The riparian owner must accept the natural flow from upstream but need not carry out work to cater for increased flows resulting from some types of works carried out upstream, for example a new housing development.</p> <p>If a riparian owner fails to carry out his responsibilities under the Land Drainage Act, or if anyone else causes a watercourse to become blocked or obstructed, the County and District Councils have powers of enforcement by serving a notice under the Act. If this is ignored, the Council concerned may carry out the necessary itself and then recharge the person responsible for the full cost incurred. The District Council normally implements these powers but the County Council will deal with problems that affect the highway. The person responsible may also be prosecuted for nuisance under the Public Health Act 1936.</p>	<p>The DWMP should be prepared in accordance with the act.</p>



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The 1994 Act amends the Land Drainage Act of 1991 in relation to the functions of internal drainage boards and local authorities.	
HM Government (1991) Water Industry Act 1991 (as amended by the Flood and Water Management Act 2010)	
The Water Industry Act sets out the regulatory, competition and consumer representation frameworks for the water sector in England and Wales including the duty for water companies to prepare WRMPs.	The DWMP should be prepared in accordance with the Water Industry Act 1991, where relevant.
HM Government (1991) Water Resources Act 1991	
The Water Resources Act applies to England and Wales and established the National Rivers Authority (now the Environment Agency) to regulate water pollution, water resources, flood defence, fisheries and navigation. The Act covers water abstraction and impounding and discharges to surface and ground waters and coastal waters.	The DWMP must ensure full compliance with the Act
HM Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994	
These regulations transposed European Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) into national law. The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.	<p>The DWMP should seek to protect European sites and species.</p> <p>The SEA assessment framework should include objectives and guide questions relating to the protection of European sites and species, as well as biodiversity more generally.</p>
HM Government (1994) UK Biodiversity Action Plan	
<p>The aim of the action plan is to conserve and enhance biological diversity in the UK and to contribute to the conservation of national and global biodiversity and include the follow aims to maintain and, where practicable, to enhance:</p> <ul style="list-style-type: none"> • The overall populations and natural ranges of native species and the quality and range of wildlife habitats and ecosystems; • Internationally and nationally important and threatened species, habitats and ecosystems; • Species, habitats and natural and managed ecosystems that are characteristic of Kent; • The biodiversity of natural and semi-natural habitats, where this has diminished over 3 recent decades, and • Public awareness of, and involvement in, conserving biodiversity. 	Ensure that the DWMP and SEA encourage conservation and offer protection to areas and species of high conservation importance as identified in this action plan.
HM Government (1994) Urban Waste Water Treatment (England and Wales) Regulations 1994	
The Regulations transposed the requirements of the Urban Waste Water Treatment Directive 91/271/EEC (as amended). The Regulations impose requirements for: collection systems for treated urban waste water; discharges from treatment plants, and sets out methods for monitoring; and makes provisions with regard to discharges of industrial wastewater and the dumping of sludge from ships.	The DWMP should reflect the requirements set out in the regulations.
HM Government (1995) Environment Act 1995	
The Act seeks to protect and preserve the environment and guard against pollution to air, land or water. The Act adopts an integrated approach to environmental protection and outlines where authorisation is required from relevant authorities to carry out certain procedures as well as outlining the responsibilities of the relevant authorities. It established the Environment Agency, the Scottish Environment Protection Agency and the National Park authorities. The Act	<p>The DWMP must ensure compliance with the Act.</p> <p>The SEA assessment framework should include waste and air quality.</p>



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also includes provisions relating to remediation of contaminated land, waste and the designation of Air Quality Management Areas.	
HM Government (2000) <i>The Countryside and Rights of Way (CROW) Act 2000</i>	
This act extends the public's ability to enjoy the countryside and safeguards landowners and occupiers. The Act creates a new statutory right of access to open county and registered common land, modernise the right of way system, give greater protection to Sites of Special Scientific Interest (SSSIs), provide greater protection arrangements for Areas of Outstanding Natural Beauty (AONBs) and strengthen wildlife enforcement legislation.	The SEA must make sure that the Act is supported and that public rights of way and access to the countryside are maintained and where possible enhanced.
HM Government (2002) <i>The National Heritage Act 2002</i>	
This Act builds on the preceding National Heritage Acts of 1980, 1983 and 1997. All four Acts define the way in which National heritage assets are managed and protected. The 2002 Act extended the powers of the Historic Buildings and Monuments Commission to include underwater archaeology within the territorial waters of the United Kingdom.	The DWMP should be compliant with the Act. The SEA should include objectives relating to the protection of heritage features.
HM Government (2003) <i>The Water Act 2003</i>	
The four broad aims of the Act are: <ul style="list-style-type: none"> the sustainable use of water resources; strengthening the voice of consumers; a measured increase in competition; and the promotion of water conservation. It amends the Water Industry Act 1991 so that water companies: <ul style="list-style-type: none"> are given a duty to prepare and publicise drought plans; are placed under a duty to agree and publicise water resource management plans; and <ul style="list-style-type: none"> are placed under an enforceable duty to further water conservation. As part of the Act the Water Services Regulation Authority (Ofwat) became the economic regulator of the water and sewage industry in England and Wales.	The DWMP should support the achievement of the aims of the act, where possible. The SEA should include objectives relating to water quality, water resources and sustainable water use.
HM Government (2003) <i>The Water Environment (WFD) (England and Wales) Regulations 2003</i>	
These regulations transpose the Water Framework Directive into law in England and Wales (see Water Framework Directive 2000/60/EC above).	The DWMP should be aligned with the requirements of the Water Framework Directive. The SEA should include objectives relating to water quality, water resources, sustainable water use, and biodiversity.
HM Government (2005) <i>Securing the Future; Delivering UK Sustainable Development Strategy</i>	
The strategy for sustainable development aims to enable all people to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations. The strategy places a focus on protecting natural resources and enhancing the environment.	The SEA must seek to ensure that objectives relating to sustainable development, sustainable resource use and protecting the natural environment, are considered when assessing the potential impacts of the DWMP
HM Government (2006) <i>Climate Change and Sustainable Energy Act 2006</i>	
The Act was enacted after the publication of the UK Climate Change Programme (2006). It places an obligation on the government to report to Parliament on greenhouse gas emissions in the UK and action taken by Government to reduce these emissions.	The DWMP should take into account carbon emissions associated with the measures. The SEA could include an objective/guide question in the assessment framework to reduce greenhouse gas/carbon dioxide



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	emissions. Consider whether the monitoring arrangements can be utilised to monitor the effects of the DWMP.
HM Government (2006) <i>Natural Environment and Rural Communities Act 2006</i>	
<p>The Act:</p> <ul style="list-style-type: none"> • makes provision about bodies concerned with the natural environment and rural communities; • makes provision in connection with wildlife, sites of special scientific interest, National Parks and the Broads; • amends the law relating to rights of way; • makes provision as to the Inland Waterways Amenity Advisory Council; and <p>provides for flexible administrative arrangements in connection with functions relating to the environment and rural affairs and certain other functions; and for connected purposes.</p>	The DWMP and SEA should have regard to protected wildlife sites and species, landscapes and rights of way.
HM Government (2007) <i>Water Resources Management Plan Regulations 2007</i>	
These Regulations set out the process for the preparation of WRMPs.	The DWMP should considered these regulations, where relevant.
HM Government (2008) <i>The Climate Change Act 2008 and The Climate Change Act 2008 (2050 Target Amendment) Order 2019</i>	
<p>This Act aims:</p> <ul style="list-style-type: none"> • to improve carbon management and help the transition towards a low carbon economy in the UK; and • to demonstrate strong UK leadership internationally, signalling that the UK is committed to taking its share of responsibility for reducing emissions in the context of ratifying the global Paris Agreement. <p>The UK Climate Change Act 2008 sets legally binding targets for the UK to reduce greenhouse gas emissions by at least 80% by 2050, and CO2 emissions by at least 26% by 2020, against a 1990 baseline.</p> <p>Further the Act provides for a carbon budgeting system which caps emissions over five year periods to set out our trajectory to 2050. Budgets have been set covering the periods 2008-12, 2013-17, 2018-22, 2023-27 and 2028-32, equivalent to 22%, 28%, 34%, 50% and 57% reductions in carbon emissions compared to 1990 levels respectively.</p>	The DWMP should seek contribute towards increasing the proportion of energy from renewable energy sources. The SEA assessment framework should include consideration of greenhouse gas emissions and use of energy from renewable energy sources.
HM Government (2008) <i>The Energy Act 2008</i>	
<p>The Energy Act 2008 contains the legislative provisions required to implement UK energy policy following the publication of the Energy Review 2006 and the Energy White Paper 2007.</p> <p>The key elements of the Act:</p> <ul style="list-style-type: none"> • Strengthens the regulatory framework for offshore gas supply infrastructure to enable private sector investment; • Creates a regulatory framework to enable private sector investment in Carbon Capture and Storage projects; • Strengthens the Renewables Obligation to drive greater and more rapid deployment of renewables in the UK; • Strengthens statutory decommissioning provisions for offshore renewables and oil and gas installations to minimise the risk of liabilities falling to the Government; 	The DWMP should have regard to the provisions in the Act. The SEA should include objectives relating to energy and resource use.



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<ul style="list-style-type: none"> Improves the offshore oil and gas licensing regime in response to changes in the commercial environment and enable the Department for Business Enterprise and Regulatory Reform to carry out its regulatory functions more effectively; Ensures the operators of new nuclear power stations accumulate funds to meet the full costs of decommissioning and their full share of waste management costs; and Introduces amending powers such that Ofgem is able to run the offshore electricity transmission licensing regime more effectively. <p>The subsequent Energy Acts (2010, 2011, 2013, 2016) contain provisions relating to carbon capture and storage, decarbonisation, fuel poverty, reductions in carbon emissions, security of energy supply, nuclear regulation and the Oil and Gas Authority, amongst others.</p>	
HM Government (2008) Planning Act 2008	
<p>This Act introduced a new system for nationally significant infrastructure planning, alongside further reforms to the Town and Country Planning system.</p>	<p>The DWMP should consider any unforeseen NSIP proposals that come forward prior to adoption which may affect water resources in the region.</p> <p>The SEA should consider the cumulative effects of the DWMP and any unforeseen NSIP proposals that come forward which may affect water resources in the region.</p>
HM Government (2009) The Eels (England and Wales) Regulations 2009 (as amended 2011)	
<p>These regulations were introduced in 2009 and amended in 2011. They afford powers to the Environment Agency to implement measures for the recovery of European eel stocks and have important implications for operators of abstractions and discharges.</p>	<p>The SEA and DWMP should have regard to eel populations.</p>
HM Government (2009) The Groundwater (England and Wales) Regulations 2009	
<p>The Groundwater Regulations are designed to implement a daughter directive to the European Water Framework Directive and prevent or limit the inputs of polluting substances into groundwater.</p> <p>Substances controlled under these regulations fall into two categories:</p> <ol style="list-style-type: none"> Hazardous substances, defined as those which are toxic, persistent or liable to bioaccumulate must be prevented from entering groundwater. Substances in this list may be disposed of to the ground, under a permit, but must not reach groundwater. They include pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide. Non-hazardous pollutants are less dangerous, and can be discharged to groundwater under a permit, but must not cause pollution. Examples include sewage, trade effluent and most wastes. Non-hazardous pollutants include any substance capable of causing pollution and the list is much wider than the previous List 2 substances. 	<p>The DWMP will need to comply with the requirements of the Regulations where appropriate.</p> <p>The SEA assessment should include an objective relating to the effects of options on groundwater quality.</p>
HM Government (2009) Marine and Coastal Access Act 2009	
<p>The Marine and Coastal Access Act sets out a number of measures including the establishment of Marine Conservation Zones (MCZs) and Marine Spatial Plans. It also includes amendments to the Salmon and Freshwater Fisheries Act, 1975.</p>	<p>The DWMP should take into account its effects on coastal areas, where appropriate.</p> <p>The SEA assessment should take into account the effects of the actions on the coast where relevant.</p>



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HM Government (2009) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI 3104	
Amends Water Resources Act 1991 by extending the use of Water Protection Zones and Works Notices, in particular to deal with harm to aquatic ecosystems caused by the physical characteristics of a water course or lake, such as quantity, structure and substrate of river/lake bed. Aligns the Water Resources Act with the hydromorphological requirements of the WFD	The SEA should include objectives that cover hydromorphological aspects and seek to ensure that hydromorphological features within the plan are maintained or enhanced.
HM Government (2009) The UK Renewable Energy Strategy	
The Strategy sets out to: <ul style="list-style-type: none"> Put in place the mechanisms to provide financial support for renewable electricity and heat worth around £30 billion between up to 2020; Drive delivery and clear away barriers; Increase investment in emerging technologies and pursue new sources of supply; and Create new opportunities for individuals, communities and business to harness renewable energy.	The DWMP should contribute towards increasing the proportion of energy from renewable energy sources, where possible. The SEA assessment framework should include consideration of the use of energy from renewable energy sources.
HM Government (2010) Flood and Water Management Act 2010	
The Flood and Water Management Act 2010 aims to provide better, more sustainable management of flood risk for people, homes and businesses, help safeguard community groups from unaffordable rises in surface water drainage charges and protect water supplies to the consumer. The Act will also implement recommendations made by Sir Michael Pitt in his review of the 2007 floods. This will include giving water companies new powers to better control non-essential domestic uses of water during periods of water shortage. The Act places a number of statutory duties on water companies including: <ul style="list-style-type: none"> a duty to act consistently with the National Strategy; and a duty to have regard to the content of the Local Flood Risk Management Strategies. Does not contain any targets.	The DWMP should be in conformity with the Act. The SEA should include objectives relating to flood risk and water use.
HM Government (2011) Localism Act 2011	
The Localism Act provides greater devolved powers to councils and neighbourhoods and gives local communities more control over housing and planning decisions.	The DWMP and the SEA Environmental Report will be subject to public consultation.
HM Government (2011) UK Marine Policy Statement	
The Marine Policy Statement (MPS) sets out the framework for preparing Marine Plans and taking decisions affecting the marine environment, supporting the delivery of the following high-level marine objectives: <ul style="list-style-type: none"> Achieving a sustainable marine economy; Ensuring a strong, healthy and just society; Living within environmental limits; Promoting good governance; Using sound science responsibly. Does not contain any targets.	The DWMP should take into account its effects on coastal areas. The SEA assessment should take into account the effects of the actions on the coast/marine environment where relevant.
HM Government (2011) Water for Life: White Paper	



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<p>Water for Life describes a vision for future water management in which the water sector is resilient, in which water companies are more efficient and customer focused, and in which water is valued as the precious and finite resource it is.</p> <p>Water for Life includes several proposals for deregulating and simplifying legislation, to reduce burdens on business and stimulate growth. Ofwat’s proposals for reducing its regulatory burdens complement these.</p>	<p>The DWMP should help to contribute to the resilient and efficient management of water.</p> <p>In order to ensure future water management is resilient SEA should consider resilience to climate change and should consider the human environment.</p>
HM Government (2013) The Energy Act 2013	
<p>The Act established a legislative framework for delivering secure, affordable and low carbon energy. At its core is the need to ensure that, as older power plants are taken offline, the United Kingdom remains able to generate enough energy to meet its needs even if demand increases. The Act sets out provisions for:</p> <ul style="list-style-type: none"> • Decarbonisation • Electricity Market Reform (EMR) • Nuclear Regulation • Government Pipeline and storage system • Strategy and policy statement • Customer protection 	<p>The DWMP should comply with the act, where relevant.</p> <p>The SEA should include guide questions relating to energy use and carbon emissions.</p>
HM Government (2014) Water Act 2014	
<p>The purpose of the Act was to make provision about the water industry; about compensation for modification of licences to abstract water; about main river maps; about records of waterworks; for the regulation of the water environment; about the provision of flood insurance for household premises; about internal drainage boards; about Regional Flood and Coastal Committees; and for connected purposes.</p>	<p>The DWMP help to ensure that future water management is resilient, efficient and customer focused</p>
HM Government (2015) The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	
<p>These regulations amend the 2009 regulations and provide additional protection to habitats and species identified on Annexes 1 and 2 of the EC Habitats Directive (92/43/EEC), SSSIs and, in some cases, classified waterbodies from environmental damage where an operator has intended to cause damage or been negligent to the potential for damage.</p> <p>Applies to the most serious categories of environmental damage, including:</p> <ul style="list-style-type: none"> • Contamination of land that results in a significant risk of adverse effects on human health • Adverse effects on surface water or groundwater consistent with a deterioration in the water’s status • Adverse effects on the integrity of a Site of Special Scientific Interest (SSSI) or on the conservation status of species and habitats protected by EU legislation outside SSSIs. 	<p>The SEA should seek to ensure that the guidance provided by the regulations is considered when assessing the DWMP.</p>
HM Government (2015) Infrastructure Act 2015	
<p>The Infrastructure Act (inter alia) gives environmental authorities new powers to require landowners to take action on invasive non-native species or permit others to enter the land and carry out those operations.</p>	<p>The SEA assessment framework should include guide questions relating to invasive species.</p>
HM Government (2015) The Nitrate Pollution Prevention Regulations 2015	
<p>These regulations consolidate and revoke previous regulations on Nitrate Pollution Prevention (namely the 2008 Nitrate Pollution Prevention Regulations and subsequent amendments).</p> <p>The continue to provide for the implementation of EU Directive 91/676/EEC on the protection of waters against pollution by nitrates from agricultural sources, and Decision 2009/431/EC granting a derogation under that directive, in England.</p>	<p>The DWMP should have regard to the requirements of the regulations.</p> <p>The DWMP and the SEA should consider potential effects of</p>



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<p>The regulations: provide for the designation of land as nitrate vulnerable zones; impose annual limits on the quantity of nitrogen from organic manure that may be applied or spread in a holding in a nitrate vulnerable zone; establish requirements relating to the amount of nitrogen to be spread on a crop, and requires an occupier to plan in advance how much nitrogen fertiliser will be spread; require an occupier to provide a risk map of the holding; impose conditions on the spreading of nitrogen fertiliser; establish closed periods during which the spreading of nitrogen fertiliser is prohibited; and, makes provision for requirements for storage of nitrogen fertiliser and the keeping of records.</p>	<p>DWMP plan measures on Nitrate Vulnerable Zones (NVZs).</p>
HM Government (2015) Ozone-Depleting Substances Regulations 2015	
<p>The 2015 ODS Regulations implementation of EU Ozone Depleting Substances Regulations (1005/2009). The principle objective is to phase out and control remaining uses of ozone depleting substances (ODS). ODSs commonly include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons, which were typically used as refrigerants, air-conditioning systems, and fire-fighting equipment. The Regulations place controls and phase-out dates on the manufacture and supply of ODSs. The Regulations also require ODSs to be removed from refrigeration equipment before such appliances are scrapped. The Regulations specify minimum qualifications for those working on the recovery, recycling, reclamation or destruction of ODS.</p>	<p>The DWMP should have regard to the requirements of the regulations. The SEA assessment framework should include emissions to air.</p>
HM Government (2015) Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015	
<p>The regulations implement provisions of the Water Framework Directive (Directive 2000/60/EC), the Environmental Quality Standards Directive (Directive 2008/105/EC) and the priority substances amendment of these directives (Directive 2013/39/EU). This includes directions for the classification of surface water and groundwater bodies, monitoring requirements, standards for ecological and chemical status of surface waters, and environmental quality standards for priority substances.</p>	<p>The DWMP should be aligned with the requirements of the Water Framework Directive. The SEA should include objectives relating to water quality, water resources, sustainable water use, and biodiversity.</p>
HM Government (2016) Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018)	
<p>Provides a system for environmental permits and exemptions for industrial activities, mobile plant, waste operations, mining waste operations, water discharge activities, groundwater activities and radioactive substances activities. It also sets out the powers, functions and duties of the regulators.</p>	<p>The DWMP should accord with these Regulations.</p>
HM Government (2017) Conservation of Habitats and Species Regulations 2017 and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	
<p>These regulations consolidate all the various amendments made to the Conservation (Natural Habitats) Regulations 1994 in respect of England and Wales. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law.</p> <p>The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. Under the Regulations, competent authorities i.e. any Minister, government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive.</p> <p>New provisions implement aspects of the Marine & Coastal Access Act 2009. These provisions provide for:</p> <ul style="list-style-type: none"> the transfer of certain licensing functions from Natural England to the Marine Management Organisation (MMO); Marine Enforcement Officers to use powers under the Marine Act to enforce certain offences under the Habitats Regulations. 	<p>The DWMP must ensure full compliance with the Regulations. The SEA should take into account the effects of the actions on biodiversity.</p>



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<p>The 2019 (EU Exit) amendment to the Regulations ensures that the habitat and species protection and standards derived from EU law will continue to apply after Brexit.</p>	
HM Government (2017, updated 2019) UK Clean Growth Strategy: Leading the way to a low carbon future	
<p>This document affirms the UK's need to pursue de-carbonisation and provides information on how the UK is performing against its targets to become carbon neutral. The document highlights that continued emission reduction needs to continue in the fields of:</p> <ul style="list-style-type: none"> • Power Sector; • Buildings; • Industry; • Natural Resources; • Transport; and, • Devolved Administrations. 	<p>The SEA should have an objective/guide questions relating to sustainable development that references the need to reduce carbon emissions across all sectors.</p>
HM Government (2017) UK Climate Change Risk Assessment 2017 (CCRA2)	
<p>The Climate Change Act 2008 requires that every five years the Government must lay before Parliament a five-yearly assessment of the risks for the UK of the current and predicted impacts of climate change.</p> <p>The purpose of the second UK Climate Change Risk Assessment report is to outline the UK and Devolved Governments' views on the key climate change risks and opportunities that the UK faces today. The Adaptation Sub-Committee's UK Climate Change Risk Assessment 2017 Evidence Report sets out six priority areas needing urgent further action over the five years from when the report was published.</p> <p>These priority areas are (in order of highest risk to lowest):</p> <ul style="list-style-type: none"> • Flooding and coastal change risks to communities, businesses and infrastructure; • Risks to health, well-being and productivity from high temperatures; • Risk of shortages in the public water supply, and for agriculture, energy generation and industry; • Risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity; • Risks to domestic and international food production and trade; and, • New and emerging pests and diseases, and invasive non-native species, affecting people, plants and animals <p>The Assessment report provides the UK and Devolved Governments' views on each of those six urgent priority areas.</p>	<p>The DWMP should consider its effects on the risks set out in the report, and where it can contribute to reducing the risks.</p> <p>The SEA assessment framework should include objectives and guide questions relating to climate change, flooding, coastal change, health, well being, economy, water, agriculture, energy, natural capital, soils, biodiversity and Invasive Non Native Species (INNS).</p>
HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment	
<p>This plan sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in cities and rural landscapes, protect threatened species and provide richer wildlife habitats using a natural capital approach to better-inform policy. By adopting the plan, the government aims to achieve clean air; clean and plentiful water; thriving plants and wildlife; a reduced risk of harm from environmental hazards such as flooding and drought; using resources from nature more sustainably and efficiently; and, enhanced beauty, heritage and engagement with the natural environment. In addition, the plan will set out to manage pressures on the environment through; mitigating and adapting to climate change, minimising waste, managing exposure to chemicals and enhancing biosecurity.</p> <p>The six key areas for action are:</p> <ul style="list-style-type: none"> • Using and managing land sustainably, which includes embedding an 'environmental net gain' principle for development (including housing and infrastructure) 	<p>The DWMP may influence the environmental benefits and pressures identified in the Environment Plan, such as:</p> <ul style="list-style-type: none"> • Clean air • Clean and plentiful water • Thriving plants and wildlife



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<ul style="list-style-type: none"> Recovering nature and enhancing the beauty of landscapes Connecting people with the environment to improve health and wellbeing Increasing resource efficiency, and reducing pollution and waste Securing clean, productive and biologically diverse seas and oceans Protecting and improving the global environment 	<ul style="list-style-type: none"> Reducing risks of harm from environmental hazards Using resources from nature more sustainably and efficiently Enhancing beauty, heritage and engagement with the natural environment mitigating and adapting to climate change minimising waste managing exposure to chemicals enhancing biosecurity <p>The SEA should ensure that the impacts of any options on the 25-year goals set out in the Environment Plan are fully considered, whilst taking into account environmental net gain and natural capital approach, which the government have identified as principle themes.</p>
HM Government (2018) <i>The Water Supply (Water Quality) Regulations 2018</i>	
<p>These regulations address the quality of water supplied by water undertakers, who supply areas mainly or wholly in England. The new Regulations implement Directive 98/83/EC on the quality of water intended for human consumption.</p> <p>Under these Regulations, water undertakers are required to identify the areas that are to be water supply zones on an annual basis. A water supply zone cannot exceed 100,000 in terms of population before the beginning of each year of the supply.</p> <p>The standards of wholesomeness are set out, in respect of water for human consumption, be that through drinking, washing, food preparation or cooking and food production. In order to qualify as wholesome, the water cannot contain any:</p> <ul style="list-style-type: none"> micro-organism, other than those listed in the full text of Schedule 1 to the Regulations, or parasite; or substances, other than those listed in the full text of Schedule 1 to the Regulations. 	<p>The DWMP should consider the Regulations.</p> <p>The SEA should take into account potential effects of the measures on drinking water quality.</p>
HM Government (2020) <i>The Agriculture Act 2020</i>	
<p>The Bill provides the legislative framework for replacement agricultural support schemes to replace the European schemes after UK's exit from the EU and the EU's Common Agricultural Policy (CAP). The Bill provides powers to implement new approaches to farm payments and land management. In England, farmers will be paid to produce 'public goods' such as environmental or animal welfare improvements. The Bill also includes wider measures, including on improving fairness in the agricultural supply chain and on the operation of agricultural markets.</p>	<p>The DWMP should consider the implications of the act.</p>



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HM Government (2020) Energy White Paper: Powering our Net Zero Future	
<p>The White Paper follows on from the Prime Minister’s Ten Point Plan and the National Infrastructure Strategy. The Energy White Paper provides further clarity on the Prime Minister’s measures and puts in place a strategy for the wider energy system that:</p> <ul style="list-style-type: none"> • Transforms energy, building a cleaner, greener future for the country, its people and the planet • Supports a green recovery, growing the economy, supporting green jobs across the country in new green industries and leveraging new green export opportunities • Creates a fair deal for consumers, protecting the fuel poor, providing opportunities to save money on bills, providing warmer, more comfortable homes and balancing investment against bill impacts 	<p>The DWMP should consider if it can support the delivery of the aims of the white paper.</p> <p>The SEA should include objectives and guide questions relating to energy use and carbon emissions.</p>
HM Treasury (2016) National Infrastructure Delivery Plan	
<p>This document is the Government’s updated National Infrastructure Delivery Plan. It sets out the plan to 2021 and beyond and takes a targeted approach to infrastructure investment and delivery across different sectors. It contains major commitments to improve the UK’s transport, energy, communications, waste, water, housing and flood and coastal erosion, as well as steps to attract new private sector investment. It includes reference to the production of Water Resources Management Plans and the Ofwat price review.</p>	<p>The DWMP should consider the content and commitments of the plan.</p>
JNCC and Defra (2012) UK Post-2010 Biodiversity Framework	
<p>The framework sets out UK priorities for work on the Convention on Biological Diversity, and follows on from the 1994 UK Biodiversity Action Plan. It sets out a vision that, ‘by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people’. The goals and activities to meet this aim are grouped under the categories of International / European context; facilitating and contributing to common country approaches and solutions; evidence provision; and reporting.</p>	<p>The DWMP should support the protection and enhancement of biodiversity.</p> <p>The SEA assessment should include criteria relating to the protection of species and habitats.</p>
Ministry for Housing, Communities and Local Government (MHCLG, formerly Department for Communities and Local Government) (2014) National Planning Policy for Waste	
<p>Sets out detailed waste planning policies for local authorities. States that planning authorities need to:</p> <ul style="list-style-type: none"> • Need to use a proportionate evidence base in preparing Local Plans • Identify sufficient opportunities to meet the identified needs of their area for the management of waste streams • Identify suitable sites and areas for waste facilities. 	<p>The DWMP may need to consider the potential impact of proposals on waste generation and on waste management facilities in the DWMP area.</p> <p>The SEA should consider the effects of the DWMP on waste generation and management capacity.</p>
MHCLG (2019) National Planning Policy Framework 2021	
<p>The National Planning Policy Framework (NPPF) sets out the Government’s planning policies for England and how these are expected to be applied. The National Planning Policy Framework constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.</p> <p>At the heart of the NPPF is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.</p> <p>The NPPF requires that the planning system should be genuinely plan-led and that plans should:</p> <ol style="list-style-type: none"> a) be prepared with the objective of contributing to the achievement of sustainable development; b) be prepared positively, in a way that is aspirational but deliverable; 	<p>The DWMP should take into consideration the policies set out in the NPPF insofar as they relate to the areas covered by the DWMP.</p>



National Plans and Programmes	
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<p>c) be shaped by early, proportionate and effective engagement between plan makers and communities, local organisations, businesses, infrastructure providers and operators and statutory consultees;</p> <p>d) contain policies that are clearly written and unambiguous, so it is evident how a decision maker should react to development proposals;</p> <p>e) be accessible through the use of digital tools to assist public involvement and policy presentation; and</p> <p>f) serve a clear purpose, avoiding unnecessary duplication of policies that apply to a particular area (including policies in this Framework, where relevant).</p>	
MHCLG (various) Planning Practice Guidance	
<p>Planning Practice Guidance (PPG) is designed to support the NPPF. It reflects the objectives of the NPPF which are not repeated here. PPG provides additional planning guidance on a number of topics. Those that are particularly relevant to the draft Drought Plan include:</p> <ul style="list-style-type: none"> • Air quality; • appropriate assessment; • climate change; • effective use of land; • flood risk and coastal change; • healthy and safe communities; • historic environment; • natural environment; • open space, sports and recreation facilities, public rights of way and local green space; • strategic environmental assessment and sustainability appraisal; and, • water supply, wastewater and water quality. 	<p>The DWMP should take into consideration guidance set out in the PPG insofar as it relates to the area covered by the DWMP.</p>
National Assembly for Wales (2015) Well-being of Future Generations Act (2015)	
<p>The Well-being of Future Generations Act requires public bodies in Wales to think about the long-term impact of their decisions, to work better with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change.</p> <p>The Act puts in place seven well-being goals and makes it clear that public bodies must seek to achieve all seven of the goals:</p> <ul style="list-style-type: none"> • A prosperous Wales • A resilient Wales • A more equal Wales • A healthier Wales • A Wales of cohesive communities • A Wales of vibrant culture and thriving Welsh language • A globally responsive Wales 	<p>The DWMP should seek to contribute towards the achievement of the seven wellbeing goals, where relevant.</p> <p>The SEA assessment framework should include objectives and guide questions relating to the economic effects, human health and well being and climate change.</p>
National Assembly for Wales (2016) Environment (Wales) Act 2016	
<p>The Environment (Wales) Act 2016 introduced a new legislative approach for the Sustainable Management of Natural Resources (SMNR). The Act seeks to maintain and enhance the resilience of Wales’ ecosystems and the services and benefits they provide and, in so doing, meet the needs of the present generation without compromising the ability of future generations to meet their needs.</p> <p>The overarching aims of the Act are to enable Wales’ resources to be managed in a more proactive, sustainable and joined-up way and to establish the legislative framework necessary to tackle climate change.</p>	<p>The DWMP should seek to enhance biodiversity, promote resilience in ecosystems and maintain and enhance biodiversity</p> <p>The SEA framework should include consideration of resilience in ecosystems and the</p>



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<p>Some of the specific provisions in the Act include:</p> <ul style="list-style-type: none"> • Helping to plan and manage Wales’ natural resources at a national and local level, through a State of Natural Resources Report, a National Natural Resources Policy and area statements. • Providing Natural Resources Wales (NRW) with a general purpose that aligns fully with the statutory principles for the sustainable management of natural resources. • Providing NRW with powers to undertake land management agreements and experimental schemes. • Providing public authorities with a reshaped requirement to seek to maintain and enhance biodiversity and promote resilience of ecosystems. • Placing statutory emission reduction targets and carbon budgeting to support their delivery. • Enabling improvements to the existing scheme for single use carrier bags. • Providing the Welsh Ministers with powers to take action to achieve higher levels of recycling for business waste, food waste treatment and energy recovery. • Clarifying the law for a number of existing environmental regulatory regimes including marine licensing, shellfisheries management, land drainage and flood risk management. 	<p>maintenance and enhancement of biodiversity and resource use.</p>
Natural England (2011) UK Geodiversity Action Plan	
<p>The UKGAP sets out a framework for enhancing the importance and role of geodiversity across the UK, and provides a shared context and direction for geodiversity action through a common aim, themes, objectives and targets which link national, regional and local activities. The themes (on which the plan’s objectives are based) include: furthering our understanding of geodiversity; gathering and maintaining information on our geodiversity; conserving and managing our geodiversity; inspiring people to value and care for our geodiversity; and sustaining resources for our geodiversity. It also aims to influence planning policy, legislation and development design.</p>	<p>The DWMP should take into account the aims of the UKGAP. The SEA assessment should consider effects of options on geodiversity and outline enhancement and mitigation opportunities where these are identified.</p>
Natural Resources Wales (2016) The State of Natural Resources Report (SoNaRR)	
<p>The report sets out the states of Wales’ natural resources. It assesses the extent to which natural resources in Wales are being sustainably managed and recommends a proactive approach to building resilience. The report identifies risks and threats and opportunities for integrated solutions that provide multiple benefits (social, cultural, environmental and economic).</p>	<p>The DWMP should have regard to opportunities to address risks and threats identified in the report and identify integrated solutions.</p> <p>The SEA should have regard to the risks, threats and opportunities identified in the report and the extent to which opportunities for integrated solutions can be incorporated in the DWMP.</p>
Natural Resources Wales (2016) The State of Natural Resources Report (SoNaRR) for Wales 2020	
<p>SoNaRR2020 builds on a number of Welsh, UK and global assessments of the status and trends of natural resources. It looks at the risks those trends pose to Welsh ecosystems and to the long-term social, cultural and economic well-being of Wales, in terms defined by the Well-Being of Future Generations (Wales) Act 2015 and opportunities for integrated solutions that provide multiple benefits (social, cultural, environmental and economic).</p>	<p>The DWMP should have regard to opportunities to address risks and threats identified in the report and identify integrated solutions.</p>



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	The SEA should have regard to the risks, threats and opportunities identified in the report and the extent to which opportunities for integrated solutions can be incorporated in the DWMP.
Ofwat (2008) Water Supply and Demand Policy	
Summarised the key areas of water supply and demand, focusing on water efficiency, leakage, metering, and climate change.	The SEA framework should ensure that consideration is given to the socio-economic and environmental impact of any demand and supply policies.
Ofwat (2016) Water 2020	
<p>This document sets out Ofwat’s decisions on the design of its water and wastewater services regulatory framework in England and Wales. The approach aims to deliver the following benefits:</p> <ul style="list-style-type: none"> • Greater customer engagement and understanding • A sustainable investment model and a fair balance of risk and reward • Choice where possible, and ensuring markets are effective for customers • A focus on the long-term, targeted and risk-based • Support for sustainable improvements in the environment. 	The DWMP should take account of the regulatory framework. The SEA assessment should include criteria relating to the provision of water to customers and environmental protection.
Ofwat (2017) Resilience in the Round	
<p>The report identifies that the water sector has historically invested in options which enhance capacity, especially operational capacity and that whilst additional capacity has an important role in delivering resilience against some threats, companies should start looking at a wider set of factors in order to deliver “smarter” options for the future, including:</p> <ul style="list-style-type: none"> • Addressing multiple threats through a single intervention. For example, enhancing network connectivity to reduce the number of customers reliant on a single source of supply. This type of approach can provide water supply resilience to multiple threats such as outages, drought and contamination. • Recognising that any intervention will have its own embedded vulnerabilities to future threats. Understanding the vulnerabilities of option types will be critical to planning respective roles in delivering the planned level of resilience. For example, water transfers between areas of surplus and deficit can be a good option but might be vulnerable to wider scale drought impacts and/or contamination. 	The DWMP should consider the content of the report.
UKCP (2018) UK Climate Projections UKCP18	
<p>The UKCP18 Projections provide a basis for studies of impacts and vulnerability and decisions on adaptation to climate change in the UK over the 21st century. Projections are given of changes to climate, and of changes in the marine and coastal environment; recent trends in observed climate are also discussed.</p> <p>The methodology gives a measure of the uncertainty in the range of possible outcomes; a major advance beyond previous national scenarios.</p> <p>The Projections will allow planners and decision-makers to make adaptations to climate change. In order to do so they need as much good information as possible on how climate change will evolve. They are one part of a UK government programme of work to put in place a new statutory framework on, and provide practical support for, adaptation.</p>	The DWMP should take account of UKCP18 projections in its formulation, taking account of climate change in its projections. The SEA should also use UKCP18 projections in the broader assessment of climate change effects and any potential cumulative effects. For example, the ecological requirements of



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	aquatic habitats that may be affected by the DWMP will also be influenced by climate change.
UKTAG: Phase 3 Review of Environmental Standards	
<p>UKTAG prepares technical guidance designed to facilitate consistent implementation of the WFD in the UK.</p> <p>This report identifies standards for certain chemicals known as specific pollutants, developments in assessments of risk to groundwater, non-native species, standards for flows in rivers, standards for levels in lakes, standards for acidity in rivers and standards in intermittent discharges.</p>	<p>The SEA should seek to ensure that the guidance provided by the plan are considered when assessing the DWMP, especially with respect to objectives relating to ecology, water quality and water quantity. The SEA should also ensure the guidance in the plan is used in relation to other related regulations for example the Habitats Directive. The guidance could contribute to the formulation of any criteria for assessing significance of effects.</p>
Waterwise (2017) Water Efficiency Strategy for the UK	
<p>The document sets out a strategy for achieving the vision of a water efficient UK. It suggests policy, regulatory and practical actions that can help in the process of achieving water efficiency.</p>	<p>The DWMP should take into account their possible impacts on water efficiency and aim to improve water efficiency.</p> <p>The SEA objectives should reflect the need improve water efficiency.</p>
Welsh Government (2021) Planning Policy Wales (Edition 11)	
<p>Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.</p> <p>The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty.</p>	<p>Measures recommended in the DWMP will need to confirm to LDPs and the policies of the PPW. The SEA objectives should reflect the Welsh Government's commitments to sustainable development.</p>



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Canal & Rivers Trust (2015) North West Waterway Fisheries & Angling Action Plan	
<p>The action plan identifies the priority issues that need to be addressed locally in the North West to improve the angling experience, fish stocks and the water environment. The actions are grouped under 10 themes, which include:</p> <ul style="list-style-type: none"> • Develop & improve access to the fishery. • Fish passage and migration. • Predation & non native species. • Fisheries and water quality and quantity. 	<p>The DWMP should seek to avoid harm to fisheries.</p> <p>The SEA assessment framework should include the protection or enhancement of factors affecting fisheries.</p>
Environment Agency (2011) North West of England and North Wales Shoreline Management Plan SMP2	
<p>This second generation Shoreline Management Plan is for the shoreline which extends between Great Orme's Head in North Wales and the Scottish Border. It provides a large scale assessment of the risks associated with erosion and flooding at the coast. It also presents policies to help manage these risks to people and the developed, historic and natural environment in a sustainable manner.</p>	<p>DWMP options should take into account the policies and actions of the SMP.</p> <p>Where appropriate, the SEA should consider the cumulative effect of SMP policies and actions and DWMP options.</p>
Environment Agency (2012) Midlands Region Drought Plan	
<p>This document sets out the measures that the Midlands Region drought team will take to plan for and manage droughts. It covers the Severn and Trent catchments from the Humber to the Severn Estuary including; Birmingham, Nottingham, Derby, Leicester, Stoke-on-Trent, Coventry, Shrewsbury, Stratford-on-Avon, Worcester and Gloucester.</p> <p>The drought plan's main aims are to:</p> <ul style="list-style-type: none"> • Give a structured and flexible framework to deal with droughts of different type (for example, groundwater or surface-water) and severity; and • Set out a system of monitoring and reporting to identify and track the onset and progress of drought. 	<p>The SEA assessment framework should include a guide question on the effects of the DWMP on water resources and commentary on whether they affect the ability to manage drought.</p>
Environment Agency (2020) North West Operational Drought Plan	
<p>The document sets out how the Cumbria and Lancashire and Greater Manchester Merseyside and Cheshire areas will jointly plan for and manage drought in the North West Area.</p> <p>The drought plan's main aims are to:</p> <ul style="list-style-type: none"> • Give a structured and flexible framework to manage droughts of different types (for example, groundwater or surface-water) and severity; • Set out a system of monitoring and reporting to identify and track the onset and progress of drought; • Provide a communication plan and arrangements for working with partner organisations, such as U UW, during drought periods. 	<p>The SEA assessment framework should include a guide question on the effects of the DWMP on water resources and commentary on whether they affect the ability to manage drought.</p>
English Heritage, now known as Historic England, Heritage at Risk Register: North West (2018) and West Midlands (2018)	
<p>Heritage at Risk is a national project that aims to identify the endangered sites (historic buildings and places with increased risks of neglect and decay) and then help secure them for the future.</p> <p>Historic England Corporate Plan 2015-2018 is reducing the risk to heritage assets.</p> <p>In order to achieve this aim Historic England are working to:</p> <ul style="list-style-type: none"> • Better understand the nature and extent of risk • Encourage others to save and re-use heritage at risk • Build the capacity of the sector to deliver solutions for heritage at risk • Provide advice and grants to help remove heritage from the register <p>Within the U UW area the following regional Heritage at Risk Registers are relevant:</p>	<p>The SEA should seek to protect and enhance heritage and landscape.</p>



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<ul style="list-style-type: none"> North West (2018) West Midlands (2018) 	
Natural Resources Wales (2017) Drought Plan	
<p>Natural Resources Wales produces a drought plan which describes the indicators currently used to classify the different stages of drought.</p>	<p>The SEA assessment framework should include a guide question on the effects of the DWMP on water resources and commentary on whether they affect the ability to manage drought.</p>
Transport for the North (2019) Strategic Transport Plan	
<p>The Strategic Transport Plan outlines the need for investment in transport across the North and identifies the priority areas for improved connectivity and outlines Transport for the North's vision for the future.</p> <p>The objectives of the Strategic Transport Plan are:</p> <ul style="list-style-type: none"> Transforming economic performance Increasing efficiency, reliability, integration, and resilience in the transport system Improving inclusivity, health, and access to opportunities for all Promoting and enhancing the built, historic, and natural environment 	<p>The DWMP should seek to contribute to the objectives of the plan, where possible and appropriate to do so.</p> <p>The SEA should consider the potential effects of the DWMP on transport and infrastructure.</p>
United Utilities (2018) Final Drought Plan 2018	
<p>Drought Plans set out the steps that each water company will take through the stages of developing drought, drought, severe drought and recovery from drought to ensure their supply of water resources. Drought Plans must be produced by all water companies to fulfil their requirements under the Water Act 2003. United Utilities published its Final Drought Plan in June 2018. The Drought Plan provides a comprehensive statement of the actions that United Utilities will consider implementing during drought conditions in order to protect essential water supplies for customers and to minimise environmental impact. The Plan includes a range of drought management actions (linked to drought triggers), that can be broadly categorised as:</p> <ul style="list-style-type: none"> operational actions; communication actions; demand side actions (water efficiency campaigns, campaign for voluntary water use restraint, Temporary Use Ban, drought order to ban non-essential use); leakage control actions; resource management actions (non-commissioned sources; tankering); and drought permit/order actions. 	<p>The DWMP will need to be in accordance with United Utilities' Drought Plan.</p> <p>The SEA assessment framework should include a guide question on the effects of the DWMP on water resources and commentary on whether they affect the water resource zones' ability to manage drought.</p>
United Utilities (2019) Final Water Resources Management Plan 2019	
<p>Water Resources Management Plans (WRMPs) have been produced by all water companies to fulfil their requirements under the Water Act 2003. WRMPs set out how companies will manage the balance between supply and demand for water. Where supply demand deficits occur, water companies are required to identify options to address these deficits to ensure security of supply.</p> <p>Following on from the United Utilities 2015 WRMP, the United Utilities 2019 WRMP (covering the period 2020-2045), reflected the merging of the former West Cumbria and Integrated Resource Zones into the Strategic Resource Zone from 2022 onwards, through the construction of the new water treatment works and a pipeline between West Cumbria and Thirlmere Reservoir in order to use some of the spare water available in the</p>	<p>The SEA should include an objective/guide question relating to water resources.</p>



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<p>Integrated Resource Zone. As such the WRMP19 identified that across all of the resource zones within the UJW operational area (Barepot, North Eden, Carlisle and Strategic Resource Zones), there would be surplus of water available for supply up to 2045.</p>	
United Utilities (2020) Revised Business Plan 2020-2025	
<p>The revised business plan sets various pledges from United Utilities for the period 2020-2025. The commitments and targets relate to; provision of water, disposal of wastewater, value for money, customer service and environmental protection.</p>	<p>The DWMP should seek to support the delivery of the Business Plan.</p> <p>The objectives and guide questions that comprise the SEA Framework should, where appropriate, reflect the priorities set out in this Business Plan.</p>
Water Company (various) Drought Plans	
<p>Drought Plans set out the steps that each water company will take through the stages of developing drought, drought, severe drought and recovery from drought to ensure their supply of water resources. Drought Plans must be produced by all water companies to fulfil their requirements under the Water Act 2003. Those Drought Plans relevant to the UJW's DWMP (in addition to the United Utilities Drought Plan identified above) are:</p> <ul style="list-style-type: none"> • Hafren Dyfrydwy Drought Plan 2020 -2025 • Dwr Cymru Welsh Water Final Drought Plan 2020 • Severn Trent Draft Drought Plan 2019-2024 • Yorkshire Water Drought Plan 2019 • Northumbrian Water Final Drought Plan 2019 	<p>The DWMP will need to consider and be in accordance with the drought plans of neighbouring companies, where relevant.</p> <p>The SEA assessment framework should include a guide question on the effects of the DWMP on water resources and commentary on whether they affect the water resource zones' ability to manage drought. The baseline should, where appropriate, take into account relevant information from neighbouring plans.</p>
Water Company (various) Water Resources Management Plans (published and draft)	
<p>Water Resources Management Plans (WRMPs) have been produced by all water companies to fulfil their requirements under the Water Act 2003. WRMPs set out how companies will manage the balance between supply and demand for water. Where supply demand deficits occur, water companies are required to identify options to address these deficits to ensure security of supply.</p> <p>Those published and draft neighbouring Water Resource Management Plans relevant to the plan are:</p> <ul style="list-style-type: none"> • Hafren Dyfrydwy Final Water Resources Management Plan 2019 • Dwr Cymru Welsh Water Final Water Resources Management Plan 2019 • Severn Trent Final Water Resources Management Plan 2019 • Yorkshire Water Revised Draft Water Resources Management Plan 2019 • Northumbrian Water Final Water Resources Management Plan 2019 	<p>The DWMP should take account of neighbouring plans where appropriate.</p> <p>The SEA should include an objective/guide question relating to water resources.</p>



Sub-Regional/Local Plans and Programmes	
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Area of Outstanding Natural Beauty (AONB) Management Units (various) AONB Management Plans	
<p>The following AONBs are present in the UUW area:</p> <ul style="list-style-type: none"> • Arnside and Silverdale; • Forest of Bowland; • North Pennines; • Solway Coast. <p>The management plans for AONBs contain actions to ensure the protection and enhancement of the landscape.</p>	<p>DWMP options within AONBs should be consistent with the management plan.</p> <p>The SEA assessment framework should consider the effects of options on landscapes, including designated landscapes.</p>
Cheshire and Warrington Enterprise Partnership (2017) Cheshire and Warrington Matters, A Strategic and Economic Plan for Cheshire and Warrington	
<p>This strategy, refreshed in July 2017, is intended to be a high level, strategic road map to achieving growth ambition. It includes the deployment of funding for additional homes and new job opportunities.</p>	<p>The implementation of the DWMP may have an effect upon community cohesion, well being and continued prosperity within a sustainable environment.</p> <p>The SEA should seek to maintain and improve welfare and community infrastructure and maximise positive social impacts.</p>
Cumbria Strategic Partnership (2004) Sustainable Cumbria - A sub-regional strategy for Cumbria	
<p>This Strategy sets out a sustainable approach to securing economic growth, social progress and environmental protection and enhancement in Cumbria over the next 20 years.</p> <p>Objectives:</p> <ul style="list-style-type: none"> • Sustainable Cumbria will be a County that: • Celebrates its diversity, creativity and heritage; • Engages everyone in the mainstream of community life; • Retains and attracts the skilled and talented; • Participates to the full as a competitive sub-region; • Strengthens its infrastructure; • Makes a positive contribution to the wealth of the North West; and, • Marries economic growth with social progress and environmental protection and enhancement. <p>The strategy also includes 9 priority areas, 4 of these are town/area specific topics, the remaining 6 are:</p> <ul style="list-style-type: none"> • Sustainable communities and well-being; • High quality tourism; • Strategic communications through improvements to the road, rail and air transport infrastructure; • Creating wealth and a diversified economy; • Rural regeneration; and, • Addressing housing market failure and lack of affordable housing. 	<p>There may be some social, economic and environment effects associated with the implementation of the DWMP that may have effect upon the sustainable development and regeneration of the Cumbria sub-region.</p> <p>The SEA should seek to address the potential effects upon the local economy.</p>
Defra (2010) Eel Management Plans (various)	



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<p>A total of 15 Eel Management Plans have been prepared covering the UK's 15 river basin districts. The Plans set out actions aimed at reversing the decline in eel numbers, to ensure that at least 40% of potential adult eels will return to the sea to spawn. Those Plans relevant to the DWMP include the North West, Solway Tweed and Dee.</p>	<p>The DWMP should take account of relevant Eel Management Plan actions, where relevant.</p>
Environment Agency (various) Catchment Flood Management Plans	
<p>Catchment Flood Management Plans (CFMPs) give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years. CFMPs consider all types of inland flooding, from rivers, ground water, surface water and tidal flooding, but not flooding directly from the sea, (coastal flooding), which is covered in Shoreline Management Plans. They also take into account the likely impacts of climate change, the effects of how we use and manage the land, and how areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs.</p> <p>Those CFMPs present in the U UW area are:</p> <ul style="list-style-type: none"> • Alt Crossens CFMP • Derwent CFMP • Douglas CFMP • Irwell CFMP • Kent and Leven CFMP • Lune CFMP • Mersey Estuary CFMP • Ribble CFMP • South West Lakes CFMP • Upper Mersey CFMP • Weaver Gowy CFMP • Wyre CFMP • Eden CRMP • Dee CFMP 	<p>The DWMP should take the CFMPs into account.</p> <p>The SEA should include a guide question relating to flood risk.</p>
Environment Agency and Natural Resources Wales (various) Salmon Action Plans	
<p>The aim of the action plans is to ensure the objectives set out in the National Salmon Strategy are met. They set out what needs to be done to support and restore salmon populations.</p> <p>Individual targets are set out in each action plan</p>	<p>The DWMP should consider its effects on salmon populations.</p> <p>The SEA assessment framework should include a guide question relating to the effects of options on fish.</p>
Environment Agency (2013)(various) Abstraction Licensing Strategies (CAMS process)	
<p>This Licensing Strategies set out how the Environment Agency will manage the water resources of a catchment and contribute to implementing the WFD. It provides information about where water is available for further abstraction and an indication of how reliable a new abstraction licence may be.</p> <p>Strategies within the U UW area include:</p> <ul style="list-style-type: none"> • Derwent and West Cumbria • Eden and Esk • South Cumbria • Lune and Wyre • Ribble, Douglas and Crossens 	<p>The DWMP should take the Strategy into account.</p> <p>The SEA should include a guide question relating to sustainable water use.</p>



Sub-Regional/Local Plans and Programmes	
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<ul style="list-style-type: none"> • Lower Mersey and Alt • Northern Manchester • Upper Mersey • Weaver and Dane • Dee 	
Environment Agency, Defra, Natural Resources Wales and Natural Scotland (2015) (various) River Basin Management Plans	
<p>River Basin Management Plans (RBMPs) set out how the water environment will be managed and provides a framework for more detailed decisions to be made. RBMPs set out a more integrated approach to river basin management based on the following principles:</p> <ul style="list-style-type: none"> • Integrate and streamline plans and processes; • Set out a clear, transparent and accessible process of analysis and decision-making; • Focus at the river basin district level; • Work in partnership with other regulators; • Encourage active involvement of a broad cross-section of stakeholders; • Make use of the alternative objectives to deliver sustainable development; • Use Better Regulation principles and consider the cost-effectiveness of the full range of possible measures; • Seek to be even handed across different sectors of society and sectors of industry; • Seek to be even handed and transparent in the management of uncertainty; • Develop methodologies and refine analyses as more information becomes available. <p>RBMPs relevant to the U UW area are the North West, Solway Tweed and Dee.</p>	<p>The DWMP should reflect the broad targets set out in the RBMPs.</p> <p>The SEA objectives should reflect the need to manage water resources on a catchment basis in a sustainable manner to help improve the quality of water resources.</p>
Environment Agency, Natural Resources Wales and SEPA (2016) Flood Risk Management Plans (various)	
<p>Flood Risk Management Plans (FRMPs) give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years. FRMPs consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding. They also take into account the likely impacts of climate change, the effects of how we use and manage the land, and how areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs. Policies for managing flood risk and proposed actions for implementation are set out for each of sub-areas within the FRMPs.</p> <p>Those FRMPs present in the U UW area are:</p> <ul style="list-style-type: none"> • North West river basin district flood risk management plan; • Dee river basin district flood risk management plan; and • Solway Tweed river basin district flood risk management plan. 	<p>The DWMP should take FRMPs into account.</p> <p>The SEA should include a guide question relating to flood risk.</p>
Greater Manchester Combined Authority (2017), Our People Our Place: Greater Manchester Strategy	
<p>The strategy identifies ten priorities for the future of the Manchester city-region, to make it:</p> <ul style="list-style-type: none"> • A place where all children are given the best start in life and young people grow up inspired to exceed expectations. • A place where people are proud to live, with a decent home, a fulfilling job, and stress-free journeys the norm. But if you need a helping hand you'll get it. • A place of ideas and invention, with a modern and productive economy that draws in investment, visitors and talent. 	<p>There could be some social, economic and environmental effects associated with the implementation of the DWMP that may have effect with a particular focus upon a number of social, health and</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
<ul style="list-style-type: none"> • A place where people live healthy lives and older people are valued. • A place at the forefront of action on climate change with clean air and a flourishing natural environment. • A place where all voices are heard and where, working together, we can shape our future. 	<p>infrastructure related issues in the Manchester area.</p> <p>The SEA assessment framework should include objectives and guide questions relating to social and economic well-being, health, climate change and air quality.</p>
Hadrian’s Wall Partnership Board (2015), Hadrian’s Wall Management Plan 2015-2019	
<p>World Heritage Sites are required to have a Management Plan, as part of their management system, that sets out why the place is special; what will be done to conserve and enhance it over a five-year period, and what will be done to explain its significance to visitors. The Hadrian’s Wall Management Plan (2015 – 2019) is the fourth edition of the Management Plan for the Hadrian’s Wall World Heritage Site. The others were produced in 1996 - the first such Plan in the UK - in 2002, and in 2008*</p> <p>Objectives include:</p> <ul style="list-style-type: none"> • Informed management of the world heritage site; • Maintaining boundaries of the world heritage site. • Protect the outstanding universal value (OUV) of the site using appropriate legislation, planning policy, guidance and management measures. • To maintain effective protection and management of the undesignated remains. • To pre-empt where possible direct and indirect threats to the OUV. • To manage the archaeological remains in the world heritage site. • To achieve a sustainable balance whereby the OUV can be conserved within current and future land use. 	<p>The SEA should ensure that there are no negative direct or indirect impacts, for example during construction, on the world heritage site.</p>
Lake District National Park Authority (2006) A Vision for 2030	
<p>This vision will guide the review of the National Park Management Plan and development policies and plans within the Local Development Framework.</p> <p>Vision and objectives:</p> <p>The Lake District National Park will be an inspirational example of sustainable development in action. A place where its prosperous economy, world class visitor experiences and vibrant communities come together to sustain the spectacular landscape, its wildlife and cultural heritage.</p> <p>Local people, visitors, and the many organisations working in the National Park or have a contribution to make to it, must be united in achieving this.</p> <p>The 4 key elements of the National Park plan are:</p> <ul style="list-style-type: none"> • A Prosperous Economy – Businesses will locate in the National Park because they value the quality of opportunity, environment and lifestyle it offers – many will draw on a strong connection to the landscape. Entrepreneurial spirit will be nurtured across all sectors and traditional industries maintained to ensure a diverse economy; • World Class Visitor Experiences –High quality and unique experiences for visitors within a stunning and globally significant landscape. Experiences that compete with the best in the international market; 	<p>The DWMP could help to ensure resources required to achieve the visions for local communities and economic development.</p> <p>The SEA should ensure that there are no negative impacts, for example during construction, on heritage sites.</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
<ul style="list-style-type: none"> • Vibrant Communities –People successfully living, working and relaxing within upland, valley and lakeside places where distinctive local character is maintained and celebrate; and • A Spectacular Landscape – A landscape which provides an irreplaceable source of inspiration, whose benefits to people and wildlife are valued and improved. A landscape whose natural and cultural resources are assets to be managed and used wisely for future generations. 	
Lake District National Park Authority (2008) Landscape Character Assessment and Guidelines	
<p>The Assessment seeks to provide a framework for developing a shared understanding of the current character of the Lake District’s landscapes and its future management needs. The specific aims and objectives for the two elements of the Assessment are:</p> <p>Character Assessment</p> <p><i>Aims</i></p> <ul style="list-style-type: none"> • To improve the knowledge and understanding of the Lake District landscape to help conserve and enhance the overall characteristics, qualities and diversity of landscape character, its sense of place and local distinctiveness; • To identify and understand factors influencing landscape change; and • To provide baseline data to facilitate future monitoring. <p><i>Objectives</i></p> <ul style="list-style-type: none"> • To highlight and describe the character of the physical, cultural, historical, ecological, visual and sensory landscape; • To identify past, present and future forces for change and describe their impacts; and • To assess the sensitivity to and capacity for change, for each defined landscape character unit. <p>Guidelines</p> <p><i>Aims</i></p> <ul style="list-style-type: none"> • To support a holistic approach to managing change and encourage the sustainable planning and management of the Lake District landscape including the conservation and enhancement of the historic environment and the enrichment of biological diversity. <p><i>Objectives</i></p> <ul style="list-style-type: none"> • To provide planning, management and design guidelines, integrated with the Local Development Framework and the National Park Management Plan, for each landscape character type and area of distinctive character; and • To suggest indicators for monitoring landscape change. 	<p>The DWMP should recognise the importance of effective management of water as an issue for natural landscapes. The DWMP may also have an effect on access to the national park and recreational opportunities for local communities and visitors.</p> <p>The SEA should seek to protect the landscapes of the Lake District National Park; including the conservation and enhancement of the historic environment and the enrichment of biological diversity.</p>
Lake District National Park Authority (2010) Core Strategy	
<p>This document sets out how the strategic vision for the National Park will be delivered by 2025.</p> <p>Other local plan documents include Allocations of Land and Minerals Safeguarding Areas.</p> <p>The Core Strategy seeks to achieve the vision that <i>‘The Lake District National Park will be an inspirational example of sustainable development in action.’</i></p>	<p>The DWMP could help to ensure resources required to achieve the visions for local communities and economic development.</p> <p>The DWMP should recognise the importance of effective management of water resources as an issue for natural landscapes. The DWMP may also</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
<p>In order to achieve this vision, the strategy sets out 20 strategic objectives, grouped under the following headings:</p> <ul style="list-style-type: none"> • Spectacular landscapes • Prosperous economy • World class visitor experience • Vibrant communities • Minerals and waste • transport 	<p>have an effect on access to the national park and recreational opportunities for local communities and visitors.</p> <p>The SEA should seek to protect the landscapes and environment of the Lake District National Park.</p>
Lake District National Park – State of the Park (2018): Reporting on the Partnership’s Plan 2015-2020	
<p>This report summarises the progress made by the Lake District National Park Partnership to deliver Vision for the National Park. The findings of this report will be used to develop the next Partnership Plan.</p>	<p>The DWMP should recognise the importance of effective management of water as an issue for natural landscapes. The DWMP may also have an effect on access to the national park and recreational opportunities for local communities and visitors.</p> <p>The SEA should seek to protect the landscapes and environment of the Lake District National Park.</p>
Local Biodiversity Action Plans (BAPs) (various)	
<p>Each Local Biodiversity Action Plan works on the basis of partnership to identify local priorities and to determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets. They include targets for increasing and enhancing biodiversity.</p> <p>Species Action Plans set objectives with regard specific species and set out proposed actions and targets along with which agency will be responsible for carrying them out.</p> <p>Habitat Action Plans sets objectives with regard specific UK habitats and sets out proposed actions targets along with which agency will be responsible for carrying them out.</p> <p>Local Biodiversity Actions Plans relevant to the U UW area are:</p> <ul style="list-style-type: none"> • Cumbria; • Greater Manchester; • Lancashire; • Cheshire; • North Merseyside; • Powys. 	<p>DWMP options should take into account BAP objectives.</p> <p>The SEA assessment should consider effects of options on biodiversity and outline enhancement and mitigation opportunities where these are identified.</p>
Local Planning Authority (various) Land Use Plans	
<p>The U UW area covers a large number of Local Planning Authorities. Additionally, Local Development Plans prepared by local authorities in Wales may also be relevant to the DWMP and SEA. The main objectives of the existing and emerging Land Use Plans in these areas are related to the sustainable development of the area.</p>	<p>The SEA should seek to ensure the DWMP options should be consistent with the Land Use Plans of those local authorities</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
	that will be affected by the option.
Local Geodiversity Action Plans (LGAPs)	
<p>Local Geodiversity Action Plans (LGAPs) set out actions to conserve and enhance the geodiversity of a particular area. In general they aim to identify, conserve and enhance the best sites that represent the geological history of an area. They also aim to promote geological sites, provide a local geodiversity audit and influence local planning policy.</p> <p>Currently, LGAPs exist or are in development for Cheshire Region, Cumbria, Greater Manchester, Lancashire, West Yorkshire, North Pennines AONB and Clwydian Range.</p>	<p>The DWMP options should take into account the aims of the LGAPs.</p> <p>The SEA assessment should consider effects of options on geodiversity and outline enhancement and mitigation opportunities where these are identified.</p>
Local Planning Authority (various) Local Plans/Local Development Plans	
<p>The UUW assessment area includes a large number of Local Planning Authorities, identified as:</p> <ul style="list-style-type: none"> • Cheshire East • Cheshire West and Chester; • Halton Borough Council; • Warrington Borough Council; • Allerdale Borough Council; • Copeland Borough Council; • Barrow In-Furness Borough Council; • Carlisle City Council; • Cumbria County council; • Eden District Council; • South Lakeland District Council; • Bolton Metropolitan Borough Council; • Bury Metropolitan Borough Council; • Manchester City Council; • Oldham Metropolitan Borough Council; • Rochdale Metropolitan Borough Council; • Salford City Council; • Stockport Metropolitan Borough Council; • Tameside Metropolitan Borough Council; • Trafford Metropolitan Borough; • Wigan Metropolitan Borough Council; • Blackburn with Darwen Borough Council; • Blackpool Council; • Burnley Borough Council; • Chorley Borough Council; • Fylde Borough Council; • Hyndburn Borough Council; • Lancashire County Council; • Lancaster City Council; • Pendle Borough Council; • Preston City Council; • Ribble Valley Borough; • Rossendale Borough Council; • South Ribble Borough Council; 	<p>The DWMP should have regard of the Local Plans and emerging Local Plans.</p> <p>The SEA assessment framework should consider the effects of the DWMP on the achievement of the Plans' visions and the effects of options on sustainable land use.</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
<ul style="list-style-type: none"> • West Lancashire Borough Council; • Wyre Borough Council; • Knowsley Metropolitan Borough Council; • Liverpool City Council; • Sefton Council; • St. Helens Metropolitan Borough Council; • Wirral Metropolitan Borough Council; • Bradford District Council; • Calderdale Metropolitan Borough Council; • Craven District Council; • High Peak Borough Council; • Kirklees Metropolitan Borough Council; • Newcastle-under-Lyme Borough Council; • Richmondshire District Council; • Staffordshire Moorlands District Council; • Lake District National Park Authority; 	
Local Wildlife Trust Strategies (various)	
<p>The following local Wildlife Trusts are present in the U UW area:</p> <ul style="list-style-type: none"> • Cumbria Wildlife Trust; • Lancashire Wildlife Trust; • Cheshire Wildlife Trust; and • Derbyshire Wildlife Trust. <p>The objectives/outcomes of the plans are largely related to the conservation of wildlife and wild places and enjoyment of wildlife by the public, as well as ensuring the effectiveness of the Trust as an organisation.</p>	<p>The DWMP should have regard to the protection of local wildlife.</p> <p>The SEA assessment framework should consider the effects of the options on biodiversity.</p>
National Park Management Plans (various)	
<p>The following National Parks/management plans are present in the U UW area:</p> <ul style="list-style-type: none"> • Lake District National Park Partnership – The Management Plan 2015-2020 • Peak District National Park Management Plan 2018-2023 • Snowdonia National Park Management Plan 2010-2015 • Yorkshire Dales National Park Management Plan 2019-2024 <p>The management plans for National Parks contain actions to ensure the protection and enhancement of the landscape and natural environment of these areas.</p>	<p>DWMP options within the National Parks should be consistent with the respective management plan.</p> <p>The SEA assessment framework should consider the effects of options on landscapes and the natural environment, including designated areas. Proposed extensions to the National Park boundaries should also be recognised where appropriate.</p>
Natural England, Site Improvement Plans (SIPs) for Natura 2000 Sites (various)	
<p>Site Improvement Plans (SIPs) have been developed for each Natura 2000 site in England as part of the Improvement Programme for England’s Natura 2000 Sites (IPENS).</p> <p>The plan provides a high level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site(s) and outlines the priority measures required to improve the condition of the features. It does not cover issues where remedial actions are already in place or ongoing management activities which are required for maintenance.</p> <p>There are a number of Natura 2000 sites within the U UW operational area.</p>	<p>The DWMP should seek to avoid contributing to any issues affecting the condition of Natura 2000 site features and contribute to their improvement where appropriate.</p> <p>The SEA should include and objective and guide questions related to the protection of</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
	biodiversity and designated species and habitats.
Natural England National Character Area (NCA) Profiles (various)	
<p>There are over 30 NCAs within UJW's operating boundary. Each of these have individual objective relating to specific landscapes, habitats and species.</p> <p>Generalised objectives for each of these include:</p> <ul style="list-style-type: none"> • Conserve characteristic historic structures • Protect the area's rich and diverse archaeology • Protect the area's high levels of tranquility • Protect, manage and enhance the good rights of way network • Manage and enhance existing habitats • Encourage the maintenance of traditional land management practices • Protect, and encourage sympathetic management • Protect and manage geological features • Plan for climate change mitigation and adaptation 	<p>The DWMP may have an effect on NCAs.</p> <p>The SEA should include objectives that take into account the objectives of the NCAs where relevant (e.g. manage and enhance existing habitats).</p>
Natural England and Environment Agency (various) River Restoration and Water Level Management Plans	
<p>Cumbria River Restoration Strategy</p> <p>The Cumbria River Restoration Strategy was developed to help deliver the joint Natural England/Environment Agency drivers to improve the quality and function of three riverine SSSI/SAC sites; the Eden, Derwent and Kent catchments. River restoration interventions reinstate natural river processes that provide benefits to both people and wildlife.</p>	<p>The DWMP should seek to support the delivery of the aims of the strategy, where appropriate.</p> <p>The SEA should include and objective and guide questions related to the protection of biodiversity, designated species and habitats and restoration of rivers.</p>
Outline Water Cycle Studies	
<p>Water cycle studies identify tensions between growth proposals, particularly housing development, and environmental requirements, and identify potential solutions to addressing them. Outline Water Cycle Studies have been prepared for Mid Mersey (Warrington Borough Council, Halton Borough Council and St. Helens Council), Cheshire West and Chester and Central Lancaster and Blackpool Councils have jointly prepared an Outline Water Cycle Study. The strategic objectives for Outline Water Cycle Studies are to:</p> <ul style="list-style-type: none"> • Identify whether environmental resources can cope with further development, with particular reference to Water Framework Directive targets and UKCP09 climate change projections (i.e. can growth be accommodated without breaching water quality and abstraction limits); • Identify any potential impacts of development on the specially designated conservation sites and watercourses in the specified areas and other sites or features of significant nature conservation importance resulting from additional abstraction and wastewater discharge; 	<p>The DWMP should take into account any water cycle studies completed for identified growth areas (Mid Mersey, Cheshire West and Chester, Central Lancashire and Blackpool).</p> <p>The SEA assessment framework should include an objective relating to the efficient management of water.</p>
One West Lancs Partnership (Formed 2013)	
<p>One West Lancs is a partnership which aims to improve the quality of life for everyone in West Lancashire. It was formed in April 2013 and is a partnership of local voluntary, public and business sectors.</p>	<p>There may be some economic effects associated with the implementation of the DWMP</p>



Sub-Regional/Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the DWMP and SEA	Relationships and Influences on the DWMPs and the SEA
<p>The key aims of One West Lancs are to:</p> <ul style="list-style-type: none"> • To reduce health inequalities across West Lancashire • To improve educational attainment across West Lancashire • To develop and deliver an action plan for transport within and connecting West Lancashire • To promote energy efficiency, sustainable living and tackle fuel and food poverty • To promote excellent local services tailored to local priorities • To stand up for communities in West Lancs, listen to what they say and take appropriate action • To support and work towards the priorities of the West Lancs Sustainable Community Strategy which are: Safer, stronger communities, Improved health for all, Affordable housing, Sustainable development, Improved opportunities for young and older people, High quality accessible services, Improved economy and increased jobs and Better and protected environments. 	<p>and the future management of water resources in the north west. The DWMP may also have some effects upon recreational and leisure opportunities. This may have an impact upon some of the strategic ambitions set out in the objectives of One West Lancs.</p> <p>The SEA should seek to address the potential effects upon the local economy.</p>
Public Rights of Way Improvement Plans (ROWIPs)	
<p>Most local authorities have a rights of way improvement plan. The plan must explain how improvements made by the local authority to the public rights of way network in their area will provide a better experience for these users:</p> <ul style="list-style-type: none"> • walkers • cyclists • horse riders • horse and carriage drivers • people with mobility problems • people using motorised vehicles, e.g. motorbikes <p>Objectives include those associated with each local authority's rights of way improvement plans.</p>	<p>The DWMP may have the potential to affect the objectives of the ROWIPs.</p> <p>The SEA should include objectives that take into account the objectives of the ROWIPs where relevant.</p>



Appendix C

Baseline

Biodiversity, Flora and Fauna

Baseline Characteristics

Biodiversity is defined as the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. The importance of preserving biodiversity is recognised from an international to a local level. Biodiversity is important in its own right and has value in terms of quality of life and amenity.

The North West of England is rich in areas of biodiversity interest, and it contains some of the most varied upland and lowland terrain in England. The North West Biodiversity Audit²⁵ shows that the region contains 31 out of the 37 different 'Broad Biodiversity Action Plan habitat classifications', one of the most diverse in the country. Wildlife indicators show that the region is also a haven for a significant number of species, with 135 rare species that are a UK or regional priority to protect.

The region also includes a number of sites that are designated at a European, national or local level as important for biodiversity, including:

- 18 Ramsar Sites;
- 14 Special Protection Areas (SPA);
- 42 Special Areas of Conservation (SAC);
- 451 Sites of Special Scientific Interest (SSSI);
- 4 Marine Conservation Zones (MCZ);
- 32 National Nature Reserves (NNR);
- 154 Local Nature Reserves (LNR).

The distribution of designated sites across UUW's operational area (including North Wales) is shown in **Figures C.1 to C.5**.

²⁵ North West Biodiversity (1999) *Wild About the North West: A Biodiversity Audit of North West England*.

Figure C.1 Ramsar Sites in the United Utilities Water Operational Area and North Wales

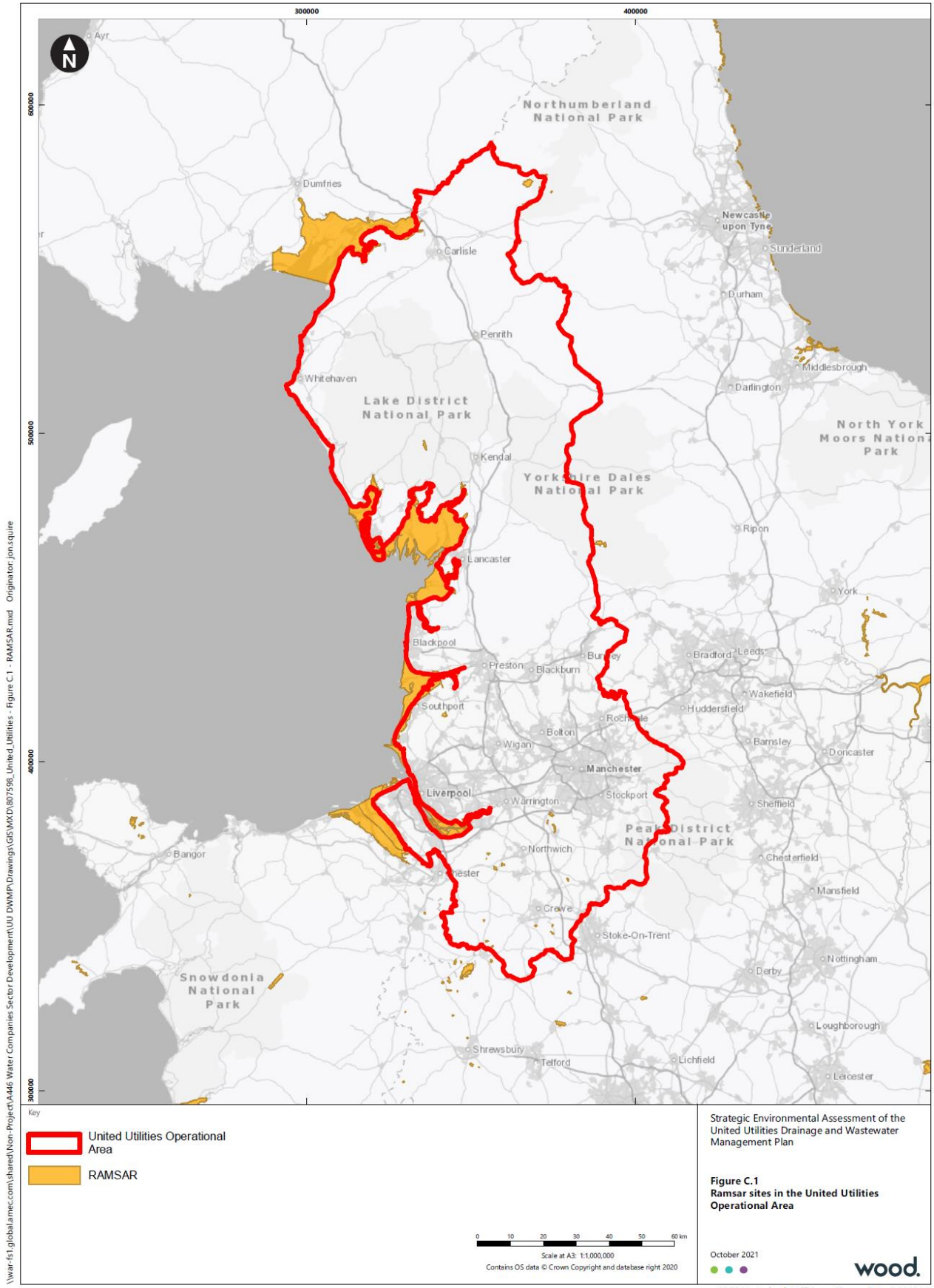
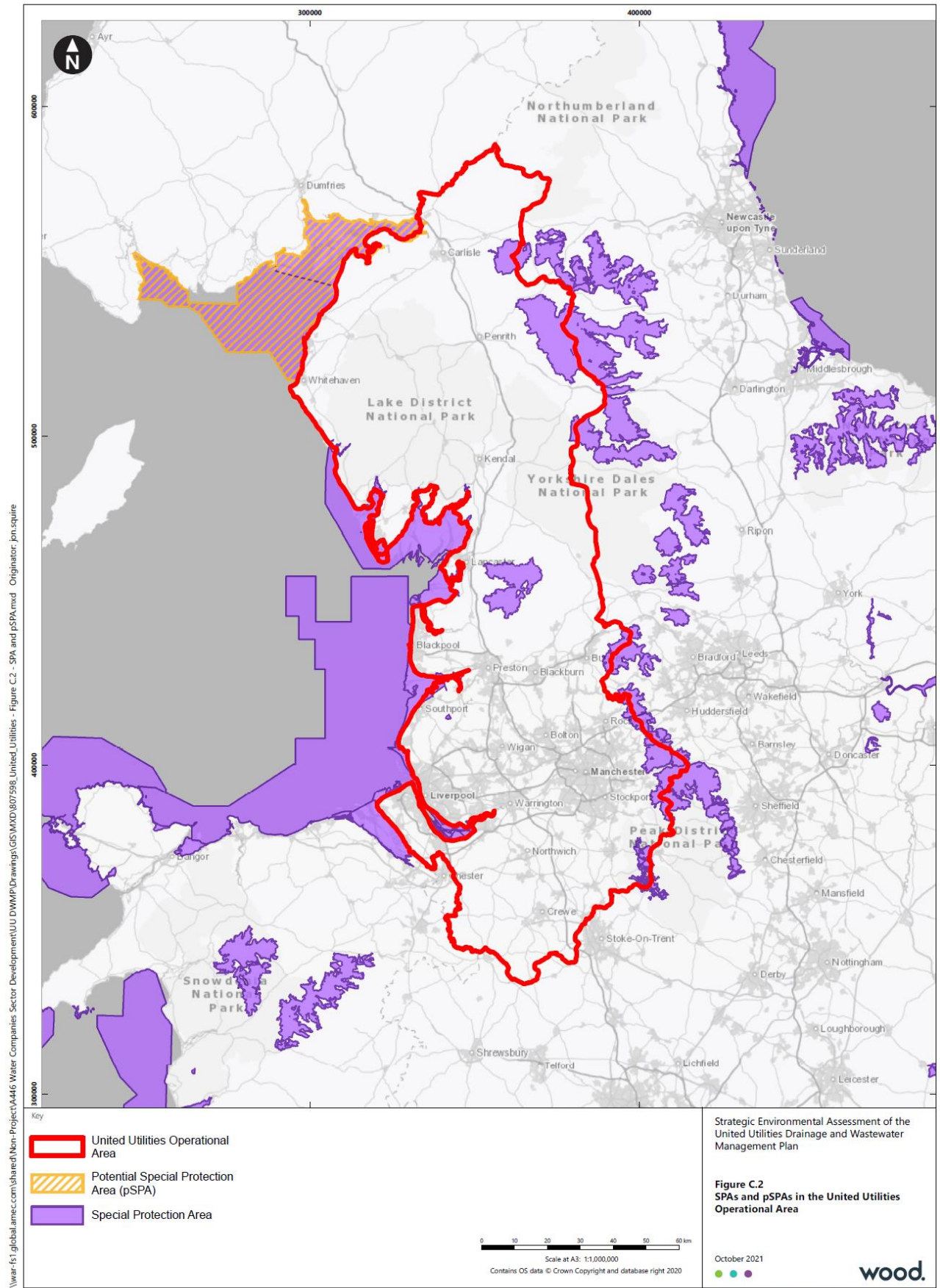
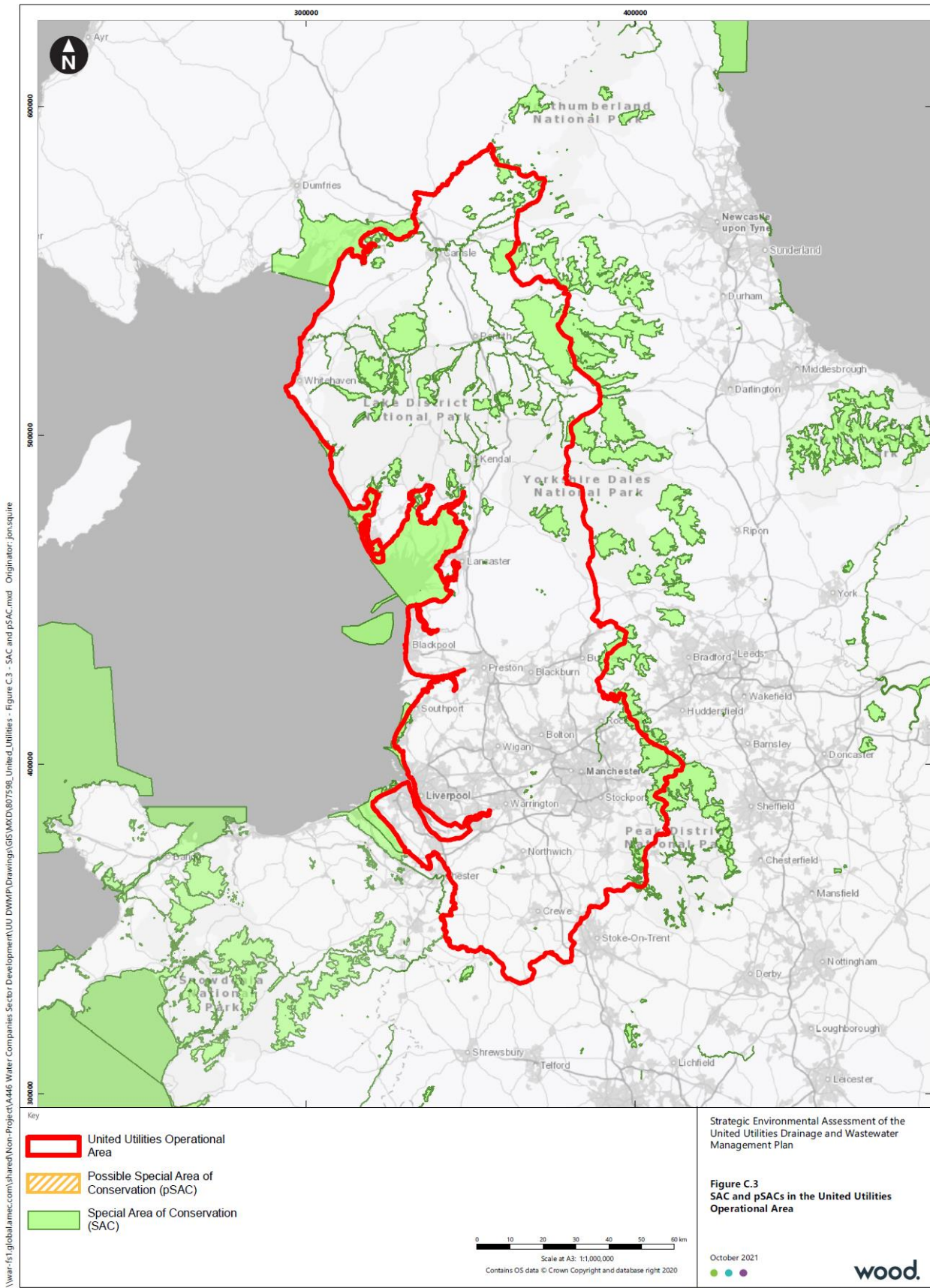


Figure C.2 SPAs and pSPAs in the United Utilities Water Operational Area and North Wales



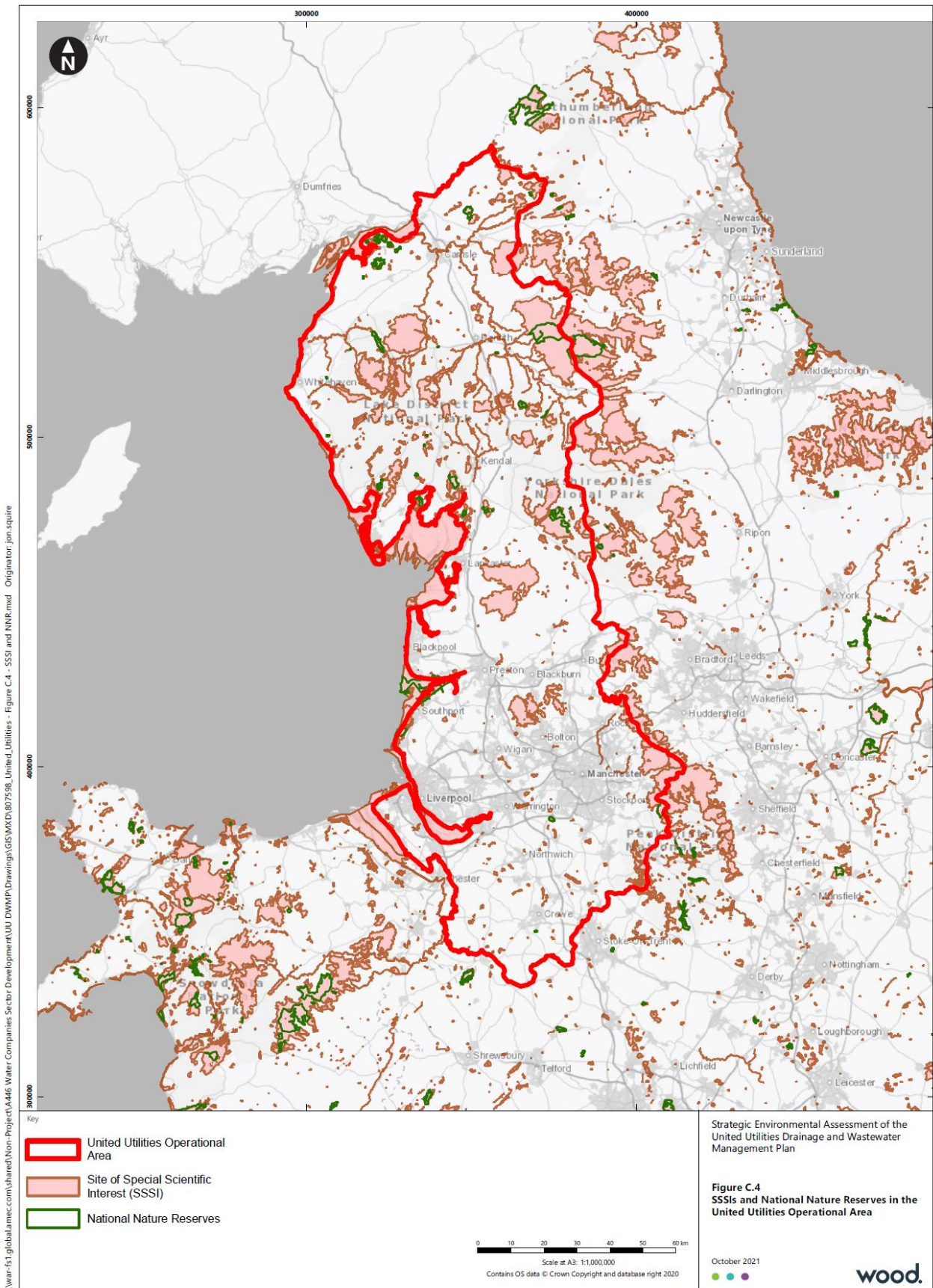
807598_United_Utilities - Figure C.2 - SPA and pSPA

Figure C.3 SACs and pSACs in the United Utilities Water Operational Area and North Wales



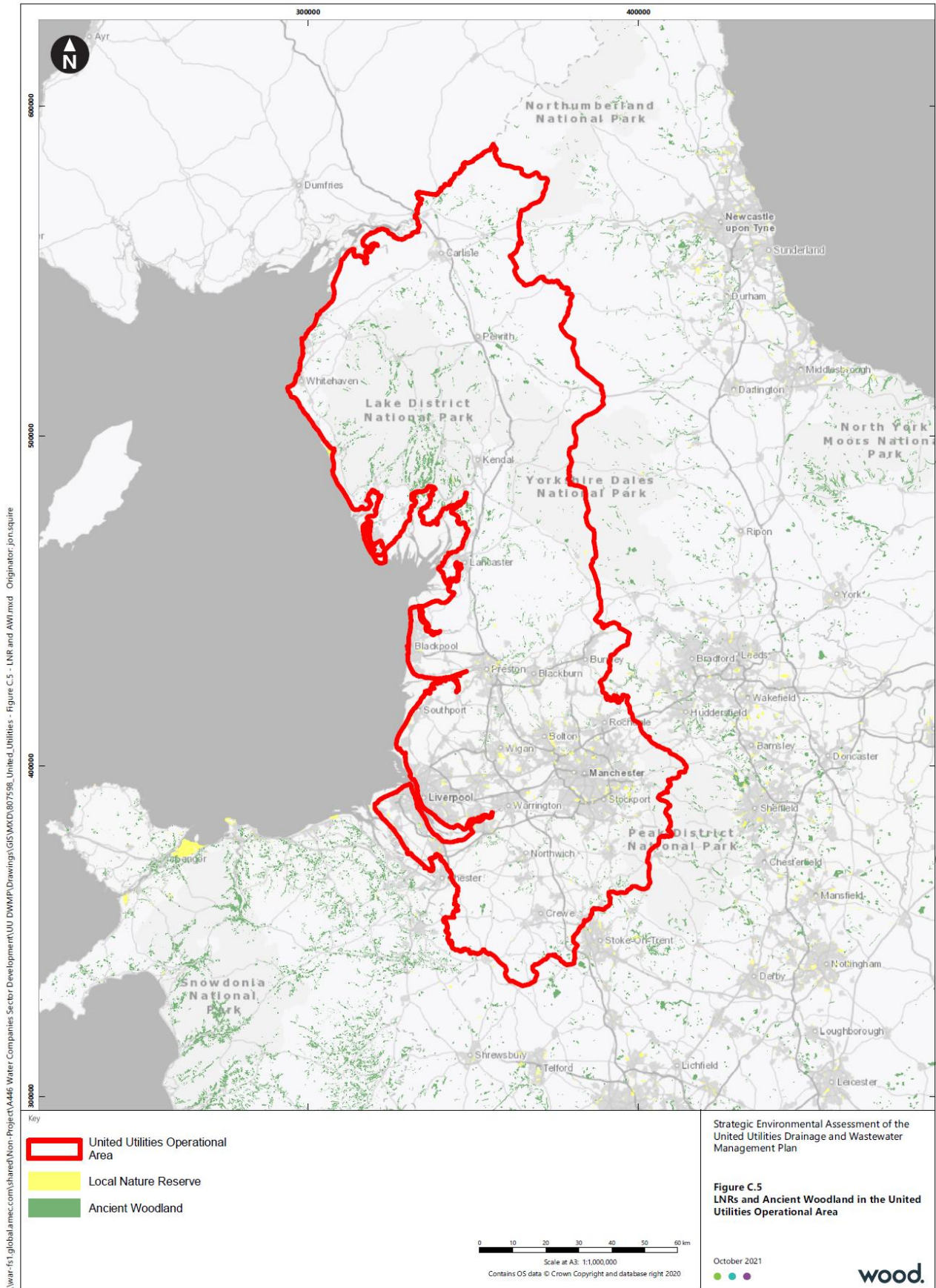
807598_United_Utilities - Figure C.3 - SAC and pSAC

Figure C.4 SSSI and NNRs in the United Utilities Water Operational Area and North Wales



807598_United_Utilities - Figure C.4 - SSSI and NNR

Figure C.5 LNRs and Ancient Woodland in the United Utilities Water Operational Area and North Wales



807598_United_Utilities - Figure C.5 - LNR and AWI



Information provided by the Natural England database indicates that an area of at least 21,300ha of freshwater, wetland and peatland habitat is designated in the North West, comprising over 400 SSSIs, with much of this area also designated as SPA, SAC and/or Ramsar Site. In Cumbria alone, there are 634km of SAC river systems, including within them approximately 2,500ha of component lakes. A total of 31 lakes and tarns in Cumbria are designated as open water SSSIs. In addition to these SSSIs designated specifically for their freshwater and wetland interest, there are numerous additional SSSIs and international sites with freshwater and wetland habitats present as an important component feature within the wider site.

The condition of habitats in the region has improved over recent years, and this is reflected in a gradual increase in woodland and farmland wild bird populations, one of the UK's key indicators for biodiversity. Improvements in inland and coastal water based habitats have also seen a noteworthy increase in numbers of otters, salmon and trout in some areas. However, the long-term regional population trends for some of these species is still showing a general decline.

The Biodiversity 2020 strategy²⁶ contains the UK Governments commitment to improving the condition of more SSSIs to favourable condition. As at August 2021, across the whole of England the number of SSSIs identified as having a condition of 'favourable' or 'unfavourable recovering' was 90.38% (38.04% and 52.34% respectively)²⁷. As at August 2021, 85.90% of the North West's SSSIs were in 'favourable' or 'unfavourable recovering' condition (42.37% and 43.53% respectively) whilst 8.45% were classified as being in 'unfavourable no change' condition and 5.61% were classified as being in 'unfavourable declining' condition²⁸.

To the west of UUW's operational area, the West Cheshire and North East Wales area contains some significant areas that are protected nationally or internationally. This includes the Clwydian Range Area of Outstanding Natural Beauty (AONB), a 35km long chain of hills rising between the Vale of Clwyd to the west and the Dee Estuary to the east. The area also has 8 SACs, 4 SPAs and 3 Ramsar Sites including the Dee Estuary, an area deemed of particular importance for its internationally recognised population of wintering waterfowl and waders.

To the north west of UUW's operational area (crossing the border between England and Scotland) is the Solway Firth Estuary, which is internationally and nationally designated (Solway Firth SAC/SPA/ Upper Solway Flats & Marshes Ramsar/SSSI – shown in figures C.1 to C.4) due to the importance of its habitats, including sandbanks, estuary, mudflats and sandflats, saltmarshes and salt meadows, which make the estuary of national and international importance for internationally recognised species including wintering wildfowl and wading birds and it is a vital link in a chain of west coast estuaries used by migrating birds²⁹.

The River Dee and Bala Lake SAC, meanwhile, are part of a network of water resources used by UUW. The River Dee flows from Llyn Tegid and is important for a range of species and habitats including migratory fish, particularly salmon, and three species of lamprey. The Dee is also important for its population of otters, which live and breed in the river and tributaries throughout the catchment, and for bullhead which are widespread throughout the river system. The State of Natural Resources Report (SoNaRR) for Wales published by Natural Resources Wales³⁰ highlights that as at 2013, the condition of SAC and SPA species features on sites in Wales remained mostly unfavourable (55%), with the exception of birds and mammals of which 86% and 68% were in favourable condition, respectively.

²⁶ Defra (2011) *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*.

²⁷ Natural England (2021) *SSSI Condition Summary*. Available online at: <https://designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteType=ALL> [Accessed 12th August 2021].

²⁸ Natural England (2021) *Condition of SSSI Units in Region: North West*. Available online at: <https://designatedsites.naturalengland.org.uk/SearchRegion.aspx> [Accessed August 2021]

²⁹ JNCC (2005) *Information Sheet on Ramsar Wetlands (RIS)* Available online at: <https://rsis.ramsar.org/RISapp/files/RISrep/GB341RIS.pdf> [Accessed October 2021]

³⁰ Natural Resources Wales (2020) *The State of Natural Resources Report (SoNaRR)*. Available online at: <https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en> [Accessed August 2021].

There has been a dramatic increase in the number of non-native species arriving in Britain over recent decades, as well as in the numbers of invasive species being established³¹. There are approximately 2,000 non-native species established in Britain, with the majority in the terrestrial environment and smaller numbers in marine and freshwater environments. Non-native species cause significant adverse impacts, including out-competing native species and spreading disease. The UK Government 2015 strategy on invasive non-native species³² builds on previous strategies to provide a framework for coordination action to prevent spread and work to eradicate species across the UK.

UW owns some 57,000 ha of land, much of which is of high value in terms of nature conservation and recreational use. 30% of the land within UW's ownership is designated as SSSIs, and UW is helping to protect these sites as part of its obligation to conserve and enhance these areas. This has included working with partners such as the Royal Society for the Protection of Birds (RSPB), Natural England and the Forestry Commission on a Sustainable Catchment Management Programme (SCaMP) project, which began in 2005. This scheme has helped to:

- protect and improve water quality;
- reduce the rate of increase in raw water colour which will reduce future revenue costs;
- reduce or delay the need for future capital investment for additional water treatment;
- deliver Government targets for SSSIs;
- ensure a sustainable future for the company's agricultural tenants;
- enhance and protect the natural environment;
- permit moorland habitat to become more resilient to long term climate change; and
- allow healthy upland peat moors to absorb significant volumes of carbon from the atmosphere.

SCaMP is now in its third stage and is being driven by drinking water safeguard zones i.e., drinking water catchments where water quality in rivers, reservoirs or groundwater is deteriorating and is becoming harder to treat, due to human activities on the land. Between 2015 and 2020, UW invested in 29 projects under SCaMP 3. The new Catchment Wise initiative has also been put in place to drive similar change around wastewater issues, in order to tackle pollution at source to improve the quality of water in lakes, rivers and the sea.³³

Additionally, UW's Catchment Systems Thinking (CaST) approach (an evolution of the SCaMP), sets out to manage catchments in a holistic, integrated manner to meet the needs of the whole catchment, considering what is best for the environment and communities, by viewing water and wastewater in an integrated way, and the environment as a connected system³⁴.

³¹ Defra (2012) *Non-Native Species in Great Britain: establishment, detection and reporting to inform effective decision making*. Available online at: <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=16281> [Accessed August 2021]

³² Defra (2015) *The Great Britain Invasive Non-native Species Strategy*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/455526/gb-non-native-species-strategy-pb14324.pdf [Accessed August 2021]

³³ United Utilities (2021) *Catchment Management*. Available online at: <https://corporate.unitedutilities.com/corporate/responsibility/stakeholders/catchment-systems-thinking/catchment-management/> [Accessed August 2021]

³⁴ United Utilities (2021) *CaST Catchment Systems Thinking*. Available online at: <https://collab-uu.co.uk/cast/> [Accessed October 2021]

Non-statutory Protected Sites and Other Biodiversity

There are over 100 LNRs across the North West region, in addition to numerous Local Wildlife Sites. Local Wildlife Sites include the following:

- **Cumbria:** over 1,600 County Wildlife Sites, including ancient woodland, species-rich grasslands, wetlands, roadside verges and hedgerows.³⁵
- **Lancashire:** over 1,100 Biological Heritage Sites, covering 25,000 ha. This represents 8% of the county's area.
- **Greater Manchester:** more than 500 sites, which are known as Sites of Biological Importance³⁶.
- **North Merseyside:** 161 Local Wildlife Sites in the area.³⁷
- **Cheshire:** around 1,000 Local Wildlife Sites, covering over 15,000 ha and representing 5.75% of the total area of Cheshire.³⁸
- **Derbyshire:** 1,179 Local Wildlife Sites covering almost 10,000 ha (outside of the Peak District National Park).³⁹

In Wales, 557 species are identified under Section 7 of the Environment (Wales) Act 2016, which specifies species of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. This comprises:

- 188 invertebrates;
- 67 lichens;
- 77 vascular plants;
- 51 birds;
- 55 marine species;
- 52 mosses and liverworts;
- 27 fungi;
- 5 stoneworts;
- 17 mammals;
- 10 fish; and
- 8 amphibians and reptiles.⁴⁰

³⁵ Cumbria Wildlife Trust, *County Wildlife Sites in Cumbria*. Available online at: <http://www.cumbriawildlifetrust.org.uk/what-we-do/county-wildlife-sites> [Accessed August 2021].

³⁶ Greater Manchester Ecology Unit (GMEU), *Sites of Biological Importance (SBI / LWS) in Greater Manchester (Spreadsheet)*. Available online at: <https://data.gov.uk/dataset/81cbf1a0-6304-470c-ade8-60272be0d219/sites-of-biological-importance-sbi-lws-in-greater-manchester> [Accessed August 2021]

³⁷ Merseyside Biodiversity Group (2008) *North Merseyside Local Wildlife Site Selection Guidelines*. Available online: <http://www.merseysidebiodiversity.org.uk/download/north-merseyside-local-wildlife-site-selection-guidelines/> [Accessed August 2021].

³⁸ Cheshire Wildlife Trust, *Local Wildlife Sites (LWS)*. Available online at: <https://www.cheshirewildlifetrust.org.uk/wildlife/our-work-wildlife/our-work-wildlife/local-wildlife-sites> [Accessed August 2021]

³⁹ Derbyshire Wildlife Trust, *Local Wildlife Sites*. Available online at: <https://www.derbyshirewildlifetrust.org.uk/local-wildlife-sites> [Accessed August 2021]

⁴⁰ Wales Biodiversity Partnership (2021) *Section 7 lists: Section 7 Priority species*. Available online at: <https://www.biodiversitywales.org.uk/Environment-Wales-Act> [Accessed August 2021]

In Scotland, habitats and species considered to be of principal importance to biodiversity conservation in Scotland are identified on the Scottish Biodiversity List. There are 41 terrestrial habitats, 1,289 terrestrial species, and, 156 marine species and 20 marine habitats that feature on the list including⁴¹:

Terrestrial habitats:

- 5 coastal;
- 9 freshwater and wetland;
- 10 lowland;
- 10 upland; and
- 7 woodland;

Terrestrial species:

- 83 aquatic invertebrates;
- 105 birds;
- 13 fish;
- 713 fungi;
- 19 mammals;
- 457 non-vascular plants;
- 7 reptiles and amphibians;
- 304 terrestrial invertebrates; and
- 245 vascular plants.

Marine species:

- 6 alga;
- 1 ascidian;
- 22 bony fish;
- 5 bony fish (anadromous);
- 1 bony fish (catadromous);
- 2 brown algae;
- 13 bryozoan;
- 20 cnidarian;
- 3 crustacean;
- 1 echinoderm;
- 3 jawless fish (anadromous);

⁴¹ NatureScot (2020) *Scottish Biodiversity List* Available online at: <https://www.nature.scot/doc/scottish-biodiversity-list> [Accessed October 2021]

- 23 mammal;
- 17 mollusc;
- 8 poriferan;
- 4 reptile;
- 11 ribbon worm/ nemertea;
- 13 Shark/skate/ray; and
- 3 stonewort.

Across the UK, 177 priority species (15%) are classified as internationally threatened whilst 324 priority species (28%) have suffered a marked decline in the UK.⁴²

Likely Evolution of the Baseline without the DWMP

Current trends in data have shown that the condition of SSSIs in the region has increased over the recent years. Considerable effort is being made to ensure that the condition of SSSIs improves and condition assessments are undertaken regularly, as such, the condition of SSSIs in the region is likely to continue to improve.

In the Biodiversity Strategy 2020, the Government has outlined an aspiration to maintain at least 95% of SSSIs in favourable or unfavourable recovering condition, therefore a range of measures are included in the management plans to contribute towards either maintaining or improving the conditions of each site. Further to this, there are several legislative instruments, including the Habitats Regulations and the UK's Restoring Sustainable Abstraction programme, which should contribute towards future improvements to the quality of habitats in the region.

Trend data has also shown that otters are showing a gradual increase in numbers in recent years and this trend is expected to continue⁴³. However, salmon and eel stocks in the North West and North Wales have shown a decline over recent years, in common with a wider national trend⁴⁴. Eel Management Plans (EMPs) have been prepared for every River Basin District in England, Wales and Scotland, which set out actions to halt and reverse the decline in the European eel stock.

Wild bird species indicators have shown an increase in the incidence of farmland and woodland bird species in the region. However, this is in contrast to national trends and as such, possible future trends for the region are difficult to predict or determine.

Climate change is anticipated to have an impact on wildlife in the future by exacerbating existing pressures such as changes to the timing of seasonal activity, and water scarcity. There is, therefore, a need to allow wildlife to adapt to climate change, in line with the Government's ambition for the reversal of the decline in native species and increase in wildlife-rich habitats⁴⁵.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA arising from the analysis of the biodiversity baseline are:

⁴² JNCC (2010) *Priority Lists Spreadsheet*. Available online at: <http://jncc.defra.gov.uk/page-5717> [Accessed August 2021].

⁴³ Environment Agency, North West Environment Summary

⁴⁴ Environment Agency, North West Regional Contribution 2010-2015 Evidence Pack

⁴⁵ Defra (2019) *Annexes to the Environment Bill*. Available online at: <https://publications.parliament.uk/pa/bills/cbill/58-01/0009/Environment%20Bill%20IA%20ANNEXES.pdf> [Accessed August 2021]

- the need to protect, restore and enhance biodiversity, ecological functions and biodiversity connectivity within UUW's operational area, particularly protected sites designated for nature conservation;
- the need to continue to increase and improve the condition of priority habitats and habitats of priority species, and restore populations of these species and other specially protected species;
- the need to avoid activities likely to cause irreversible damage to natural heritage;
- the need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors;
- the need to recognise the importance of ensuring biodiversity is resilient to the effects of climate change, including allowing adaptation; and
- 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.

Geology, Land Use and Soils

Baseline Characteristics

Geology

There is a great diversity in the composition of geology across the North West region. The majority of the lowland Cheshire plains, Merseyside and western Lancashire are dominated largely by Triassic mudstone and sandstone. The uplands of Cumbria are partly made up of volcanic igneous rock from the Devonian period. Moving eastwards towards the Yorkshire Dales, the geology becomes dominated by distinctive carboniferous limestone, and south into Lancashire millstone grit and coal becomes abundant.

As a broad overview of Welsh geology, the following rock types exist in a progression from North West to South East (predominant rock types): Ordovician; Silurian; Devonian; and Carboniferous Peat (covers 3% to 4% of Wales and is predominantly acid blanket peat) (**Figure C.6**). There are small areas of raised bog scattered in lowland areas.⁴⁶ The Permo-Triassic sandstone forms an important groundwater resource in North Wales, whilst peat, sand and gravel deposits along river valleys support strategic local water supplies.

A wide range of rock types of different ages can be found across Scotland, however, largely it is underlain by metamorphic (in the northern half of Scotland) and sedimentary rock (in the southern half) with scattered pockets of igneous rock. The southern part of Scotland, which borders the UUW operational area is primarily characterised by sedimentary rock from the Ordovician, Silurian, and Cambrian periods⁴⁷.

Within the North West region, there are 203 Geological Conservation Review (GCR) Sites, i.e., sites that are often SSSIs and selected on the basis of their national and international importance.⁴⁸ Information obtained from Natural England indicates that, UK-wide, 86% of SSSIs designated for one or more geodiversity features

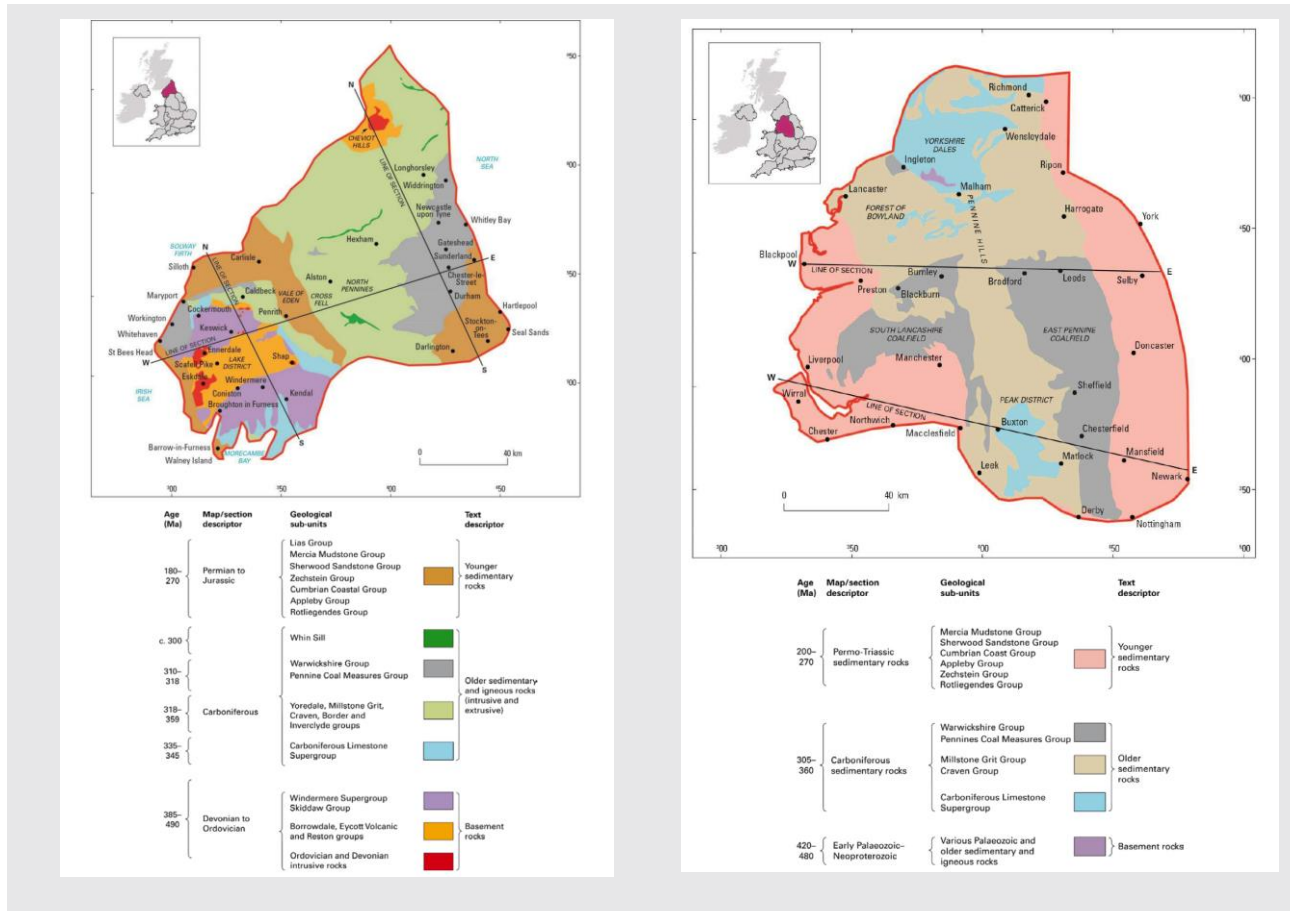
⁴⁶ JNCC (2021) *Habitat Account - Raised Bogs and Mires and Fens* [available at: <http://jncc.defra.gov.uk/protectedsites/sacselecion/habitat.asp?FeatureIntCode=H7110> (accessed August 2021)].

⁴⁷ Scottish Geology Trust (undated) *Geology of Scotland Map* Available online at: <https://www.scottishgeology.com/geology-of-scotland-map/> [Accessed October 2021]

⁴⁸ JNCC (2019) *Geological Conservation Review (GCR) csv extract of the GCR database (part) 2019* (filtered to Cheshire, East Cumbria, West Cumbria, Lancashire, Sefton, Greater Manchester North) Available online: <https://hub.jncc.gov.uk/assets/b0f53582-f93d-4e70-8ff9-0f16b660e4ad> [Accessed August 2021].

are in favourable or unfavourable recovering condition.⁴⁹ Within Wales there are 452 GCR Sites and within Scotland there are 926 GCR sites⁵⁰.

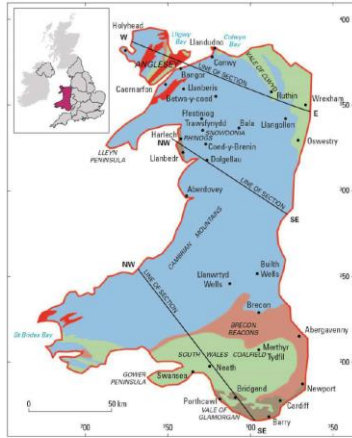
Figure C.6 Geological Map for Northern England (top left), Pennines and adjacent areas (top right), Wales (bottom left) and Central England (bottom right)



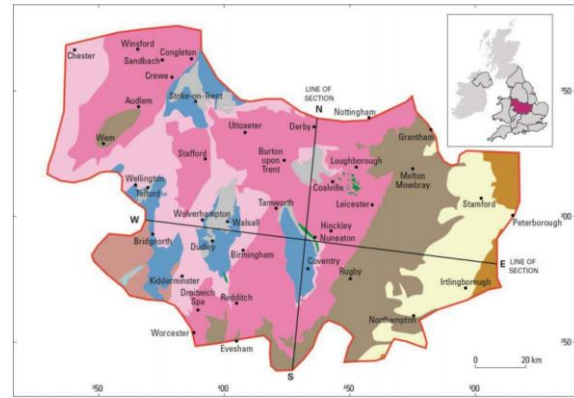
⁴⁹ Natural England (2015) *Natural England Access to Evidence Information Note EIN007: Summary of evidence: Geodiversity* [available at: <http://publications.naturalengland.org.uk/publication/5005683512573952> (accessed August 2021)]

⁵⁰ JNCC (2019) *Geological Conservation Review (GCR) csv extract of the GCR database (part) 2019* Available online: <https://hub.jncc.gov.uk/assets/b0f53582-f93d-4e70-8ff9-0f16b660e4ad> [Accessed October 2021].



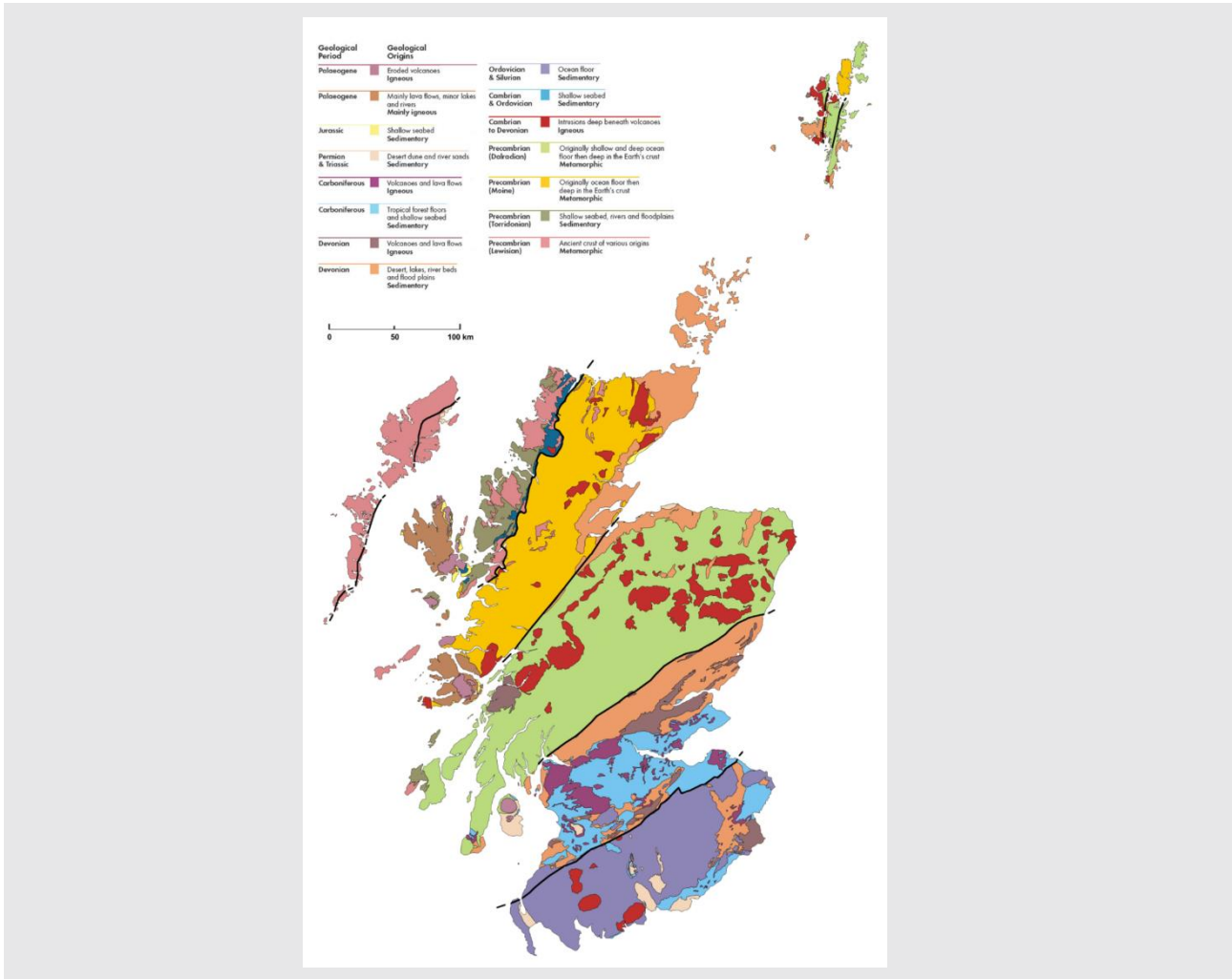


Age (Ma)	Map/section descriptor	Geological sub-units	Text descriptor
25-200	Jurassic sedimentary rocks	Anglo-Saxon Group	Younger sedimentary rocks
		Lias Group	
303-260	Permian-Carboniferous sedimentary rocks	Mercia Mudstone Group	Older sedimentary rocks
		Warwickshire Group	
		Coal Measures Group	
415-360	Devonian sedimentary rocks	Old Red Sandstone	Basement rocks
		Silurian, Ordovician and Cambrian sedimentary and volcanic rocks	
542-750	Precambrian rocks	Sedimentary, intrusive and volcanic rocks	Basement rocks



Age (Ma)	Map/section descriptor	Geological sub-units	Text descriptor
150-200	Jurassic sedimentary rocks	Anchole Group	Younger sedimentary rocks
		Inferior and Great Oolite groups	
		Lias Group	
200-300	Permo-Triassic sedimentary rocks	Mercia Mudstone Group	Older sedimentary rocks
		Sherwood Sandstone Group	
300-360	Carboniferous sedimentary rocks	Warwickshire Group	Older sedimentary rocks
		Coal Measures Group	
		Mid and early Carboniferous rocks	
360-415	Devonian sedimentary rocks	Older sedimentary rocks	Basement rocks
415-630	Early Palaeozoic to Precambrian	Various sedimentary and igneous rocks	





Sources: BGS (2020) Regional Geological Summaries Available from: <https://www.bgs.ac.uk/geology-projects/regional-geological-summaries/> and Scottish Geology Trust (undated) Geology of Scotland Map. Available from: <https://www.scottishgeology.com/geology-of-scotland-map/> [Accessed October 2021]

Soils

The variety of underlying geology in the North West region is reflected in its soils, the agricultural value of which varies. Rural land covers 80% of the region, with the majority of this managed for agriculture. Intensive arable and livestock farming are supported in lowland areas, while upland areas may be managed for grouse, forestry or farming.

The Agricultural Land Classification System developed by Defra provides a method for assessing the quality of farmland, principally for use in land use planning. The system divides the quality of land into five categories, as well as non-agricultural and urban. The 'best and most versatile land' is generally defined as the agricultural land which falls into Grades 1, 2 and 3a.

Figure C.7 shows agricultural land quality across UUW's supply area. The quality of agricultural land in the North West region is relatively poor, with large swathes of land classed as 'Poor' (Grade 4) or 'Very Poor' (Grade 5) reflecting the large proportion of upland area which generally has low agricultural quality due to exposure and poor soil cover. Areas to the north of Liverpool, west of Blackpool and across the southern part of the region include small areas of agricultural land of 'Excellent' (Grade 1) or 'Very Good' (Grade 2) quality. Large areas of 'Good to Moderate' (Grade 3) land are also present in the far north, far south and central parts of the region. Areas of urban land are focussed around Manchester and Liverpool. In Wales,



7% of the total land cover is classified as the 'best and most versatile land'.⁵¹ Agricultural land is classified in a slightly different manner in Scotland, using the Land Capability for Agriculture (LCA) classification, which includes seven 'classes' of agricultural land, with classes 3, 4, 5 and 6 being further subdivided into divisions. There is also a class for urban land⁵². Broadly, LCA classes 1 – 3.1 are suitable for arable agriculture, LCA classes 3.2 – 4.2 are suitable for mixed agriculture, LCA classes 5.1 – 5.3 are suitable for use as improved grassland and LCA classes 6.1 – 7 are suitable for rough grazing⁵³. Primarily, land across Scotland falls within class 6 (across the various subdivisions) with scattered areas of class 5 (across the various subdivisions), however, the majority of the eastern coast of Scotland falls within classes 3 and 2 with other scattered areas of class 3 in the southern part of Scotland. There are also pockets of class 4 land across the east and south as well as some very minor areas in class 1⁵⁴.

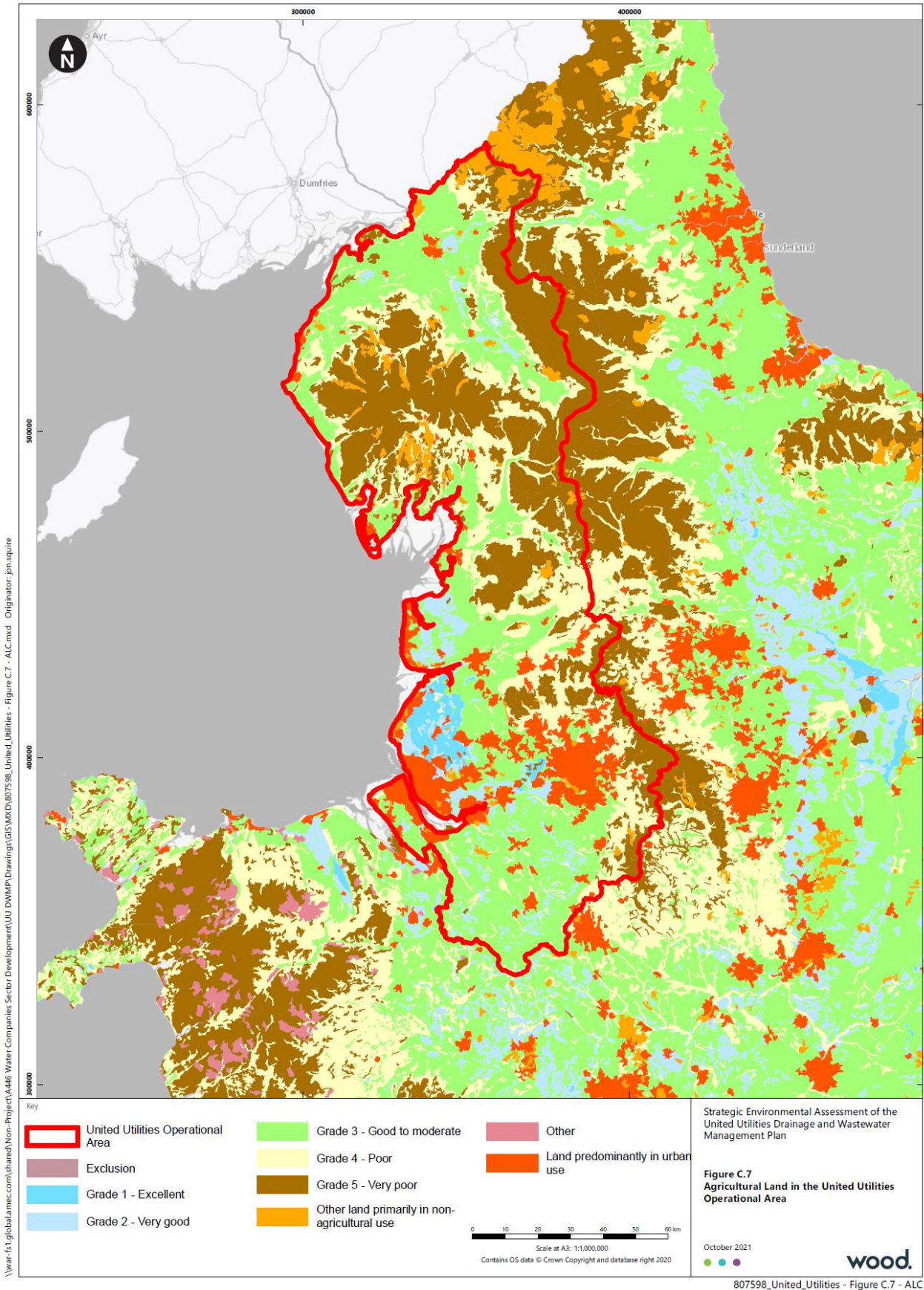
⁵¹ Welsh Government (2021) *Agricultural Land Classification: Predictive Map*. Available at: <https://gov.wales/agricultural-land-classification-predictive-map> [Accessed August 2021].

⁵² Scotland's Soils (2017) *National scale land capability for agriculture*. Available online at: <https://soils.environment.gov.scot/maps/capability-maps/national-scale-land-capability-for-agriculture/> [Accessed October 2021]

⁵³ The James Hutton Institute (undated) *Land Capability for Agriculture in Scotland. The Macaulay System Explained*. Available online at: https://www.hutton.ac.uk/sites/default/files/files/soils/lca_leaflet_hutton.pdf [Accessed October 2021].

⁵⁴ Scotland's Soils (part of Scotland's Environment) (undated) National scale land capability for agriculture map. Available online at: https://map.environment.gov.scot/Soil_maps/?layer=5 [Accessed October 2021]

Figure C.7 North West Region Agricultural Land Classification

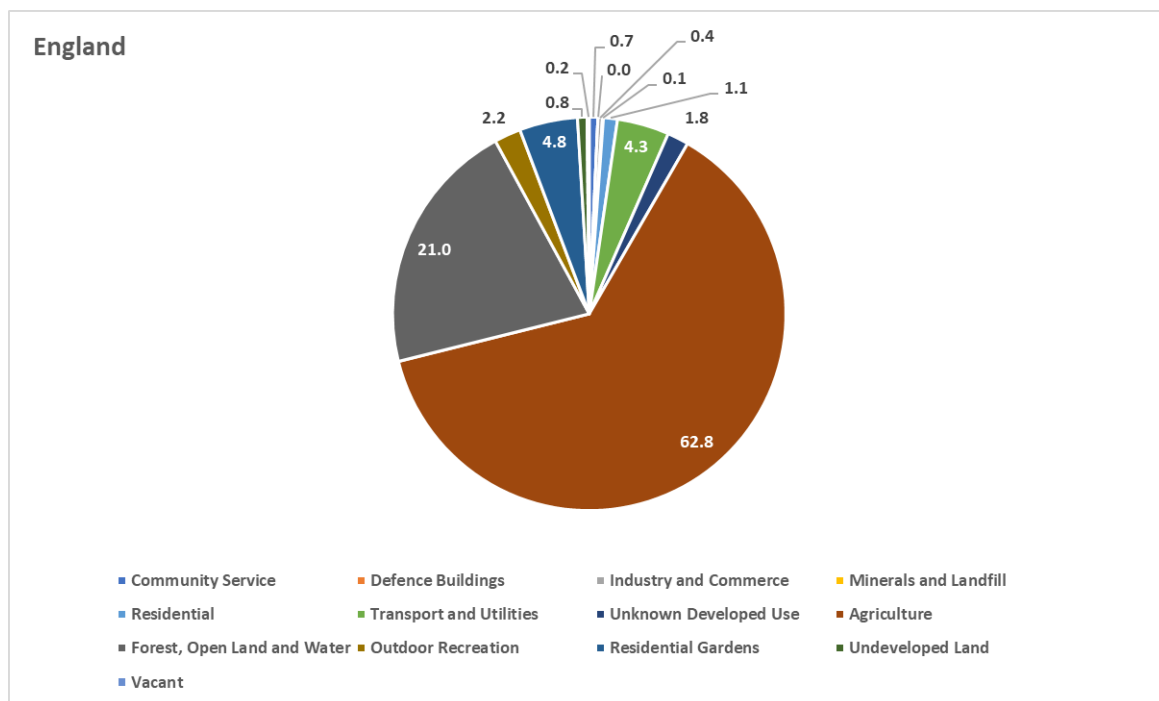


Peat is of great importance in the North West region and nationally, providing a rich habitat, water quality improvements (through filtration of water), flood management and carbon storage. The UK’s peatlands contain more carbon than all the forests in France and the UK combined. Half of England’s blanket bog lies in the north Pennines in an area that straddles parts of Cumbria, and peat soils cover 40% of the Lake District National Park and World Heritage Site. There is pressure on peatland in England, with over 80% of UK peatland in a damaged state due to peat extraction, drainage for agriculture and forest planting, overgrazing, burning and pollution.⁵⁵ With regard to Wales, SoNaRR highlights that only 30% of the Welsh peat soil area is considered to be in ‘good condition.’⁵⁶ Most of the UK’s peatlands are found in Scotland, with peatlands covering more than 20% of Scotland’s total land area⁵⁷, however, it is estimated that around 80% of Scotland’s peatlands are degraded⁵⁸

Land Use

Figure C.8 shows land use in England and the North West region as reported in the Land Use Statistics for England (2018). This indicates that for both the North West region and England, agriculture constitutes the majority of the total land area (46.8% and 62.8% respectively). The next largest area of land cover is forest, open land and water (36.0% of land cover in the North West region and 21.0% of land cover in England).

Figure C.8 Land Use in England and the North West Region



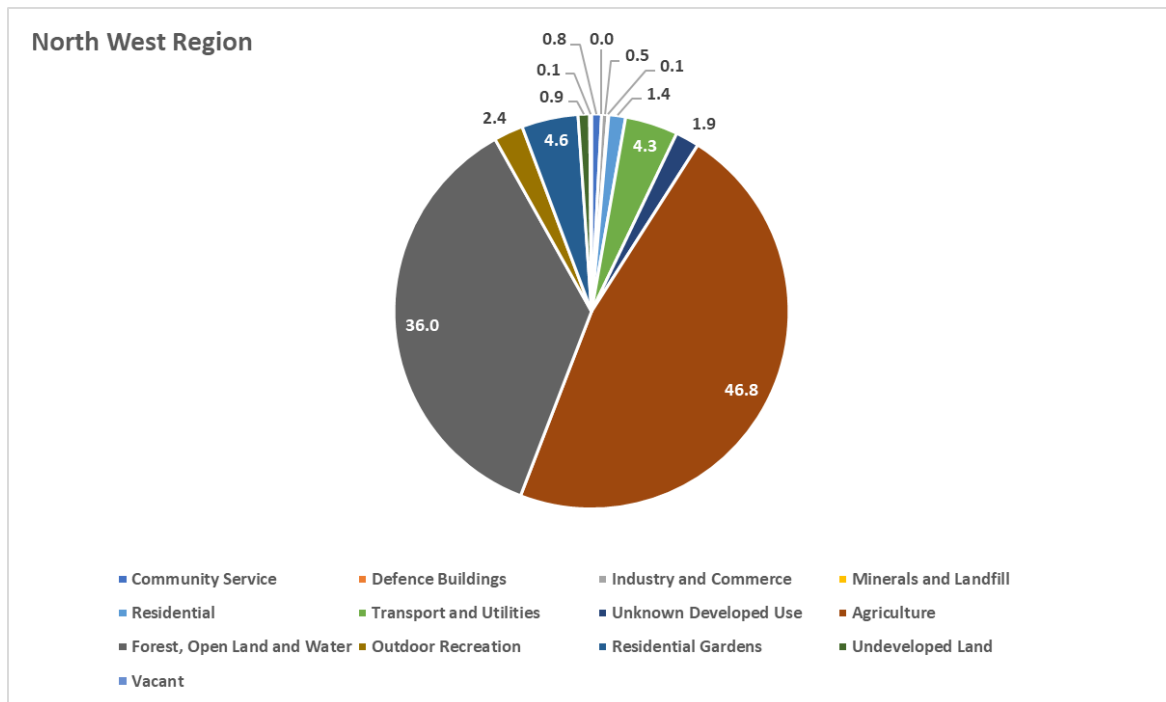
⁵⁵ IUCN National Committee United Kingdom Peatland Programme (2021) *What’s So Special about Peatlands?* Available online at: https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-06/Peatland_Leaflet_ONLINE_V2.pdf [Accessed August 2021].

⁵⁶ Natural Resources Wales (2016) *The State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources. Technical Report. Chapter 3. Summary of extent, condition and trends of natural resources and ecosystems in Wales.* Available online at: <https://naturalresources.wales/media/681127/chapter-3-state-and-trends-final-for-publication.pdf> [Accessed August 2021]

⁵⁷ Scottish Natural Heritage (2015) *Scotland’s National Peatland Plan Working for our future.* Available online at: <https://www.nature.scot/sites/default/files/Publication%202015%20-%20Scotland%27s%20National%20Peatland%20Plan%20-%20July%202015.pdf> [Accessed October 2021]

⁵⁸ Scotland’s Soils (part of Scotland’s Environment)(2019) *Peatland restoration* Available online at: <https://soils.environment.gov.scot/resources/peatland-restoration/> [Accessed October 2021]





Source: Ministry of Housing, Communities and Local Government (2020). *Statistical data set - Live tables on land use England 2018*. Available online: <https://www.gov.uk/government/statistical-data-sets/live-tables-on-land-use> [Accessed August 2021]

Previously developed land (PDL) is defined as land that is, or was, occupied by a permanent structure (excluding agricultural or forestry buildings, landfills and parks) and associated fixed surface infrastructure. In 2012, the North West had a total of 7,220 ha of vacant or derelict PDL that was unused or may be available for redevelopment, which was the highest of all the English regions (see **Table C.1**). Of this, almost 70% had some form of planning permission or was allocated for development in a local plan.

Table C.1 Total Area of Vacant and Derelict Previously Developed Land in 2012

Region	All Vacant and Derelict PDL (ha)
North West	7,220
South East	2,670
Yorkshire & the Humber	3,900
East of England	3,240
East Midlands	2,840
South West	2,360
West Midlands	3,000
North East	2,600
London	1,240
England	45,120

Source: University of the West of England, for the Campaign to Protect Rural England (2014) *From Wasted Space to Living Spaces: The Availability of Brownfield Land for Housing Development in England*.



Adopted and emerging local plans of the local planning authorities that comprise the region seek to utilise brownfield sites in addition to greenfield land where appropriate to meet housing and economic development needs.

UW operates a large network of infrastructure assets including:

- 43,000 kilometres of water pipes;
- 77,000 kilometres of sewers;
- 168 reservoirs;
- 91 water treatment works; and
- 567 waste water treatment works.⁵⁹

Likely Evolution of the Baseline without the DWMP

New development (for example, to accommodate population growth) could place pressure on geological assets in the region.

Key threats to soils include draining soils, intensive agriculture, changes in land management, climate change, burning and extraction of peat, construction, and pollution. Loss of nitrate from agricultural soils, meanwhile, can lead to failure of drinking water standards and contribute to eutrophication in estuaries and the sea. Eutrophication can also be caused by excess phosphate entering water bodies, usually via soil erosion.

The vision of Defra's Soils Strategy for England⁶⁰ is for all England's soils to be managed sustainably and degradation threats tackled successfully by 2030. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations. 'Water for Life'⁶¹, the Government's white paper for water and the environment, outlines the Government's work towards improving water efficiency within agricultural practices in order to reduce water consumption.

There are a number of Environmentally Sensitive Areas (ESAs) in the region including the Lake District and parts of the North Peak, the South West Peak and the Pennine Dales. The ESA Scheme is designed to protect and enhance the environment by offering payments to landowners and occupiers in these areas to adopt environmentally beneficial agricultural practices. The scheme has now been superseded by the Environmental Stewardship Scheme. Continued development of this scheme is expected to see an improvement in land use in the future.

In this context, it is expected that there will be increased opportunities to protect soils and improve water quality as agricultural practices and farm management are influenced by sustainable land management schemes such as UW's SCaMP and CaST projects.

The National Policy Planning Framework (NPPF) aims to encourage the effective use of land by reusing land that has been previously developed (brownfield), provided that it is not of high environmental value.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA arising from the analysis of the geology and soils baseline are:

- the need to sustainably manage and/or improve the quality of agricultural land in the region;

⁵⁹ United Utilities (2021) *Our Water Cycle*. Available online at: <https://www.unitedutilities.com/corporate/about-us/what-we-do/water-cycle/> [Accessed August 2021].

⁶⁰ Defra (2009) *Safeguarding our Soils: A Strategy for England*.

⁶¹ Defra (2011) *Water for Life*.

- the need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health;
- the need to protect, maintain and enhance geomorphological functions and services;
- 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 protect peatlands in the North West;
- the need to make use of PDL, and to reduce the prevalence of derelict land; and
- the need to maintain soil function.

Water

Baseline Characteristics

The North West's exposure to westerly maritime air masses and extensive areas of high ground make the region one of the wettest in the UK. However, the large geographical differences across the region result in considerable variation in annual rainfall, for example higher parts of the Lake District receive 3,200mm of rain each year, while parts of the Eden Valley in Cumbria receive less than 800mm annually.⁶² Rainfall patterns combined with sources of demand drive the nature of the water resource system operated by U UW.

The high proportion of upland landscape in the region means many of the rivers and streams in the North West are short and steep and often flow over impermeable rock and thin soils, which results in large variations in flow especially during periods of heavy rain.

U UW supplies water to approximately 7 million people and 0.2 million non-household customers in Cumbria, Lancashire, Greater Manchester, Merseyside, most of Cheshire and a small part of Derbyshire. More than 90% of the water supplied by U UW comes from rivers and reservoirs, with the remainder from groundwater. In contrast, an average of 60% of water is supplied from rivers and reservoirs across the rest of England.⁶³

U UW's region is currently split into four water resource zones (WRZs): Carlisle Resource Zone, North Eden Resource Zone, Strategic Resource zone and the Barepot Resource Zone. The Barepot Resource Zone is geographically within the Strategic Resource Zone; however, it is delineated as a separate zone as it comprises a non-potable supply to industrial customers at Barepot in West Cumbria.

In the WRMP15 (covering the period 2015-2040), U UW identified a future supply shortfall in the former West Cumbria WRZ and the Thirlmere Transfer scheme was selected to meet this shortfall by using some of the spare water available in the neighbouring former Integrated Resource Zone. U UW is in the process of building a new water treatment works and a pipeline from Thirlmere Reservoir into West Cumbria. The scheme is expected to be completed by 2022 and as such, the WRMP19 (covering the period 2020-2045) reflected the merging of the former West Cumbria and Integrated Resource Zones into the Strategic Resource Zone from 2022 onwards (see **Figure C.9**).

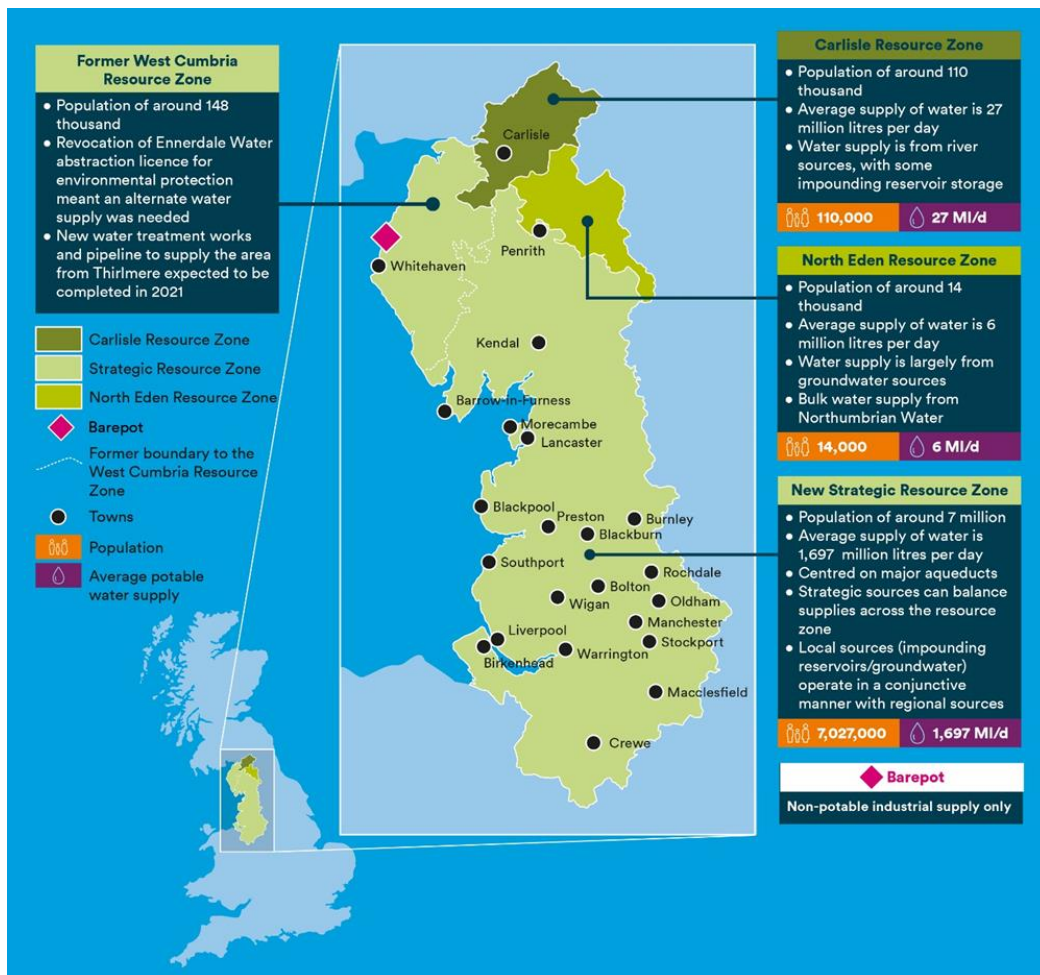
U UW owns and operates over 100 water supply reservoirs, various river and stream intakes, as well as lake abstractions and numerous groundwater sources, and supplies around 1,730 million litres per day (ML/d) of drinking water in a typical year (although this would be higher in a dry year). The Strategic Resource Zone

⁶² Met Office (2016) *North West England & Isle of Man: Climate*. Available online at: <http://www.metoffice.gov.uk/climate/uk/regional-climates/nw> [Accessed August 2021].

⁶³ United Utilities (2019) *Final Water Resources Management Plan 2019*

supplies around 1,697MI/d of drinking water, and has water sources in Wales, Cumbria and other parts of North West England. The remaining WRZs are served from sources in other parts of the region.⁶⁴

Figure C.9 United Utilities Water Resource Zones (from 2022 onwards)



Source: United Utilities Final Water Resources Management Plan 2019

Water Availability

Water abstraction may impact hydrologically sensitive nationally and internationally designated sites and/or influence wider biodiversity. Water abstraction may also impact landscape and visual amenity of landscapes, including those designated as AONBs or as part of National Parks. Lake Vyrnwy, the River Dee, and other freshwater-dependent habitats in North East Wales are of importance for biodiversity and it is noted that many of these habitats are internationally or nationally designated sites for nature conservation.

The Environment Agency and Natural Resources Wales have produced a series of Catchment Abstraction Management Strategies (CAMS) for the North West and other areas from which water is sourced to supply the Uuw supply area (e.g., those sources in Wales). These CAMS set out how water resources will be managed in each catchment and provide information on how existing abstraction licences are managed and the availability of water for further abstraction. Within each CAMS, river flows and groundwater levels are monitored at Assessment Points (significant points on rivers) and assessed alongside the amount of water which has been abstracted on average over the previous six years and the situation if all abstraction licences

⁶⁴ Ibid



were used to full capacity. This data is used to determine the water availability for each water body. Water availability falls into the following categories:

- **Water available for licensing:** There is more water than required to meet the needs of the environment. New licences can be considered depending on local and downstream impacts.
- **Restricted water available for licensing:** If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted and restrictions may be in place. Trading from an existing licence holder can occur.
- **Water not available for licensing:** Water body flows are below the indicative flow requirement to help support Good Ecological Status (as required by the Water Framework Directive). No further consumptive licences will be granted. Trading from an existing licence holder can occur.

The water availability assessments for the CAMS are summarised in **Table C.2** below.

Table C.2 Summary of CAMS Water Availability Assessments

Catchment Abstraction Management Strategy	Water Available	Restricted Water Available	Water Not Available	Total Number of Assessment Points
Derwent and West Cumbria	4	1	10	15
Eden and Esk	12	5	2	19
Lower Mersey and Alt	10	4	6	20
Lune & Wyre	4	11	8	23
Northern Manchester	0	11	2	13
Ribble, Douglas and Crossens	19	9	8	36
South Cumbria	11	14	1	26
Upper Mersey	1	12	4	17
Weaver and Dane	5	7	1	13
Severn Corridor	0	13	0	13
Tyne	6	1	0	7
Dee	0	0	8	8
Total	72	88	50	210

Source: Environment Agency (2013, 2019 and 2020) and Natural Resources Wales (2015) *Abstraction Licensing Strategies*.

Wastewater Treatment

Wastewater from 3 million homes and 200,000 businesses across the North West is treated by UUW every day. The wastewater is carried down drains, into the underground sewer network which comprises 77,000km



of sewers, and transported to one of 567 wastewater treatment works, where, once it is treated, is returned to rivers and to the sea⁶⁵.

Wastewater treatment works discharge consent standards are set to maintain good water quality. In 2019, UUW's wastewater treatment works achieved 98.5% compliance with their environmental permit conditions, slightly lower than both 2017 and 2018 compliance (98.8% and 98.7% respectively) and also below the 2019 average across all water companies in England and Wales (98.7%). The Environment Agency and Natural Resources Wales give water companies a star rating for their overall performance in protecting the environment (including during return of treated water to rivers and the sea). UUW maintained the top four-star Environmental Performance Assessment (EPA) rating in 2015, 2016 and 2017; however, this dropped to three stars in 2018 and 2019 (although across all water companies in England and Wales, the average was also three stars for 2019). In 2019 UUW also completed 100% of its environmental improvement measures, which is above the average (99%) for all water companies in England and Wales⁶⁶.

Storm Overflows

Combined sewers handle both rain water run-off from gutters, drains, roads etc. as well as sewage. Storm overflows act as a pressure relief valves during heavy rainfall events, when more surface water enters the sewerage system than it is designed to cope with. During these events, storm overflows allow rain water, mixed with sewage, to rise inside the sewer and eventually enter a separate pipe which flows into a river or the sea, in order to prevent the flooding of streets, homes and businesses.

UUW operates a larger proportion of combined sewers than the average for water companies in England and Wales, with 54% of UUW's public sewers being combined foul (sewage) and surface water sewers compared to a water company average of 33%. UUW also operates 40% more sewer overflows than the industry average. However, annual water runoff in the North West is 28% higher than the average for England and Wales which means more water runs into UUW's sewers⁶⁷.

Since 2000, UUW has invested £1.2bn to improve overflow discharges to reduce spill frequency, volume and impact upon the natural environment. This investment has improved the operation of over 1,200 intermittent overflows⁶⁸.

Water Quality

There are 1,266 surface water bodies covered by three River Basin Management Plans (RBMPs) that lie within the North West region (North West, Solway Tweed and Dee). Additionally, Lake Vyrnwy is a source to the UUW supply area which lies within the Severn RBMP district. All the water bodies in the region have been classified for their ecological status and have objectives set for 2021, 2027 and beyond.

Table C.3 shows the percentage of water bodies in each River Basin District that are achieving good ecological status/potential or better, their target status by 2021 (based on data contained within the RBMPs prepared under the WFD) and a summary of the key water management issues that need to be dealt with in each district. Assessments in 2015 showed that around a third of surface water bodies across all districts had good ecological status/potential, with the Solway Tweed River Basin District having the greatest percentage of bodies at good or better status/potential (42%). Conversely, the Severn had the lowest proportion of bodies at good or better status/potential (20%). The percentage of bodies with this status is expected to increase to 2021. Out of the areas with groundwater bodies, the Dee had the greatest percentage at good or

⁶⁵ United Utilities (2021) *Our Water Cycle*. Available online at: <https://www.unitedutilities.com/corporate/about-us/what-we-do/water-cycle/> [Accessed August 2021].

⁶⁶ Discover Water (2019) *Environmental Performance Assessment*. Available online at: <http://www.discoverwater.co.uk/environmental-performance> [Accessed August 2021]

⁶⁷ United Utilities (2021) *Combined Sewer Overflows* Available online at: <https://www.unitedutilities.com/corporate/responsibility/environment/Reducing-pollution/combined-sewer-overflows/> [Accessed August 2021]

⁶⁸ Ibid

better status (100%). The Severn district, meanwhile, had the lowest proportion of groundwater bodies at good status (79%).

Table C.3 Percentage of Water Bodies Achieving Good Ecological Status or Potential, 2015/2021

River Basin District	Surface Water (% of water bodies at good or better ecological status / potential)		Groundwater (% of water bodies at good or better quantitative status)		Significant Pressures
	2015	2021	2015	2021	
North West	22	25	89	94	<ul style="list-style-type: none"> Physical modification; Phosphate; Pollution from waste water; Pollution from rural areas; Ammonia; Pollution from towns, cities and transport; Chemicals; and Dissolved oxygen.
Solway Tweed	42	57 (surface and groundwater)	80	57 (surface and groundwater)	<ul style="list-style-type: none"> Point source discharges; Diffuse source pollution; Water abstraction and flow regulation; Modifications to physical condition; Barriers to fish migration; and Invasive non-native species.
Severn	20	27	79	81	<ul style="list-style-type: none"> Phosphate; Pollution from rural areas; Pollution from waste water; Physical modification; Chemicals; Pollution from towns, cities and transport; Abstraction and flow; and Changes to the natural flow and level of water.
Dee	29	71 (surface and groundwater)	100	71 (surface and groundwater)	<ul style="list-style-type: none"> Physical modifications; Pollution from waste water; Pollution from rural areas; Pollution from abandoned mines; Pollution from towns, cities and transport; and Changes to the natural flow and level of water.

Source: Environment Agency, Natural Resources Wales and Natural Scotland (2015) *River Basin Management Plans (North West, Solway Tweed, Severn, Dee)*.

Bathing water in the region is generally of a high quality, with all 29 bathing waters in the North West region achieving a pass status. The 2019 results for bathing waters in England, Wales, Scotland and the North West are presented in **Table C.4** below.

Table C.4 Mandatory Compliance Results for Bathing Waters in England, Wales, Scotland and the North West in 2019

	North West			England			Wales			Scotland		
	Pass	Fail	Compliance	Pass	Fail	Compliance	Pass	Fail	Compliance	Pass	Fail	Compliance
Bathing Waters	29	0	100%	413	7	98.3%	105	0	100%	80	6	93%



Source: United Utilities (2021)⁶⁹, Defra (2019)⁷⁰, Natural Resources Wales (2020)⁷¹ and Scottish Environment Protection Agency (SEPA) (undated)⁷²

Nitrate Zones

Nitrate Vulnerable Zones (NVZs) are areas of land that drain into surface or groundwater where nitrate levels are already high (greater than 50mg/l), or may have high levels of nitrate in the future. **Table C.5** identifies the number of NVZs designated for high nitrate in surface water for each of the River Basin Districts in the UuW operational area. The Severn district has the highest number of NVZs designated for surface water nitrate levels, covering over half of the district. In contrast, the Solway Tweed NVZs cover only 1% of the district. In each district, there are also a smaller number of additional NVZs designated for groundwater nitrate levels or eutrophication.

Table C.5 Nitrate Vulnerable Zones Designated for High Nitrate in Surface Water

River Basin District	Number of NVZs (high nitrate in surface water)	% of RBD covered by NVZ
North West	23	26
Solway Tweed	7	1
Severn	66	51
Dee	7	18

Source: Environment Agency, Natural Resources Wales and Natural Scotland (2015) *River Basin Management Plans (North West, Solway Tweed, Severn, Dee)*.

The lower parts of the River Dee were designated as a Water Protection Zone (WPZ) in 1999. This is the only designated WPZ in the UK and was designated to protect public water supply sources from point source pollution on the river. This designation means that consent is required before substances including fuels, medicines and liquid foods can be used within the zone.

Flood Risk

Parts of the area supplied by UuW are prone to flooding. Much of the coastal area is at risk of tidal flooding, particularly low-lying land adjacent to the major estuaries in the region including the Solway Firth, the rivers entering Morecambe Bay, the Ribble, the Mersey and the Dee.

The 2016 Flood Risk Management Plans identify the number of people at high risk of flooding (more than a 1 in 30 chance of being flooded in any year (3.3%)) for each River Basin District. In the North West district, approximately 31,000 people are at high risk of flooding from rivers and the sea, and a further 32,600 people

⁶⁹ United Utilities (2021) *Our wonderful coastline* Available online at: <https://www.unitedutilities.com/help-and-support/wastewater-services/bathing-waters/> [Accessed September 2021]

⁷⁰ Defra (2019) *Statistics on English Coastal and Inland Bathing Waters Compliance with the 2006 Bathing Water Directive*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/870176/EMBARGOED_STATS_bathing_water_release-2019v2_access.pdf [Accessed September 2021]

⁷¹ Natural Resources Wales (2020) *Wales bathing water quality report 2019*. Available online at: <https://naturalresources.wales/evidence-and-data/research-and-reports/water-reports/2019-wales-bathing-water-quality-report/?lang=en> [Accessed September 2021]

⁷² Scottish Environment Protection Agency (SEPA) (undated) *Bathing Waters, Current classification*. Available online at <https://informatics.sepa.org.uk/BathingWaters/> [Accessed October 2021]



are at high risk living in the Severn district. Lower numbers of people are at high risk in the Dee and Solway Tweed river basin districts, with 3,000 people and 1,800 people respectively.⁷³

Figure C.10 shows the location of areas most at risk from flooding in the U UW operational area. Flood Zone 3 represents areas with a high probability of flooding, which could be flooded either from rivers or the sea if there were no flood defences. These areas could be affected by flooding from the sea that has a 0.5% (1 in 200) or greater chance of occurring each year, or flooding from rivers that has a 1% (1 in 100) or greater chance of occurring each year. Flood Zone 2 shows the additional extent of an extreme flood from rivers or the sea, with up to a 0.1% (1 in 1,000) chance of occurring each year.

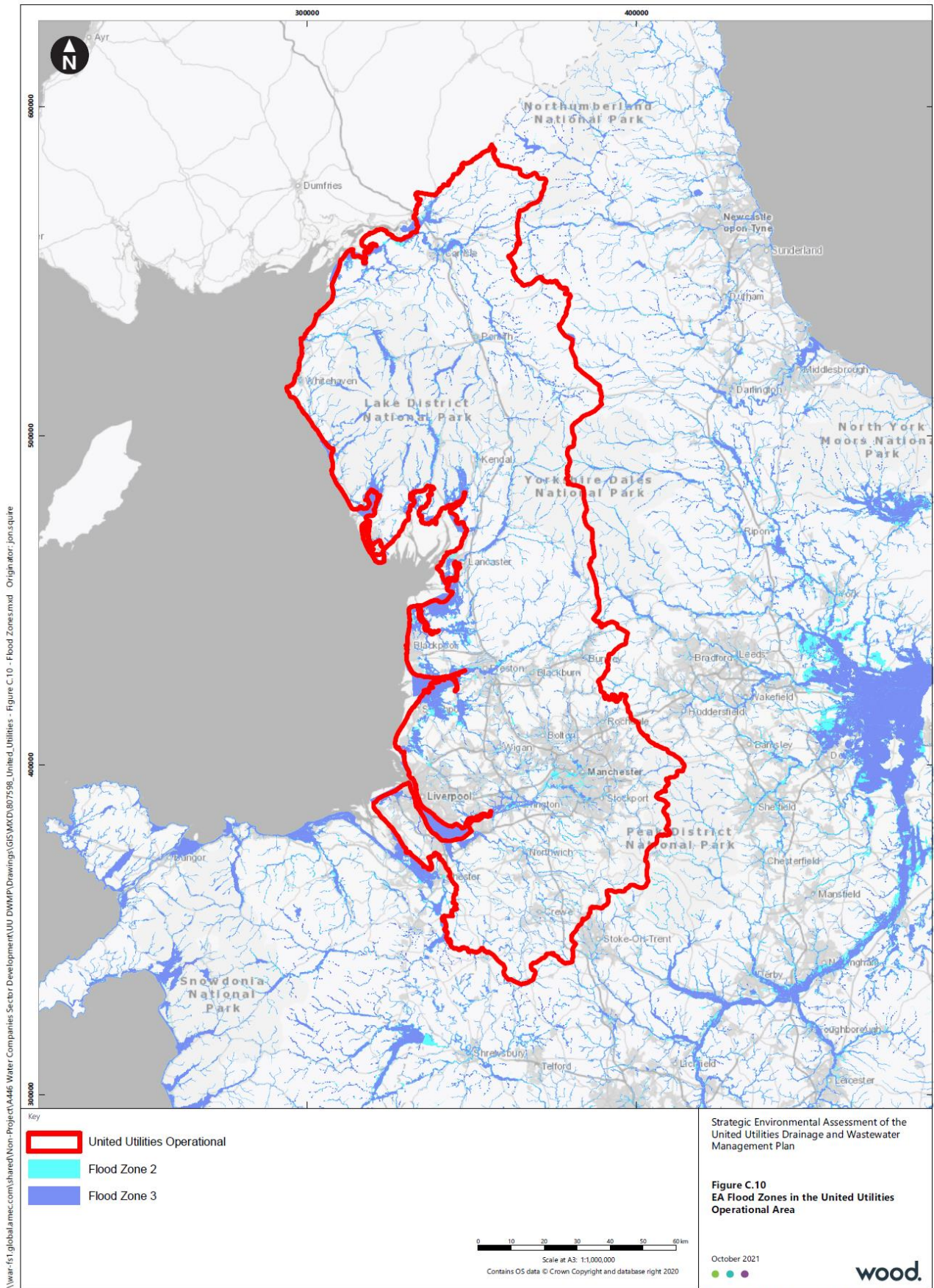
Sewer flooding can result from blockages within sewers and from the capacity of sewers being exceeded due to intense or prolonged rainfall. U UW's 2019/20 target for sewer flooding was exceeded at 79.8 index points against a target of <68.1. This was also higher than performance against the sewer flooding index in 2018/19 (61.7) and 2017/18 (70.0).⁷⁴ The target was not met, partly due to the target becoming more stringent in 2019/20, but also likely due to the unusually high rainfall across the year and significant storm events in the winter of 2019/20.

Additionally, U UW's infrastructure may be at risk of flooding and flood events could lead to disruption to water supply and pollution incidents. This occurred during the December 2015 storms, when the Keswick treatment works and several other large wastewater treatment works were heavily flooded resulting in severe impacts on operations.

⁷³ Environment Agency, Natural Resources Wales, SEPA (2016) *Flood Risk Management Plans (North West, Solway Tweed, Severn, Dee)* [available at: <https://www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021>].

⁷⁴ United Utilities Water Limited (2020) *United Utilities 2019/20 Annual Performance Report* Available online at: <https://www.unitedutilities.com/corporate/about-us/performance/annual-performance-reports-2015-20/> [Accessed September 2021]

Figure C.10 Areas at Risk of Flooding in the United Utilities Water Operational Area



Likely Evolution of the Baseline without the DWMP

Under the WFD, rivers in England, Wales and Scotland were required to have achieved 'good ecological status by 2015. Where this was not possible and subject to criteria set out in the Directive, the aim is to achieve good status by 2021 or 2027. Only 20 – 42% of water bodies in the relevant River Basin Districts have so far met this target; however, the quality of water in rivers and seas in the North West region has been gradually improving over recent years. With current targets and measures in place, this trend is expected to continue.

Pressure to meet demand for public water supply in the area will increase as the population grows, despite efforts to manage demand through water efficiency and leakage reduction. Water is restricted for licensing in much of the North West. The West Cumbria Thirlmere Transfer Project is being brought forward in response to the need to cease abstraction from Ennerdale Water. In the interim, UUW has committed to revoking some licences in West Cumbria as compensation for the continued abstraction at Ennerdale until 2022. Further sustainability reductions may be required over the period of the WRMP, although this is to be confirmed by the Environment Agency.

Priority water quality issues in the region include various pollution sources (including waste water, rural areas, diffuse and point source discharges), physical modifications and phosphate, which may put further pressure on water quality as well as habitats and species. With specific regard to Wales, SoNaRR highlights a need to work within whole catchments to manage nutrients, and maintain, enhance and restore floodplains and hydrological systems.

Climate change presents increased risk with respect to coastal flooding in the long term, while climate change combined with an increase in housing numbers or urban area presents an increased risk to fluvial and sewer flooding. The UK Climate Programme 2009 (UKCP09) projections for the North West for the medium emissions scenario central estimate (50% probability) that:

- Winter mean precipitation will increase by 16% by the 2080s. It is very unlikely to increase by less than 3% and is very unlikely to increase by more than 34%.
- Summer mean precipitation will reduce by 22% by the 2080s. It is very unlikely that summer mean precipitation will reduce by more than 43% and it is very unlikely that it will increase by more than 0%.

UKCP18⁷⁵ has updated the UKCP09 projections. It has found that climate change trends projected over UK land for the 21st century are broadly consistent with earlier projections (UKCP09) showing an increased chance of milder, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extremes.

SoNaRR highlights that climate change may affect groundwater recharge in Wales and that by 2025, it is likely that groundwater recharge will decrease, resulting in decreased dry weather river flows and a general lowering of groundwater levels. This may have impacts on base-flow to rivers and wetlands in dry periods and affect small domestic and agricultural water supplies.

Following regional flooding in 2015, the Environment Agency committed to investing in flood defence programmes covering the North West of England, including spending of £46 million towards a flood defence scheme along the River Irwell to better protect nearly 1,000 homes⁷⁶. The Government has further recognised

⁷⁵ UKCP18 website. *UK Climate projections (2019) Headline findings*. Available online: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp-headline-findings-v2.pdf> [Accessed September 2021].

⁷⁶ Gov.uk (2018) '£40m extra funding to boost regeneration and better protect thousands of homes against flooding' Available online at: <https://www.gov.uk/government/news/40m-extra-funding-to-better-protect-thousands-of-homes-against-flooding> [Accessed September 2021]

the importance of investing in flood risk and coastal management by committing £2.6 billion investment from 2015 to 2051 to fund 1,500 flood defences, with the aim to improve protection to 300,000 homes.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA, arising from the analysis of the water baseline are:

- the need to maintain and further improve the quality of the region's river, estuarine and coastal waters and in particular the biological quality of rivers, taking into account WFD/RBMP objectives;
- the need to maintain and further improve the quantity and quality of groundwater resources taking into account WFD/RBMP objectives;
- the need to ensure the continued risk of flooding is mitigated effectively;
- 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 water and groundwaters;
- the need to ensure sustainable abstraction to protect the water environment; and
- the need to ensure that people understand the value of water.

Air Quality

Baseline Characteristics

The emission of pollutants to air can pose a hazard to human health (e.g., respiratory illnesses and lung conditions) and can also have a negative impact on the environment (e.g., changes to ecosystems and damage to vegetation when present within the atmosphere in excess of certain concentrations). Such thresholds are set as objectives and include pollutants such as nitrogen dioxide (NO₂), sulphur dioxide (SO₂) volatile organic compounds (VOCs) and fine particles (known as 'particulates'). Air Quality Management Areas (AQMAs) are declared in specific locations where atmospheric concentrations of one or more pollutants are either close to or exceeding statutory objectives set out within the *Air Quality Strategy for England, Scotland, Wales and Northern Ireland*.⁷⁷

A total of 36 local authorities across the North West have declared AQMAs for exceedance of NO₂ (within each local authority there may be several AQMAs). One local authority has declared an AQMA for particulate matter. In Wales, AQMAs for NO₂ have been declared in twelve local authorities, predominantly across mid and south Wales, and there is a further particulate matter AQMA in Neath Port Talbot⁷⁸. In Scotland fourteen local authorities have declared AQMAs, either for NO₂ and PM₁₀ (either alone or in combination), including a number of local authorities with multiple AQMAs. Falkirk Council (one of the fourteen aforementioned local authorities with AQMAs for NO₂ and PM₁₀, has also declared one AQMA for SO₂⁷⁹.

In recent years, several key air pollutants have shown major decreases in atmospheric concentrations across the UK, while others have remained constant:

⁷⁷ Defra (2007) *Air Quality Strategy for England, Scotland, Wales and Northern Ireland* Available online: <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-2> [Accessed September 2021]

⁷⁸ Welsh Government (2021) *Air Quality Management Areas*. Available online: <https://airquality.gov.wales/laqm/air-quality-management-areas> [Accessed September 2021]

⁷⁹ Defra (2021) UK AIR Air Information Resource. *List of Local Authorities with AQMAs*. Available online at: <https://uk-air.defra.gov.uk/aqma/list?la=all&country=scotland&pollutant=all> [Accessed October 2021]

- Atmospheric concentrations of SO₂ decreased across the UK due to reductions in the use of coal, gas and oil and reductions in the sulphur content of fuels.
- While overall emissions of NO_x have decreased over the last 25 years, the monitored atmospheric concentrations of urban traffic sites did not show such a consistent decrease, potentially due to the quantity and type of traffic on the adjacent road.
- Atmospheric concentrations of particulate matter (PM₁₀ and PM_{2.5}) have steadily decreased since the early 1990s but have remained relatively constant since 2009.
- Carbon monoxide (CO) concentrations have reduced as a result of reductions in emissions from road transport, iron and steel production and the domestic sector.⁸⁰

Likely Evolution of the Baseline without the DWMP

With increasingly strong air quality legislation and de-industrialisation, coupled with technological improvements such as lower emission vehicles, levels of the majority of air pollutants are expected to continue to decline.

Pollutants associated with road transport such as nitrogen oxides and ozone will be harder to reduce particularly in hotspot areas of traffic congestion.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA, arising from the analysis of the air quality baseline are:

- the need to minimise emissions of pollutant gases and particulates and enhance air quality; and
- the need to reduce the need to travel and promote sustainable modes of transport.

Climatic Factors

Baseline Characteristics

The effects of climate change are potentially some of the most significant environmental problems facing this area. These effects could include increased variability in precipitation and drought patterns, increased sea levels and a higher risk of flooding.

Greenhouse gases (GHG) including carbon dioxide (CO₂) emitted from human actions are a major contributor to climate change. North West England emitted 11% of the UK's GHG emissions in 2019. The amount of CO₂ emitted in the North West of England between 2014 and 2019 is shown in **Table C.6** and highlights that emissions have reduced since 2014 by nearly 13.6% to 38.5 million tonnes (Mt) CO₂ in 2019, principally because of declines in emissions from the industry and commercial and domestic sectors. Overall, since 2005 emissions in the North West have dropped by 36% (which is comparable to the UK average of 35.8%).⁸¹ All local authorities in the North West region saw a decline in GHG emissions.

⁸⁰ Defra (2020) *Air Pollution in the UK 2019* Available online at: https://uk-air.defra.gov.uk/library/annualreport/assets/documents/annualreport/air_pollution_uk_2019_Compliance_Assessment_Summary_Issue1.pdf [Accessed September 2021].

⁸¹ Department for Business, Energy and Industrial Strategy (2021) *2005 to 2019 UK local and regional CO₂ emissions – data tables* Available online at: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019> [Accessed September 2021]

Table C.6 End User Estimates of Carbon Emissions (kt CO₂), North West England 2014-2019

End User	2014	2015	2016	2017	2018	2019
Industry	10,716.7	10,175.8	9,552.6	9,240.0	8,919.5	8,755.8
Commercial	5,329.9	4,601.5	3,941.9	4,057.5	3,789.6	3,482.2
Public Sector	1,944.4	1,992.5	1,787.6	1,525.8	1,563.0	1,529.2
Domestic	12,449.2	11,943.7	11,428.5	10,807.1	10,789.7	10,527.4
Transport	13,814.9	14,105.5	14,298.4	14,079.5	13,964.6	13,917.3
LULUCF	336.1	332.1	340.7	318.1	326.5	329.8
Total	44,591.2	43,151.1	41,349.6	40,028.0	39,352.8	38,541.6
Per capita Emissions (t)	6.3	6.0	5.7	5.5	5.4	5.3

Source: Department for Business, Energy and Industrial Strategy (2021)⁸²

Wales and Scotland also experienced a decline in emissions across the same period, with the amount of CO₂ emitted reducing by around 16.5% and 12.3% respectively, between 2014 and 2019. CO₂ emissions in 2019 were 23.8 MtCO₂ and 31.0MtCO₂ for Wales and Scotland respectively. In Wales, industrial emissions were the highest sector with 11MtCO₂, whilst in Scotland, domestic emissions were the highest sector in 2021 with 8.5 MtCO₂, with industrial emissions closely following with 8.1 MtCO₂. However, in both cases these sectors had shown marked reductions over the same period.⁸³

On a per capita basis, the North West emitted 5.3 tonnes (t) CO₂ per person in 2019. Across the UK as a whole, this averaged at 5.2 tCO₂ with figures ranging from 3.2 tCO₂ per person in London to 7.6 tCO₂ per person in Wales, the highest in the UK. This reflects the significant industrial base in Wales which resulted in a high contribution from industrial and commercial emissions. Per capita emissions in Scotland were 5.7 tCO₂ in 2019.

Increasing the amount of renewable energy generation is one response to the need to reduce CO₂ emissions, and the North West region has shown a steady year-on-year increase in renewable electricity generation from 2003 to 2020, with slight drops in 2010 and 2016 (compared to the previous year). The renewable electricity capacity in the region continued to rise in 2020. The most recent data from the Department for Business, Energy & Industrial Strategy (BEIS) shows that in 2020, the North West generated 11,606.3 GWh electricity from renewable sources, an increase of 514% compared to 2010 (primarily due to increases in wind capacity)⁸⁴. In 2020, the North West had a total renewable energy installed capacity of 3,515.2MWe, equivalent to 7.4% of the UK total (47,815.5MWe), while Wales had 7.5% (3,589.6 MWe) and Scotland had 24.7% (11,792.4MWe) of the UK's capacity.⁸⁵

⁸² Ibid

⁸³ Ibid

⁸⁴ BEIS (2021) *Regional Statistics 2003-2020: Generation*. Available online: <https://www.gov.uk/government/statistics/regional-renewable-statistics> [Accessed October 2021].

⁸⁵ BEIS (2020) *Regional Statistics 2003-2020: Installed Capacity*. Available online: <https://www.gov.uk/government/statistics/regional-renewable-statistics> [Accessed October 2021].



In 2019/20 UUW's GHG emissions were 159 ktCO₂e, a reduction of 73% since 2005/06. In 2020 UUW met its target of reducing its carbon footprint by 50% from a 2005/06 baseline. A major contributor to this has been the purchase of certified renewable electricity, with over 95 per cent of the electricity used having zero emissions. The company's renewable energy production in 2019/20 was 191 GWh, which represented an increase of 18 GWh on the previous year. This was predominantly from energy recovery, wind and solar photovoltaics.⁸⁶

Actions associated with infrastructure work such as building water treatment works, renewing pipes and infrastructure can also require large quantities of materials which contain embodied carbon as a result of transport and manufacturing processes.

Likely Evolution of the Baseline without the DWMP

UKCP18 provides the following predictions on changes in climate in the UK (based on a high emissions scenario). By 2070:

- winter temperature: a change in temperature of between 0.7 and 4.2°C;
- summer temperature: a change in temperature of between 0.9 and 5.4°C;
- winter precipitation: an increase of up to 35 per cent; and
- summer precipitation: 47 per cent drier to 2 per cent wetter.

Sea levels are also forecast to rise, although the highest increases are expected in the south rather than the north of the UK⁸⁷.

The changes in average temperatures and rainfall as a result of climate change are likely to cause hotter, drier summers which will potentially result in:

- Increased maximum summer temperatures that are likely to lead to increased thermal discomfort in buildings;
- Increased health problems in the summer, including heat related deaths and those linked to high air pollution (elevated summer temperatures cause health problems both directly and indirectly, via elevated levels of air pollutants);
- Increased summer water shortages as summer rainfall decreases;
- Growth in summer tourism; and
- Changes to the natural environment including impacts on habitats and species associated with changing temperatures and water availability (in both summer and winter).

Milder winters are expected to result in:

- A reduction in the number and severity of annual frosts and snowfall, caused by the likely increased temperatures during the winter months which could lead to longer growing seasons for suitable crops and grasslands;
- Less cold weather transport disruption;
- Reduced demand for winter heating;

⁸⁶ United Utilities (2020) *Operational performance 2019/20*. Available online: <http://unitedutilities.annualreport2020.com/strategic-report/our-performance-in-201920/operational-performance-201920.html> [Accessed August 2021]

⁸⁷ UKCP18 website. *UK Climate projections (2019) Headline findings*. Available online: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp-headline-findings-v2.pdf> [Accessed September 2021]

- Less cold weather related illnesses;
- Increased river and urban flooding, due to the increased incidence and severity of extreme rainfall events;
- Increased pressure on sewer systems with associated water quality impacts; and
- Increased localised flooding as a result of pressures on the sewerage/drainage network due to exceeded capacity.

Under the second UK Climate Change Risk Assessment evidence report, there are significant reductions projected in the availability of public water supplies by the 2050s and the 2080s under both a medium and high climate change scenario⁸⁸. Climate change is also identified as one of the potential key drivers associated with a significant and growing risk of severe drought.

The 2015 United Nations Climate Change Conference (COP21) negotiated the Paris Agreement, a global agreement to (*inter alia*) hold the increase in the global average temperature to well below 2 °C above pre-industrial levels and to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development.

The UK and the Welsh Government are committed to net zero emissions in 2050 and are required to set carbon budgets to set out a trajectory for emissions reductions to 2050. The Scottish Government has set a target date for net zero emissions of all greenhouse gases in Scotland for 2045.⁸⁹ For the UK, the sixth carbon budget has been set at a 78% reduction in emissions between 1990 and 2030. For Wales, the carbon budgets have been set for 37% lower than the baseline over 2021-25 and an average of 58% lower than the baseline for 2026-30.

There the potential for some conflict between increasing the level of treatment of waste water required to meet stricter environmental quality standards, the associated increase in energy used and the resultant carbon emissions (depending on the energy source) that result from the improved treatment processes. It is anticipated that this will be resolved through the move to low carbon and renewable energy sources and U UW's commitments to net zero⁹⁰.

Key Issues Relevant to the DWMP

The key sustainability issues relevant to the DWMP and the SEA arising from the analysis of the climatic factors baseline are:

- the need to reduce the need to travel and promote sustainable modes of transport;
- the need to reduce greenhouse gas emissions arising from implementation of the DWMP;
- the need to take into account, and where possible adapt to, the potential effects of climate change; and
- the need to increase environmental resilience to the effects of climate change.

⁸⁸ UK Climate Change Risk Assessment 2017 Evidence Report. Available online: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> [Accessed August 2021]

⁸⁹ Scottish Government (undated) *Climate Change* Available online at: <https://www.gov.scot/policies/climate-change/> [Accessed October 2021]

⁹⁰ <https://www.unitedutilities.com/corporate/responsibility/stakeholders/catchment-systems-thinking/beyond-water-series/our-journey-to-net-zero/>

Population and Human Health

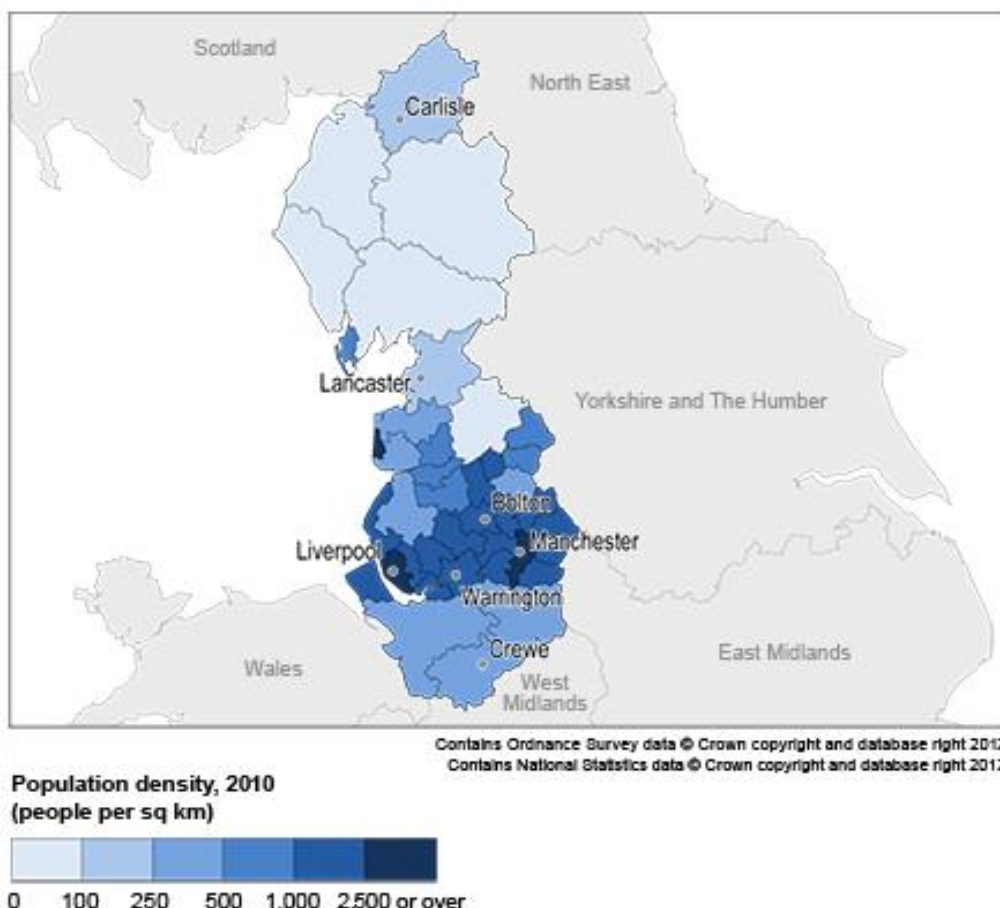
Baseline Characteristics

Demographics

As at the 2011 Census, the population of the North West was 7.1 million, an increase of 4% from 2001. In 2020, the region’s population had grown to an estimated population of 7,367,500⁹¹.

The majority of the region’s residents live in urban areas, with 2011 Census data suggesting that this equates to 89% of total residents. Population densities vary greatly. Across the North West the average population density was 500 people per square kilometre (sq km) at 2011; the most densely populated area was Manchester with 4,726 people per sq km, followed by Liverpool with 4,395 people per sq km. In contrast, the district of Eden in Cumbria had the lowest population density in England with 24 people per sq km. **Figure C.11** illustrates the population density across the region.

Figure C.11 Population Density in the North West



Source: Office for National Statistics (2012) Regional Profiles: Key Statistics - North West. Available from <https://webarchive.nationalarchives.gov.uk/20160129150331/http://www.ons.gov.uk/ons/rel/regional-trends/regional-trends/no--43--2011-edition/regional-profiles---summary---north-west.html> [Accessed September 2021]

⁹¹ Nomis (2021) Total Population. Available from <https://www.nomisweb.co.uk/reports/lmp/gor/2013265922/report.aspx> [Accessed September 2021]



The population of Wales stood at 3.1 million in 2011, with a population density of 150 people per sq km. 67% of the population lived in urban areas. The population of Scotland in 2011 stood at almost 5.3 million, with a population density of 68 people per sq km.

Economy

The North West region has a large and diverse economy and areas within the region are facing different challenges. The North West's share of total UK gross value added (GVA) has remained relatively stable over the period 2009 - 2019 (remaining between 9.8% - 9.5%) with a 9.5% share of total UK GVA in 2019. In absolute terms, the region's GVA grew by 36.3% over this period which is similar to the national average of 40.2%.⁹²

The economic performance of sub-regional areas does vary significantly. The growth of areas such as Liverpool and Manchester has been strong, and the general economic performance of other areas such as Cheshire and Lancashire has also been positive. However, there does continue to be a degree of variation in economic performance within these sub-regions. Cumbria remains the poorest performing sub-region, particularly in areas such as Carlisle and Barrow-in-Furness which have been affected by the loss of some of the manufacturing base and agriculture.

The proportion of economically active people during the period June 2021 – August 2021 (seasonally adjusted) was 76.8% in the North West region, 77.4% in Wales and 77.8 in Scotland with all three being lower than for the UK as a whole (78.9%). Economically active in this context is defined as those persons of working age who are employed or looking to be employed. In the same period, the unemployment rates for the North West (4.1%) Wales (4.0%) and Scotland (4.4%) were all lower than the UK average (4.5%).⁹³ It should be noted that unemployment rates have been recently affected by the global COVID-19 pandemic and whilst they had shown long term decline since 2012, there were increases between July 2020 and January 2021, however, they have again begun to reduce throughout 2021.

The average gross weekly earnings for full-time employees in the North West in 2020 was £604/week (compared to £678/week for England), whilst the Wales average was £616/week and the Scotland average was slightly higher at £621/week. All were below the UK average of £667/week.⁹⁴

The largest proportion of jobs in the North West, Wales and Scotland are within the wholesale and retail trade and human health and social work sectors, similar to UK trends. As at June 2021, a total of 24,000 jobs in the North West (0.6%) are within the water supply, sewerage and waste management sector, similar to the proportion of jobs in this sector in Wales (0.8%), Scotland (0.7%) and for the UK as a whole (0.6%).⁹⁵

UW currently employs over 5,000 people and plays a major role in the North West's economy. In addition, 10,000 people are engaged through the UW supply chain, meaning that the company generates (either directly or indirectly) one in every 150 jobs in the region⁹⁶. UW also invested £2.15 million in the

⁹² ONS (2021) Regional gross value added (balanced) per head and income components. Available from <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalregionalgrossvalueaddedbalancedperheadandincomecomponents> [Accessed September 2021]

⁹³ ONS (2021) EARN05: Gross weekly earnings of full-time employees by region. Available from <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/grossweeklyearningsoffulltimeemployeesbyregionearn05> [Accessed October 2021]

⁹⁴ Nomis (2021) Earnings by Place of Residence. Available from <https://www.nomisweb.co.uk/reports/lmp/gor/2013265922/report.aspx> [Accessed September 2021]

⁹⁵ Nomis (2021) Workforce Jobs by Industry Section. Available from <https://www.nomisweb.co.uk/reports/lmp/gor/2013265922/report.aspx> [Accessed September 2021]

⁹⁶ United Utilities (2021) Employees. Available from <https://www.unitedutilities.com/corporate/responsibility/employees/#:~:text=In%20addition%2C%2010%2C000%20people%20are,is%20worth%20getting%20hurt%20for.> [Accessed September 2021]

local community in 2020/2021. This figure was slightly lower than U UW target, however, this was mainly as a result of much lower community activity as a result of the impact of COVID-19.⁹⁷

Education and Skills

The levels of qualifications in the North West region are reasonably representative of the UK (see **Table C.7**). In the period January to December 2020, a slightly higher than average percentage of people had qualifications equivalent to GCSE Grades A-C or above, although the proportion of people with degree level qualifications was slightly below the national average, and those with no qualifications was above.

Table C.7 Level of Qualifications

Qualifications (economically active population of working age)	North West	UK
Degree or equivalent and above (NVQ 4 equivalent and above)	38.7%	43%
Higher education below degree level (NVQ3 equivalent)	17.9%	16.9%
Trade Apprenticeships	3.3%	2.8%
GCSE A level or equivalent (NVQ2 equivalent)	17%	15.5%
GCSE grades A-C or equivalent (NVQ1 equivalent)	10.7%	9.7%
Other qualifications	4.9%	5.6%
No qualifications	7.5%	6.6%

Source: Nomis (2021) Qualifications. Available from <https://www.nomisweb.co.uk/reports/lmp/gor/2013265922/report.aspx> [Accessed September 2021]

Housing

In 2020, there were an estimated 3.3 million dwellings in the North West, which represents 13.5% of England’s housing stock. An estimated 66% of the housing stock in the North West was owner (or shared ownership) occupied (very similar to the overall English proportion, 63.8%), 14.8% was rented from a housing association, 2.5% was rented from a local authority, and 16.7% was privately rented.⁹⁸

Transport

The North West is easily accessible from the north and the south via the M6 and the West Coast mainline railway between London and Edinburgh; from east to west, the M62 connects Liverpool to Leeds. There are two major international airports in the region; Manchester Airport and Liverpool John Lennon Airport. The North West also has a major seaport, Liverpool.

The North West accounted for 11.4% of Great Britain’s motor vehicle miles in 2019 with 40.5 billion million miles driven in the region. This figure was reduced in 2020, (32.3 billion miles) due to the impacts of COVID-19 on travel. Prior to 2020 vehicle miles driven had seen a steady increase since 2010; prior to this, there had been a notable drop in annual motor vehicle miles, likely to be associated with the effects of COVID-19

⁹⁷ United Utilities (2021) Community Investment. Available from <https://www.unitedutilities.com/corporate/responsibility/communities/community-investment/> [Accessed September 2021]

⁹⁸ Ministry of Housing, Communities and Local Government (2021) Dwelling Stock. Available from <https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants> [Accessed September 2021]



on travel.⁹⁹ In 2018/2019, the average resident of the North West made around 979 trips within England each year, slightly above the average for England (969 trips).¹⁰⁰ Over the 2018/2019 period, the average distance travelled per person per year in the North West by all modes of transport was 6,007 miles, lower than the England average of 6,515 miles. In the North West, over 4,794 miles (79.8%) were undertaken as a car/van driver or passenger, higher than the England average of 77.1%.¹⁰¹ Both the average number of trips and distance travelled by persons in the North West and in England reduced substantially in 2020 due to the effects of the COVID-19 pandemic on travel.

Human Health

The health of people residing in the North West region is relatively poor compared to other regions in England and the national average. According to the 2011 Census, 20.3% of the North West's population classified themselves as having an activity limiting health problem or disability, 2.7 percentage points above the average for England of 17.6%. The only region in England with a greater proportion of people with an activity limiting problem is the North East (21.7%). Wales had a higher proportion than both the English average and the North West, with 22.7% of the Welsh population experiencing an activity limiting health problem or disability. According to the Scottish 2011 census, approximately 19.6% of people had a long term health condition or disability that limited their day-to-day activities.

Since 2001, both the North West and Wales had a small decrease in the proportion of their populations with a disability. However, of the ten English local authorities with the highest prevalence of activity limiting health problems or disabilities, four of these are located in the North West.¹⁰²

Life expectancy is used as a broad measure of the health of an area and where a person is born can influence how long they will live. In the North West, the average life expectancy at birth for the period 2012-14 was 78.1 years for men and 81.9 years for women, compared to 79.5 and 83.2 years respectively for all of England. The region has one of the lowest life expectancies across all the English regions and one of the highest proportions of life spent with a persistent illness or disability. Compared with the rest of England, men in the North West can expect to live 1.4 years less on average whilst women can expect to live 1.3 years less.¹⁰³

Deprivation

The English Index of Deprivation measures relative levels of deprivation in small areas of England called Lower Layer Super Output Areas (LSOA). The Indices of Deprivation is based on seven different domains of deprivation:

- Income Deprivation;
- Employment Deprivation;

⁹⁹ Department for Transport (2021) Motor vehicle traffic (vehicle miles) by local authority in Great Britain, annual from 1993. Available from <https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra> [Accessed September 2021]

¹⁰⁰ Department for Transport (2020) Average number of trips (trip rates) by main mode, region and Rural-Urban Classification: England. Available from <https://www.gov.uk/government/statistical-data-sets/nts99-travel-by-region-and-area-type-of-residence> [Accessed September 2021]

¹⁰¹ Department for Transport (2021) Average distance travelled by mode, region and Rural-Urban Classification: England. Available from <https://www.gov.uk/government/statistical-data-sets/nts99-travel-by-region-and-area-type-of-residence> [Accessed September 2021]

¹⁰² Office for National Statistics (2013) *Disability in England and Wales: 2011 and Comparison with 2001* [available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/disability/articles/disabilityinenglandandwales/2013-01-30>] [Accessed September 2021]

¹⁰³ Office for National Statistics (2016) *Disability-Free Life Expectancy (DFLE) and Life Expectancy (LE) at birth by Region, England* [available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/datasets/disabilityfreelifeexpectancydfleandlifeexpectancyatbirthbyregionengland>] [Accessed September 2021]

- Education, Skills and Training Deprivation;
- Health Deprivation and Disability;
- Crime;
- Barriers to Housing and Services; and
- Living Environment Deprivation.

The 2019 indices show that there are some significant pockets of deprivation in all of the counties and districts in the region, with particularly large concentrations in and around the urban conurbations of Knowsley, Liverpool, Manchester and Blackpool.

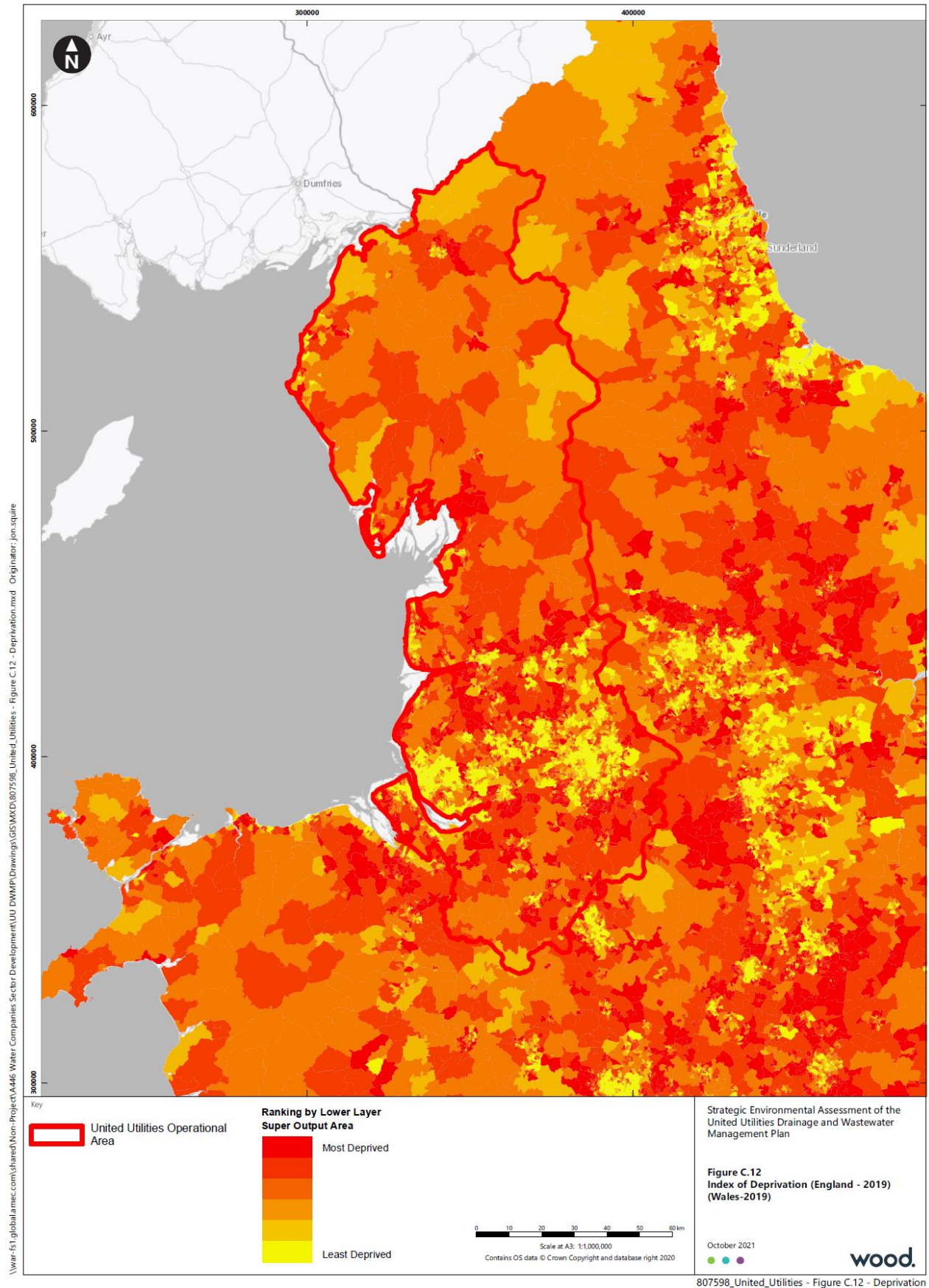
Levels of deprivation, particularly income deprivation, affect the ability of customers to pay for water and may also impact on total water usage. UUW invests in programmes that support communities and those struggling to pay bills, and has various schemes to give financial support and reduce debts.¹⁰⁴ In 2020/2021, UUW invested £2.15 million in local communities and contributed an additional £2.7 million from its Trust Fund to help those struggling to pay their bills, with a further £15 million being made available to help customers reduce their water bill to an affordable amount through the extension of UUW's social tariff.¹⁰⁵

Figure C.12 presents the index of deprivation for the LSOA for the UUW operational area.

¹⁰⁴ United Utilities (2021) *Value for Money*. Available from <https://www.unitedutilities.com/corporate/responsibility/customers/value-for-money/> [Accessed September 2021]

¹⁰⁵ United Utilities (2021) Community Investment. Available from <https://www.unitedutilities.com/corporate/responsibility/communities/community-investment/> [Accessed September 2021]

Figure C.12 Index of Deprivation for United Utilities Water Operational Area and North Wales



Recreation and Tourism

The North West offers a variety of opportunities for recreation and tourism, from the cultural offerings of the major cities to recreation in the region's National Parks and AONBs. Tourism also generates value for the region's economy. In 2019, 14.1 million UK domestic overnight trips were made to the North West, amounting to spending of just over £2.9 billion¹⁰⁶.

UW contributes to the recreational and tourism assets of the region through its ownership and management of land and water bodies, and through the impact of its activities on the wider natural environment. The company owns over 56,000ha of land, the majority of which is accessible to the public for recreational use. Specifically, there are opportunities for angling, water sports activities, walking and cycling trails as well as educational centres on nature reserves, reservoirs, and other land owned by the company. The Environment Agency has prepared a strategy¹⁰⁷ for water-based recreation in the North West. This report identifies priorities and initiatives which will help to address gaps in information or activity provision in the North West.

UW's water management has an impact on river and bathing water quality and thus can bear a direct influence on the tourist industry in the North West. With specific regard to water resources, large seasonal fluxes in tourist numbers create additional demand on water resources in summer months when demand is already at its highest.

Likely Evolution of the Baseline without the DWMP

The population of the North West region are likely to continue to change, particularly with an increasing ageing population. The 2018-based sub-national population projections provide an indication of future population levels if current trends continue. The projections indicate that over the period 2018 to 2028, the population of the North West is expected to rise by 289,138 to reach 7,581,231 people. This equates to a 4.0% population increase across the 10-year period. Longer term, the population of the North West is expected to rise further to 7,912,587 by 2043¹⁰⁸.

If recently observed trends continue, the number of households in the region is expected to increase by 5.7% between 2018 and 2028 to 3,297,000 households which is lower than the national average increase (7.1%)¹⁰⁹.

The population of Wales is projected to increase by 2.7% to 3.22 million by 2028, and by 3.7% to 3.26 million by 2043¹¹⁰. The total number of households in Wales is projected to be around 1.42 million by 2028 (an increase of 4.4% compared to 2018) and to 1.49 million by 2043¹¹¹.

¹⁰⁶ Kantar (2020) The GB Tourist 2019 Annual Report. Available from <https://www.visitbritain.org/great-britain-tourism-survey-latest-monthly-overnight-data> [Accessed September 2021]

¹⁰⁷ Environment Agency (2010) Blue Horizons 2010-2015.

¹⁰⁸ Office for National Statistics (2020) Population projections for regions: Table 1 Available online at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/regionsinenglandtable1> [Accessed September 2021]

¹⁰⁹ Office for National Statistics (2020) Household projections for England: 2018-based. Available from <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/householdprojectionsforengland/2018based> [Accessed September 2021]

¹¹⁰ Welsh Government (2019) National population projections: 2018-based. Available from <https://gov.wales/national-population-projections-2018-based#:~:text=The%20population%20of%20Wales%20is,536%2C300%20between%202018%20and%202028.> [Accessed September 2021]

¹¹¹ Welsh Government (2020) Subnational household projections (local authority): 2018 to 2043. Available from <https://gov.wales/subnational-household-projections-2018-based#:~:text=the%20total%20number%20of%20households,local%20authorities%2C%20other%20than%20Ceredigion&text=the%20number%20of%20households%20in%20Ceredigion%20is%20projected%20to%20decrease%20by%201.6%25.>

In Scotland, by mid 2028 the population is projected to increase by 1.8% to 5.54 million and by mid 2043 the population is projected to grow by 2.5% to 5.57 million (compared to 2018)¹¹². The total number of households in Scotland is projected to increase from 2.48 million (in 2018) to 2.60 million in 2028 and by 10% to 2.71 million by 2043¹¹³.

An increase in population and households is likely to place additional pressures on water resources and drainage and wastewater infrastructure.

Future economic activity and growth is more uncertain given the ongoing impacts of the COVID-19 pandemic, although it is anticipated that growth will return in the longer term. In this context, whilst unemployment in the North West has fallen since 2012, it has recently increased, similar to national trends and those experienced in Wales and Scotland.

There is likely to be an increase in tourist numbers in the region and popularity of water sports and other water based recreational activities which may place seasonal pressure on water resources and drainage and wastewater infrastructure.

Department for Transport (DfT) forecasts¹¹⁴ indicate that vehicle miles travelled in the North West could increase by circa 40% by 2050 (compared to a 2015 baseline). This increase is likely to lead to impacts including increased congestion, driver delay and accidents. However, emissions to air are expected to decline.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA arising from the analysis of the population and human health baseline are:

- the need to ensure drainage and wastewater services remain affordable, especially for deprived or vulnerable communities;
- the need to ensure water quantity and quality is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture;
- the need to ensure a balance between the built and natural environment that will help to provide opportunities for local residents and tourists for access to green infrastructure and the natural and historic environment, as well as protecting and enhancing recreational resources;
- the need to ensure that the DWMP measures do not adversely affect the health and well-being of any member of the community;
- the need to ensure that the DWMP measures do not have an adverse economic impact and that benefits are maximised; and
- the need to ensure that 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 wellbeing and the economy.

¹¹² National Records of Scotland (2019) *Projected Population of Scotland 2018-based*. Available online at: <https://www.nrscotland.gov.uk/files//statistics/population-projections/2018-based/pop-proj-2018-scot-nat-pub.pdf> [Accessed October 2021]

¹¹³ National Records of Scotland (2020) *Household Projections for Scotland (2018-based)*. Available online at: <https://www.nrscotland.gov.uk/files//statistics/household-projections/18/household-proj-18-report.pdf> [Accessed October 2021]

¹¹⁴ DfT (2018) *Road Traffic Forecasts 2018*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/873929/road-traffic-forecasts-2018-document.pdf [Accessed September 2021]

Material Assets and Resource Use

Baseline Characteristics

Water Demand

UW currently supplies around 7.3 million people with water and distributes approximately 1,750 million litres of water every day to meet customer demand in the North West.¹¹⁵ In 2019/20, the UW regional average household per capita consumption was 141 litres/person/day which was a small decrease (2%) from the previous year's figure of 144 l/hd/d.¹¹⁶

Consumption in the UW area is slightly lower than the average for England and Wales of 142 l/hd/d but has largely reflected the average in the last three years.¹¹⁷ Within the WRMP 2019 UW project household consumption to fall to 110 litres/person/day by 2039/40.

The key demand statistics for UW are set out for each WRZ in **Table C.8**. Resource demand is heavily weighted to the Integrated Resource Zone, which is unsurprising given that it is by far the largest area of the four WRZs in the UW supply area and contains the North West's main urban centres.

Table C.8 Key WRZ Data for United Utilities Water 2019/20

	Carlisle Resource Zone	Integrated Resource Zone	North Eden Resource Zone	West Cumbria Resource Zone	Regional Total
Water available for use (own water sources) (MI/d)	35	1,905	9	57	2,005
Total Population (000's)	110	7,023	14	148	7,295
Number of metered households (000's)	19	1,286	2	19	1,327
Water consumption by households (MI/d)	15	874	2	20	910
Leakage (MI/d)	6	419	4	17	446
Average per capita use (l/hd/d)	142	141	140	144	141

Source: Annual Water Resources Review April 2019–March 2020¹¹⁸

Leakage

Leakage levels are affected by a number of factors including the length, age and condition of the water mains network as well as weather conditions. Between 2018/19 and 2019/20, overall leakage in the UW

¹¹⁵ United Utilities (2019) *United Utilities Final Water Resources Management Plan 2019*. Available online: https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/wrmp-2019---2045/final-water-resources-management-plan-2019.pdf [Accessed September 2021]

¹¹⁶ United Utilities (202) *Annual Water Resources Review April 2019 – March 2020*. Available online: <https://www.unitedutilities.com/globalassets/documents/pdf/annual-review-of-water-resources-management-plan-2019-20.pdf> [Accessed September 2021]

¹¹⁷ Discover Water (2020) *The Amount We Use*. Available online: <https://discoverwater.co.uk/amount-we-use> [Accessed September 2021]

¹¹⁸ United Utilities (2020) *Annual Water Resources Review April 2019 – March 2020*. Available online: <https://www.unitedutilities.com/globalassets/documents/pdf/annual-review-of-water-resources-management-plan-2019-20.pdf> [Accessed September 2021]

operational area reduced by 9.9MI/d to 446 MI/d. This was below the target of 463 MI/d. However, leakage varies between the WRZs reflecting the length of the network, age and condition of pipes, and the volume of water supplied through the network (see **Table C.9**). In this regard, there was a slight increase in leakage in all WRZs except for the Integrated Resource Zone compared to the previous year. These resource zones are relatively smaller, with fewer properties, and the water balance across such areas is harder to reconcile.¹¹⁹

Table C.9 United Utilities Water Leakage Rates by WRZ

	Carlisle Resource Zone	Integrated Resource Zone	North Eden Resource Zone	West Cumbria Resource Zone	Regional Total
Total leakage 2018/19 (MI/d)	5.2	431.7	3.0	16.2	456.0
Total leakage 2019/20 (MI/d)	5.5	419.3	3.8	17.4	446.1

Source: Annual Water Resources Review April 2019–March 2020¹²⁰

Water Efficiency

In 2019/20, U UW saved an estimated 4.06 MI/d through water efficiency measures, exceeding Ofwat’s target of 2.95 MI/d. **Table C.10** below summarises U UW’s water efficiency programme in 2019/20.

Table C.10 Summary of United Utilities Water’s Water Efficiency Programme 2019/20

Water Efficiency Activity	Number	Estimated Water Saving (MI/d)
Cistern devices distributed to customers	26,682	0.22
Water butts distributed to customers	3,566	0.01
Water Efficiency Education Programme, pupils visited	9,913	1.20
Crystal packs / water sticks distributed to customers	12,179	0.01
Retrofit devices distributed to customers	51,976	1.27
Base Service Water Efficiency Programme – Total		2.71
Free meter options	25,817	0.87
West Cumbria Sustainable Level of Water Efficiency Programme	25,682	0.40
West Cumbria education programme	1,926	0.08
TOTAL SAVING		4.06

Source: Annual Water Resources Review April 2019–March 2020¹²¹

¹¹⁹ United Utilities (2020) *Annual Water Resources Review April 2019 – March 2020*. Available online: <https://www.unitedutilities.com/globalassets/documents/pdf/annual-review-of-water-resources-management-plan-2019-20.pdf> [Accessed September 2021]

¹²⁰ Ibid.

¹²¹ Ibid.



Water metering can help improve water efficiency within the home as households pay for the water that they use and as a result typically use less. Since 2001, U UW’s customers have been entitled to trial water meters free of charge. In 2019/20, 25,817 households opted for a free meter although the number of requests per year varies due to a range of factors. The number of free meter installations is generally expected to continue to decline in future within the forecasts; as the metering increases, the number of unmetered customers who still stand to benefit most from a free meter reduces.¹²²

Energy Use

Table C.11 provides a breakdown of total energy use in 2019 for the region for industry and commercial uses, domestic and road transport. It shows that for the North West, energy use by sector is broadly in line with the UK average, while for Wales and Scotland, the proportion of energy use in the industrial and commercial sector is notably higher than the rest of the UK.

Table C.11 Breakdown of Energy Consumption in North West England and Comparison with UK, 2019

Sector	North West Proportion of Total Regional Energy Use (%)	Wales Proportion of Total Regional Energy Use (%)	Scotland Proportion of Total Regional Energy Use (%)	UK Proportional Energy Use (%)
Domestic	32.6	27.6	30.4	32.8
Transport	30.1	25.2	26.1	30.5
Industrial, Commercial and other	37.3	47.2	43.5	36.7

Source: BEIS¹²³

Energy consumption by source in the North West is fairly representative of national trends, with most energy coming from petroleum (36.6%) and natural gas (37.9%)¹²⁴. North West generated 11,606.3 GWh electricity from renewable sources, an increase of 514% compared to 2010. In 2020, in Wales, 8,790.7GWh of electricity was generated from renewable sources, whilst in Scotland 32,031.2GWh was generated from renewable sources.¹²⁵

Total energy consumption in Wales over the period 2005 to 2019 reduced from 109,883.7 GWh to 92,803.9 GWh, a decrease of 15.5%. Whilst in Scotland, over the same period reduced from 173,091.6 GWh to 145,379.7 GWh, a reduction of 16%¹²⁶. Petroleum (primarily associated with road transport) and natural gas are the most dominant energy sources in Wales and Scotland, although manufactured fuels also make a notable contribution to the energy mix in Wales.¹²⁷

In 2020/21, U UW’s electricity consumption was 951 GWh. Over the same period 2020/21 U UW generated the equivalent of 205 GWh of renewable electricity, an increase of 14 GWh on 2019/20, of which 37.2 GWh

¹²² Ibid.

¹²³ BEIS (2021) *Total final energy consumption at regional and local authority level: 2005 to 2019*. Available online: <https://www.gov.uk/government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2019> [Accessed September 2021]

¹²⁴ Ibid.

¹²⁵ BEIS (2021) *Regional Statistics 2003-2020: Generation*. Available online: <https://www.gov.uk/government/statistics/regional-renewable-statistics> [Accessed October 2021]

¹²⁶ BEIS (2021) *Total final energy consumption at regional and local authority level: 2005 to 2019*. Available online: <https://www.gov.uk/government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2019> [Accessed October 2021]

¹²⁷ Ibid



was exported to the grid. U UW plans to significantly increase renewables generation over the next few years.
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Material use and waste generation

In 2019/20, around 3.5 million tonnes of waste was collected by local authorities in the North West. As highlighted in **Table C.12**, annual household waste collected by local authorities in the region has reduced overall between 2015/16 and 2019/20 tonnes. Non-household waste arisings have reduced and recycling has increased.

Table C.12 Local Authority Collected Waste Generation (in thousand tonnes) in the North West from 2015/16 to 2019/20

Household waste from:	2015-16	2016-17	2017-18	2018-19	2019-20
Regular household collection	1,296	1,310	1,301	1,287	1,296
Other household sources	169	164	165	158	165
Civic amenity sites	263	293	297	289	292
Household recycling	1,476	1,498	1,425	1,436	1,471
Total household	3,204	3,265	3,188	3,170	3,224
Non household sources (excl. recycling)	179	183	155	128	125
Non household recycling	140	123	132	150	154
Total LA collected waste	3,523	3,571	3,475	3,448	3,504

Source: DEFRA¹²⁹

Recycling rates across the region have remained level in the last five years (45-46%) but have risen significantly from 31% in 2006/07, and are higher than the national average of 42.8% in 2019/20. Whilst the volume of local authority collected waste sent to landfill has fallen from 66% to 9.2% over the same period (see **Table C.13**), although volumes of waste sent to landfill remain slightly higher than the national average (8.5%).

Table C.13 Management of Local Authority Collected Waste in the North West from 2015/16 to 2019/20

Method	2015-16	2016-17	2017-18	2018-19	2019-20
Landfill	846	865	673	441	326
(percentage)	24.1%	24.3%	19.4%	12.6%	9.2%

¹²⁸ United Utilities Group PLC (2020) Annual Report and Financial Statements for the year ended 31 March, 2020. Available online: <https://www.unitedutilities.com/corporate/investors/results-and-presentations/annual-reports/> [Accessed September 2021].

¹²⁹ Defra (2020) ENV18 - Local authority collected waste: annual results tables. Available online: <https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables> (Accessed September 2021)



Method	2015-16	2016-17	2017-18	2018-19	2019-20
Incineration with EfW	860	859	1,033	1,283	1,427
(percentage)	24.5%	24.1%	29.7%	36.8%	40.2%
Incineration without EfW	34	104	117	55	55
(percentage)	1.0%	2.9%	3.4%	1.6%	1.5%
Recycled-composted	1,617	1,622	1,557	1,586	1,626
(percentage)	46.0%	45.6%	44.8%	45.5%	45.8%
Other	159.90	110	99	124	119
(percentage)	4.5%	3.1%	2.8%	3.5%	3.4%
Total	3,517	3,560	3,477	3,488	3,553

Source: DEFRA¹³⁰

In 2020/21 U UW operations produced 527,200 tonnes of waste. U UW diverted 97% of waste produced for beneficial reuse. Some 349,310 tonnes comprised of wastewater sludge which was all diverted to beneficial use.¹³¹

Likely Evolution of the Baseline without the DWMP

U UW has more than halved leakage over the last 25 years and the company met its performance commitment for leakage for 2019/20, which was to maintain leakage below the target of 462.7 Ml/d.

Across the supply area as a whole, U UW forecast that water demand will generally reduce, despite the forecast growth in population and number of houses to be supplied with water. This is primarily due to the expected effects of:

- reduced demand from businesses and industry (due to becoming less water intensive);
- households becoming more water efficient;
- water efficiency promotion;
- pipe leak detection and repair; and
- provision of water meters to customers free of charge.

Notwithstanding the above, U UW’s current 2019 WRMP identifies that there would be a supply-demand deficit in the West Cumbria Resource Zone over the lifetime of the plan due to the need to cease abstraction from Ennerdale Water. The Thirlmere Transfer scheme was selected to meet this shortfall by using some of the spare water available in the neighbouring water resource zone (the former Integrated Resource Zone). The WRMP also sets out that U UW will continue to:

- operate the most economically sustainable level of leakage;

¹³⁰ Ibid.

¹³¹ United Utilities (2021) Resource Efficiency. Available online at: <https://www.unitedutilities.com/corporate/responsibility/environment/resource-efficiency/> [Accessed September 2021]



- encourage customers to take up a Free Meter Option; and
- be leaders in the area of water efficiency.

Installed renewable energy capacity is expected to continue to increase across North West England. In this wider context, U UW plans to significantly increase its renewable generation, and be a net zero carbon company by 2030¹³².

Future waste arisings in North West England, Wales and Scotland are likely to remain relatively stable, as they have done for recent years. There may be a future decoupling between economic growth and waste growth due to regulatory and economic measures and cultural factors, and the likely further decline in the industrial/manufacturing sector in this region. U UW met its target to divert 95% of waste to beneficial use by 2020.

Key Issues Relevant to the DWMP

The key sustainability issues relevant to the DWMP and the SEA, arising from the analysis of the material assets and resource use baseline are:

- the need to promote water efficiency;
- the need to maintain the balance between capacity, use and constraints for water;
- the need to reduce energy consumption;
- the need to ensure the sustainable and efficient use of resources such as construction materials; and
- the need to minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.

Cultural Heritage

Baseline Characteristics

The cultural and historic heritage of the region is largely dominated by its contribution towards the UK's industrial history, largely due to its wealth of natural resources and good connections via sea and inland waters to other areas of the UK and other countries. Appreciation of the North West's industrial heritage is marked through the conservation of buildings dating from the Industrial Revolution in the cities of Manchester, Salford and Liverpool.

Conversely, the majority of the region's ancient historical and archaeological heritage occurs in the more rural areas, which contain important sites including St Bees Heritage Coastline and those designated as part of the Frontiers of the Roman Empire UNESCO World Heritage Site (Hadrian's Wall). The heritage and cultural value of the region's diverse range of landscapes are also deemed of importance, with three National Parks or parts of National Parks being located within the region.

Figure C.13 highlights the key cultural heritage designations within and around the U UW operational area. This includes:

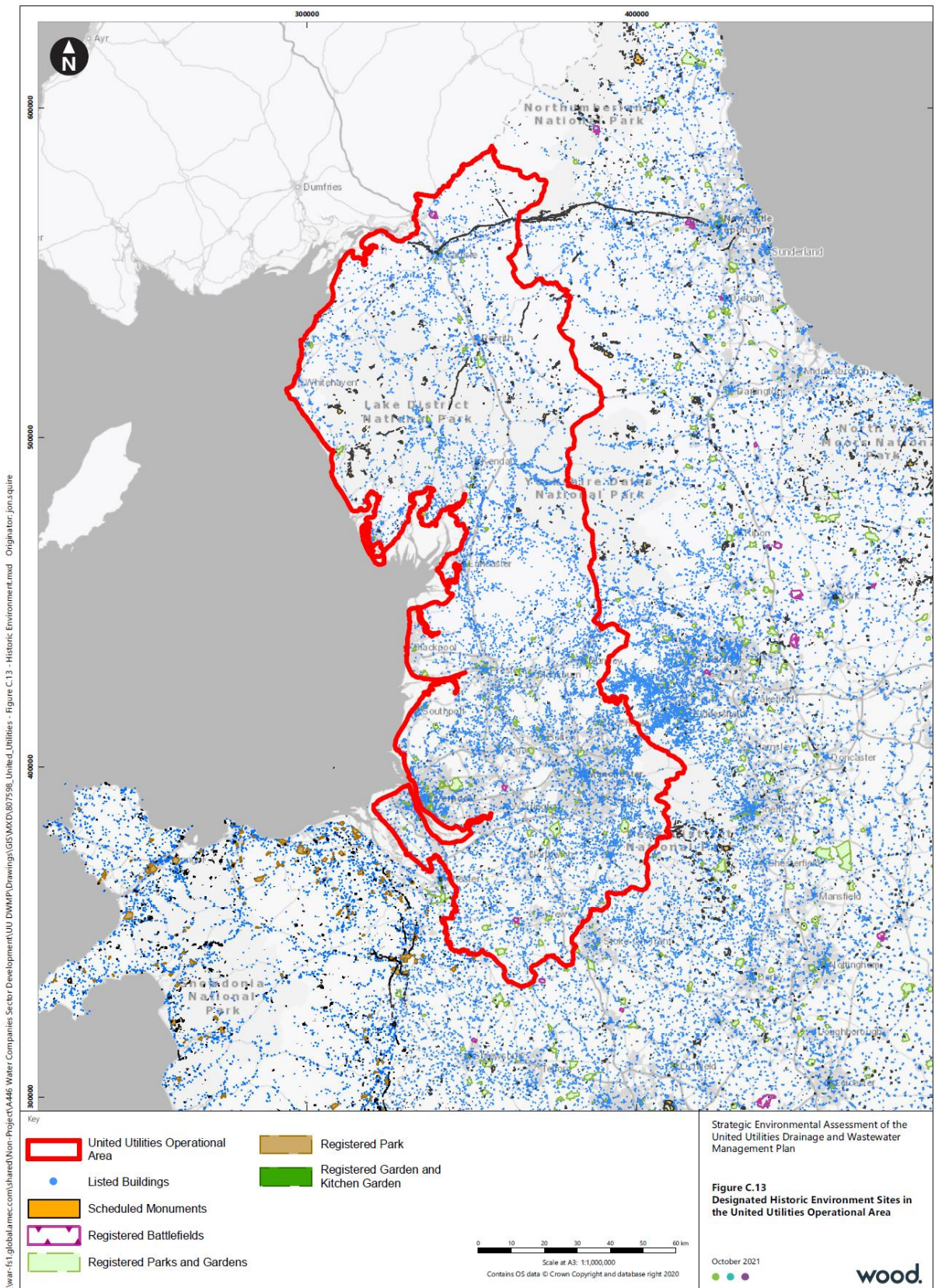
- 3 World Heritage Sites;

¹³² United Utilities (2020) United Utilities plans for Net Zero Carbon by 2030 Available online at: <https://www.unitedutilities.com/corporate/newsroom/latest-news/united-utilities-plans-for-net-zero-carbon-by-2030/> [Accessed September 2021]

- 1,325 scheduled monuments;
- 434 Grade I listed buildings;
- 1,483 Grade II* listed buildings;
- 23,906 Grade II listed buildings;
- 136 registered parks and gardens;
- 4 registered battlefields; and
- 876 conservation areas.

The cultural heritage of the North West is recognised internationally through the designation of three UNESCO World Heritage Sites; Hadrian's Wall, The Lake District National Park, and, as of 2019, the Jodrell Bank Observatory. The North East Wales area is also particularly noted for its Iron Age hill forts, particularly along the Clwydian Range, whilst South West Scotland features a number of castles, abbeys and standing stones.

Figure C.13 Designated Historic Environment Sites in the United Utilities Water Operational Area and North Wales



807598_United_Utilities - Figure C.13 - Historic Environment

The 2020 Heritage at Risk Register¹³³ highlights that:

- 76 Grade I and Grade II* listed buildings (excluding places of worship) are at risk in the region;
- 85 of region's scheduled monuments are at risk;
- 8 of the region's 136 registered parks and gardens are at risk;
- none of the regions' registered battlefields are at risk; and
- of the 867 conservation areas in the North West, 69 are at risk.

The North West region, North East Wales and South West Scotland contain a large number of undesignated cultural heritage assets, many of which may be of considerable significance (some of national quality, although not formally designated). Historic Environment Records (HERs) held by local authorities and Welsh Archaeological Trusts include both designated and undesignated assets.

The region's paleoenvironmental deposits also serve as important baseline features. These contain important records of past human activities as well as climate change. Most of this evidence is organic and only survives in favourable conditions. If water levels are reduced, these delicate materials are highly susceptible to decay and destruction. Such baseline information is site specific and no general trends or regional spatial variability is available.

Likely Evolution of the Baseline without the DWMP

There are no significant trends relating to archaeology or cultural heritage, therefore, predicting future changes is extremely difficult. The Rural Development Programme has identified that many of the region's cultural heritage sites are endangered and there are particular concerns regarding buildings on upland sites.

Development pressures, social pressures, natural and environmental threats including climate change (including increased flooding), pressures from resource exploitation and infrastructure continue to threaten the condition of cultural heritage sites and monuments. In this context, the protection, preservation and settings of cultural heritage assets needs to be considered when locating any new development including drainage and wastewater management infrastructure.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA, arising from the analysis of the cultural heritage baseline are:

- the need to conserve and enhance the historic significance of buildings, monuments, features, sites, places, areas and landscapes of archaeological and cultural heritage interest, and their settings; and
- the need to avoid damage to important wetland areas with potential for palaeoenvironmental deposits.

Landscape

Baseline Characteristics

The landscape of the North West of England is some of the most diverse in the country, containing 29 National Character Areas as defined by Natural England¹³⁴. Although the region is generally low lying, it also contains some of the most striking upland landscapes in England, particularly within the Lake District

¹³⁴ Natural England (2014) National Character Area Profiles. Available from <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles> [Accessed September 2021]

National Park and UNESCO World Heritage Site. **Figure C.14** shows the national character areas in the UUW operational area and North Wales.

The coastal landscape in the North West contains remnants of the region's industrial history, in particular the Liverpool and Merseyside docklands, as well as having protected areas of Heritage Coastline around St Bee's Head. A Heritage Coast is a section of coast exceeding one mile in length that is of exceptionally fine scenic quality, substantially undeveloped and containing features of special significance and interest. They are agreed between Natural England and the local authority. The national distribution of heritage coasts is far from even and within UUW operating area there is just 1% of the UK's Heritage Coastline, located around St. Bee's Head.

The Lake District National Park and World Heritage Site in Cumbria covers an area of 2,362 km². The National Park boundary was extended by 3% towards the east in August 2016, up to the M6 and the newly extended Yorkshire Dales National Park. Two other National Parks also fall partly within the North West region; the Yorkshire Dales and the Peak District. In total, 18% of the North West is designated as National Parks.

The North West has three AONBs which lie wholly or mainly in the region (Solway Coast, Arnside and Silverdale and Forest of Bowland). The North Pennines AONB also straddles Cumbria's eastern border. Snowdonia National Park and the Clwydian Range and Dee Valley AONB are the significant designated landscape sites within the region of Lake Vyrnwy and the River Dee.

Figure C.15 shows those landscape designations in the UUW operational area and North Wales.

Nationally, land area designated as Green Belt, in which major developments will generally not be permitted except in very special circumstances in accordance with the NPPF, has been gradually decreasing. Across the North West region, the area of land designated as Green Belt was 256,100ha (18.1% of total land area) in 2019/20. Green belt in the North West reduced by 2,525ha between 2013/14 and 2019/20¹³⁵.

¹³⁵ Ministry of Housing Communities and Local Government (2020) Local authority green belt statistics for England: 2019 to 2020. Available from <https://www.gov.uk/government/statistics/local-authority-green-belt-statistics-for-england-2019-to-2020> [Accessed September 2021]

Figure C.14 National Character Areas in the United Utilities Water Operational Area and North Wales

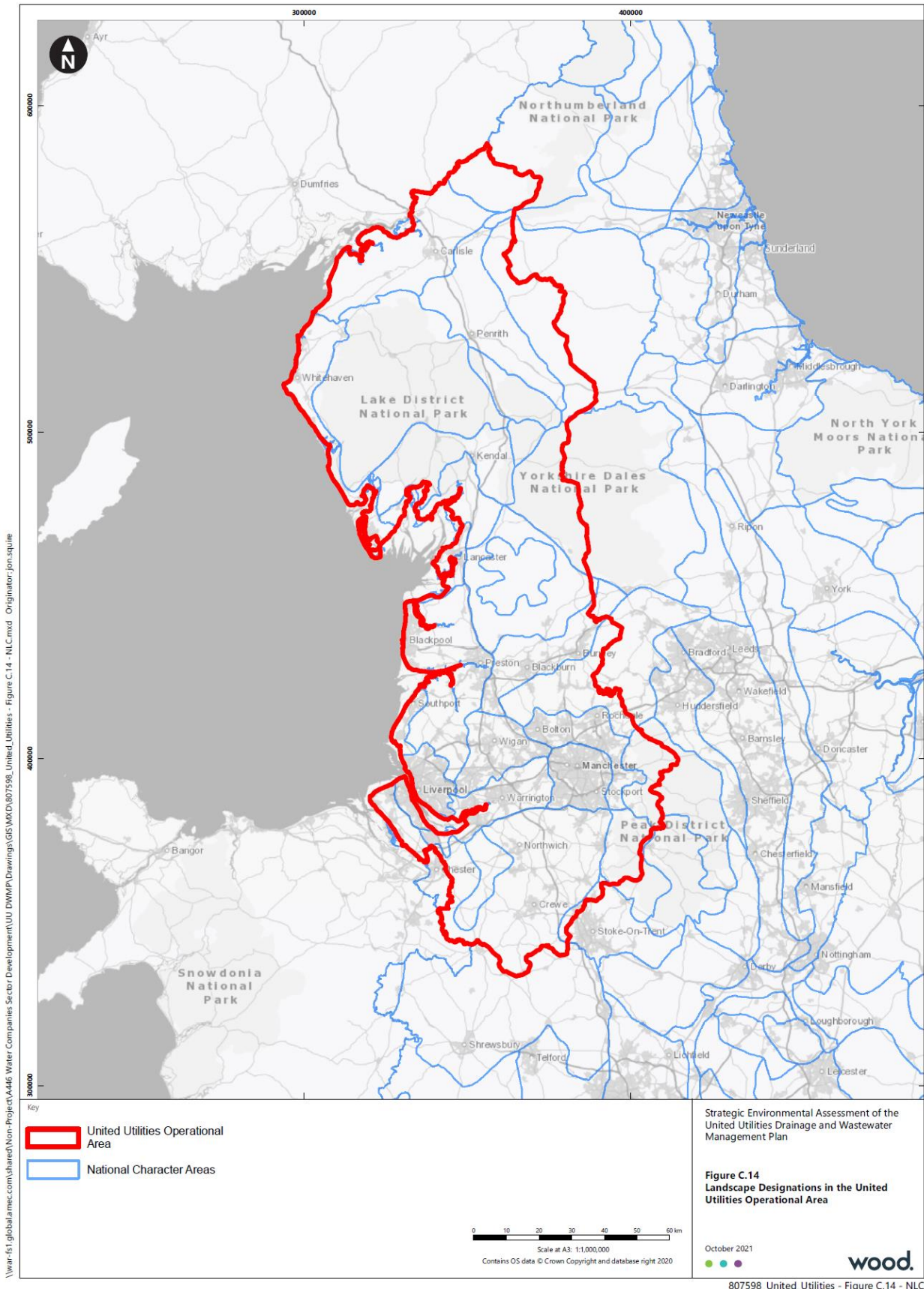
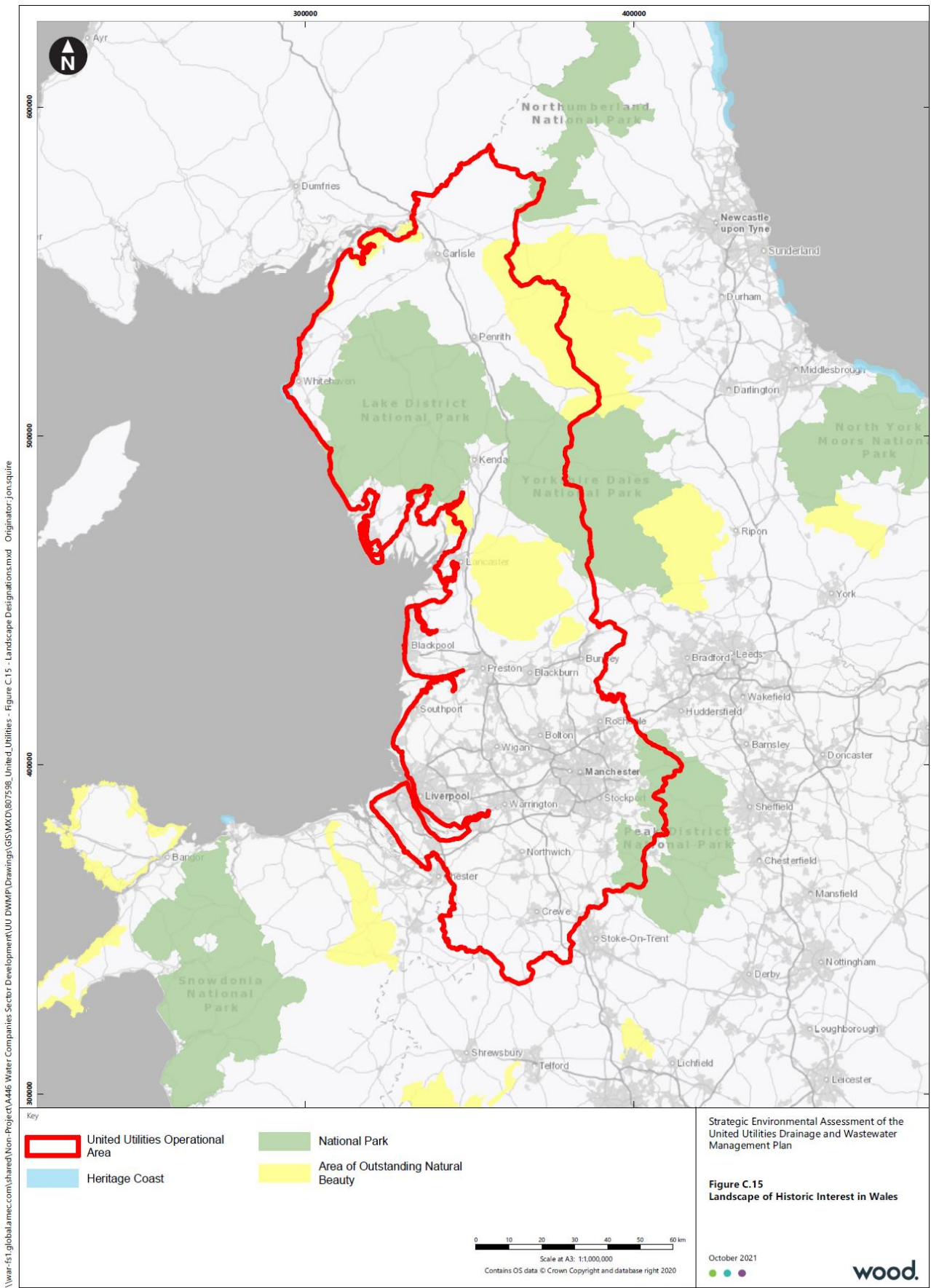


Figure C.15 Landscape Designations in the United Utilities Water Operational Area and North Wales



Likely Evolution of the Baseline without the DWMP

It is envisaged that landscape and designated sites will be maintained and enhanced for the enjoyment of the public. However, landscape character and visual amenity is likely to be affected by development pressure, particularly associated with population growth. In this context, Green Belts in the region are at risk of continuing to reduce in size which may affect local landscapes.

Defra has set a number of future targets in order to see significant expansion and restoration of a number of priority woodland habitats. These include Upland Oak, Upland Mixed Ash, Wet Woods and Beech. Furthermore, the Government has committed to increasing nationwide woodland cover by 2% before 2060¹³⁶.

Climate change and land use change (e.g. due to agricultural reform associated with the UK's exit from the EU and Common Agricultural Policy) may also, in the longer term, lead to changes in the visual amenity of the North West.

Key Issues Relevant to the DWMP

The key issues relevant to the DWMP and the SEA, arising from the analysis of the landscape baseline are:

- the need to protect and improve the natural beauty of the region's national parks, coastline, other areas of natural beauty, including undesignated landscapes and encourage the growth of woodland and forest in the region;
- the need to conserve and enhance the landscape distinctiveness of the area;
- the need to minimise any adverse impacts upon landscape that may result from measures in the DWMP.

¹³⁶ Forestry in England: Seeing the wood for the trees (2017) Accessed at: www.parliament.uk.

Appendix D

Definitions and Thresholds of Significance



PSEA Objectives	Guide Questions	Score		Description
1. To protect, restore and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species, enhanced ecosystem resilience, habitat connectivity and creation and contribute to the sustainable management of natural habitats and ecosystems.	<ul style="list-style-type: none"> Will it protect, restore and enhance where possible, the most important sites for nature conservation (e.g., internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs)? Will it protect, restore and enhance non-designated sites and local biodiversity? Will it alter geomorphological forms and processes which underpin physical habitat for aquatic ecosystems? Will it provide opportunities for new terrestrial and aquatic habitat creation or restoration and/or link existing habitats as part of the development process? Will it protect, and enhance where appropriate, coastal and marine habitats and species? Will it maintain and enhance the green infrastructure network and the biodiversity it supports? Will it maintain and enhance ecosystem resilience? Will it contribute to the sustainable management of natural habitats and ecosystems, i.e., within their limits and capacities taking into account climate change adaptability Will it promote climate change resilience of both designated and non-designated sites? 	+++	Major/Significant Positive	<p>The option would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability.</p> <p>The option would result in a major increase in the population of, or habitats for, a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function.</p> <p>The option would lead to a major increase in natural capital/ecosystem resilience and enhancement.</p>
		++	Moderate Positive	<p>The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures.</p> <p>The option would result in a moderate increase in the population of, or habitats for, a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function.</p> <p>The option would lead to a moderate increase in natural capital/ecosystem resilience and enhancement.</p>
		+	Minor Positive	<p>The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures.</p> <p>The option would result in a minor increase in the population of, or habitats for, a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function.</p> <p>The option would lead to a minor increase in natural capital/ecosystem resilience and enhancement.</p>
		0	Neutral	<p>The option would not result in any effects on designated or non-designated sites including habitats and/or species) or natural capital/ecosystem resilience.</p>
		-	Minor Negative	<p>The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation.</p> <p>The option would result in a minor decrease in the population of, or habitats for, a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function.</p> <p>The option would lead to a minor decrease in natural capital/ecosystem resilience and enhancement.</p>

		--	Moderate Negative	<p>The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation.</p> <p>The option would result in a moderate decrease in the population of, or habitats for, a priority species.</p> <p>Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function.</p> <p>The option would lead to a moderate decrease in natural capital/ecosystem resilience and enhancement.</p>
		---	Major/Significant Negative	<p>The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation.</p> <p>The option would result in a major decrease in the population of, or habitats for, a priority species.</p> <p>Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function.</p> <p>The option would lead to a major decrease in natural capital/ecosystem resilience and enhancement.</p>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the appropriate and efficient use of land.	<ul style="list-style-type: none"> Will additional land be required for the development or implementation of the intervention or will it require below ground works leading to land sterilisation? Will it avoid damage to, protect and enhance where possible protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest? Will it minimise the loss of best and most versatile agricultural land? Will it avoid adverse effects on other land uses? 	+++	Major/Significant Positive	The option would result in a major enhancement on the quality of soils as a result of remediation, implementation of catchment approaches, or other measures.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils as a result of remediation, implementation of catchment approaches, or other measures.
		+	Minor Positive	The option would be located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
		0	Neutral	The option would not result in any effects on soils or land use.
		-	Minor Negative	The option would not be located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option would result in land contamination. The option would result in a minor negative effect on a site designated for their geological interest

	<ul style="list-style-type: none"> Will it minimise land contamination? Will it ensure efficient use of land (e.g., make use of previously developed land)? 	--	Moderate Negative	<p>The option would result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use.</p> <p>The option would result in land contamination.</p> <p>The option would result in a moderate negative effect on a site designated for their geological interest</p> <p>The option would be partially overlying mineral resources leading to partial mineral sterilisation.</p>
		---	Major/Significant Negative	<p>The option would result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use.</p> <p>The option would result in land contamination.</p> <p>The option would result in a major negative effect on a site designated for their geological interest</p> <p>The option would be directly overlying mineral resources leading to mineral sterilisation.</p>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
3. To protect and enhance the quality and quantity of surface and groundwater resources	<p><u>Quantity</u></p> <ul style="list-style-type: none"> Will it minimise the customer demand for water resources? Will it result in changes to river flows, channel morphologies, wetted width or river levels? Will it support the achievement of relevant environmental objectives set out in River Basin Management Plans? Will it alter the sediment transport regime of the surface waters? <p><u>Quality</u></p> <ul style="list-style-type: none"> Will it prevent pollution and protect and improve surface, groundwater, estuarine and coastal water quality? Will it prevent the deterioration of Water Framework Directive (WFD) waterbody status (or potential)? Will it support the achievement of WFD protected area objectives? Will it ensure a new activity or new physical modification does not prevent the future 	+++	Major/Significant Positive	<p>The option would result in major reduction in the demand for water.</p> <p>The option would result in addressing failure of WFD Good Ecological Status / Good Ecological Potential.</p>
		++	Moderate Positive	<p>The option would result in moderate reduction in demand for water.</p> <p>The option would contribute to addressing failure of WFD Good Ecological Status / Good Ecological Potential.</p>
		+	Minor Positive	<p>The option would result in minor reduction in the demand for water.</p> <p>The option would contribute to a minor improvement in surface/coastal water quality or in groundwater quality.</p>
		0	Neutral	<p>The option would have no discernible effect on river flows or on groundwater levels or flows.</p> <p>The option would not lead to a change in WFD classification.</p>
		-	Minor Negative	<p>The option would result in minor short-term decreases in river flows, wetted width, depth, and velocity over small distances.</p> <p>The option would result in minor decreases in groundwater levels.</p> <p>The option would result in minor increases in demand for water.</p> <p>The option would have a minor effect on river and/or coastal water quality and lead to short term or intermittent effects on receptors (e.g., designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated.</p> <p>The option would result in minor decreases in groundwater quality.</p>
		--	Moderate Negative	<p>The option would result in medium-term, moderate decreases in river flows, wetted width, depth, and velocity over moderate distances.</p> <p>The option would result in moderate decreases in groundwater levels.</p> <p>The option would result in moderate increases in demand for water.</p>

	<ul style="list-style-type: none"> achievement of good status for a water body? Will it support the achievement of relevant environmental objectives set out in River Basin Management Plans? Will the option prevent nutrient loading in water bodies? 			<p>The option would have a moderate effect on river and/or coastal water quality and lead to long term or continuous effects on receptors (e.g., designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option would result in the likely deterioration of WFD classification. The option would result in moderate decreases in groundwater quality.</p>
		---	Major/Significant Negative	<p>The option would result in major decreases in river flows over the long-term affecting significant stretches of river. The option would result in major decreases in groundwater levels. The option would result in major increases in demand for water. The option would have a major effect on river and/or coastal water quality and lead to long term or continuous effects on receptors (e.g., designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the deterioration of WFD classification. The option would result in major decreases in groundwater quality.</p>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
4. To reduce or manage flood risk.	<ul style="list-style-type: none"> Will the option be at risk of flooding now or in the future? Will it have the potential to help alleviate or mitigate flooding in the catchment area including to people and property now or in the future? E.g., will it avoid reducing flood plain storage, or provide opportunities to improve flood risk management? Will it promote the use of sustainable drainage systems? Will it promote opportunities for collaborative working with other risk management authorities? 	+++	Major/Significant Positive	The option would result in a major improvement to flood risk.
		++	Moderate Positive	The option would result in a moderate improvement to flood risk.
		+	Minor Positive	The option would involve the construction of above-ground water supply infrastructure which help alleviate flooding in the catchment.
		0	Neutral	The option would involve the construction of above-ground water supply infrastructure, but is located outside floodplain areas. It is anticipated that the option would neither cause nor exacerbate flooding in the catchment.
		-	Minor Negative	The option would involve the construction of above-ground water supply infrastructure which would be wholly or partially located within Flood Zone 2.
		--	Moderate Negative	The option would involve the construction of above-ground water supply infrastructure which would be partially (but < 40% by area) located within Flood Zone 3 and/or site is at medium risk of surface water flooding.
		---	Major/Significant Negative	The option would involve the construction of above-ground water supply infrastructure which would be wholly or partially (≥40% of the site) within flood zone 3a or 3b and/or site is at high risk of surface water flooding.

		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
5. To minimise emissions of pollutant gases and particulates and enhance air quality.	<ul style="list-style-type: none"> Will it reduce or minimise pollutant emissions to air? Will it maintain or enhance ambient air quality, keeping pollution below Local Air Quality Management thresholds (e.g., in Air Quality Management Areas or sensitive habitats)? 	+++	Major/Significant Positive	The option would result in a major enhancement of the air quality within one or more AQMAs
		++	Moderate Positive	The option would result in a moderate enhancement of the air quality within one or more AQMAs
		+	Minor Positive	The option would result in an enhancement of the air quality
		0	Neutral	The option would not result in any effects on Air Quality and AQMAs.
		-	Minor Negative	The option would result in a decrease of the air quality
		--	Moderate Negative	The option would result in a decrease of the air quality within one or more AQMAs
		---	Major/Significant Negative	The option would result in a major decrease in the air quality within one or more AQMAs
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
6. To reduce greenhouse gas emissions.	<ul style="list-style-type: none"> Will it reduce or minimise greenhouse gas emissions? Will it have a low level of embodied carbon? Will it provide new infrastructure that is energy efficient and/or minimises the use of energy? Will it provide new infrastructure that could contribute or make use of renewable energy sources? 	+++	Major/Significant Positive	The option would reduce annual average net carbon emissions by more than 1,000 tonnes CO2e/year e.g., it would provide new infrastructure/assets that maximise the use of renewable energy sources. The option would result in a major increase in carbon sequestration.
		++	Moderate Positive	The option would reduce annual average net carbon emissions by between 100 and 1,000 tonnes CO2e/year. The option would result in a moderate increase in carbon sequestration
		+	Minor Positive	The option would reduce annual average net carbon emissions by less than 100 tonnes CO2e/year

	<ul style="list-style-type: none"> Will the option affect carbon sequestration? 	0	Neutral	The option would have no discernible effect on greenhouse gas emissions.
		-	Minor Negative	The option would increase annual average net carbon emissions by less 100 tonnes CO2e/year.
		--	Moderate Negative	The option would increase annual average net carbon emissions by between 100 and 1,000 tonnes of CO2e/year. The option would result in a moderate release of previously sequestered carbon.
		---	Major/Significant Negative	The option would increase annual average net carbon emissions by more 1,000 tonnes CO2e/year. The option would result in a major release of previously sequestered carbon.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
		7. To adapt and improve resilience to the threats of climate change.	<ul style="list-style-type: none"> Will it improve resilience and/or adaptability to the likely effects of climate change, e.g., by increasing resilience of water supplies or catchments? Will it increase environmental resilience to the effects of climate change including to impacts on flood risk and water quality? 	+++
++	Moderate Positive			The option would have a moderate positive effect on increasing the resilience/decreasing the vulnerability to climate change effects.
+	Minor Positive			The option would have a minor positive effect on increasing the resilience/decreasing the vulnerability to climate change effects.
0	Neutral			The option would have no effect on resilience/decrease vulnerability to climate change effects
-	Minor Negative			The option would not increase resilience/decrease vulnerability to climate change effects.
--	Moderate Negative			The option would have a moderate negative effect on resilience/decreasing vulnerability to climate change effects.
---	Major/Significant Negative			The option would have a major negative effect on resilience/significantly decrease vulnerability to climate change effects.

		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.	<ul style="list-style-type: none"> Will it ensure that sufficient wastewater treatment capacity is in place to support predicted increases in population (including any seasonal changes)? Will it help to meet the employment needs of local people? Will it contribute to sustaining and growing the local and regional economy? Will it avoid disruption through effects on the transport network? Will it avoid negative effects on built assets/ existing infrastructure including transport? 	+++	Major/Significant Positive	The option would address a wastewater treatment works capacity risk that affects >25,000 current and/or projected population equivalent The option would result in a significant increase in construction jobs (capital spend of ≥£25m).
		++	Moderate Positive	The option would address a wastewater treatment works capacity risk that affects between 5,000 – 25,000 current and/or projected population equivalent . The option would result in a moderate increase in construction jobs (capital spend between £5m to <£25m).
		+	Minor Positive	The option would address a wastewater treatment works capacity risk that affects <5,000 current and/or projected population equivalent. The option would result in a minor increase in construction jobs (capital spend between £1m to <£5m).
		0	Neutral	The option would have no effect on local employment opportunities, the regional or local economy, or on recreational facilities.
		-	Minor Negative	It is not expected that any options will have a negative effect on employment opportunities, the economy or design capacity. The option would result in a minor disruption on built assets and infrastructure, including transport.
		--	Moderate Negative	It is not expected that any options will have a negative effect on employment opportunities, the economy or design capacity. The option would result in a moderate disruption on built assets and infrastructure, including transport.
		---	Major/Significant Negative	It is not expected that any options will have a negative effect on employment opportunities, the economy or design capacity. The option would result in a major disruption on built assets and infrastructure, including transport.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
9. To protect and enhance human health and well-being.	<ul style="list-style-type: none"> Will it maintain surface water and bathing water quality within statutory standards? Will it help to promote healthy communities and avoid risks to health and wellbeing (for example, 	+++	Major/Significant Positive	The option would address a wastewater treatment works capacity risk that affects >25,000 current and/or projected population equivalent. The options would have a sustained positive effect on the health of local communities and would ensure that surface water and bathing water quality is maintained within statutory limits. The option would provide new, and/or significantly enhances existing, recreational facilities and publicly accessible greenspace within the operational area.

	<p>due to noise resulting from construction traffic or disruption to safe and reliable water/sewerage services)?</p> <ul style="list-style-type: none"> • Will it improve opportunities for social interaction and community cohesion? • Will it protect and enhance public access to, and enjoyment of, green and blue infrastructure, open space/recreational facilities and the natural and historic environment, and in doing so help promote healthy lifestyles including mental well-being? 	++	Moderate Positive	<p>The option would address a wastewater treatment works capacity risk that affects between 5,000 – 25,000 current and/or projected population equivalent.</p> <p>The option would have a positive effect on the health of local communities and would ensure that surface water and bathing water quality is maintained within statutory limits.</p> <p>The option would have a moderate positive effect on existing, recreational facilities and publicly accessible greenspace within the operational area.</p>
		+	Minor Positive	<p>The option would address a wastewater treatment works capacity risk that affects <5,000 current and/or projected population equivalent.</p> <p>The option would have a temporary positive effect on the health of local communities and would ensure that surface water and bathing water quality is maintained within statutory limits.</p> <p>The option would have a minor positive effect on existing, recreational facilities and publicly accessible greenspace within the operational area.</p>
		0	Neutral	The option would not result in any effects on human health and/or existing recreational facilities.
		-	Minor Negative	<p>The option would result in the deterioration of surface water or bathing water quality and would have a temporary effect on human health (e.g., noise or air quality).</p> <p>The option would reduce the availability and quality of existing recreational facilities and publicly accessible greenspace within the operational area</p>
		--	Moderate Negative	<p>The option would have a moderate long-term negative effect on human health (e.g., noise or air quality).</p> <p>The option would result in the permanent removal of existing recreational facilities and publicly accessible greenspace within the operational area.</p>
		---	Major/Significant Negative	<p>The option would have a significant long-term effect on human health (e.g., noise or air quality).</p> <p>The option would result in the removal of existing recreational facilities and publicly accessible greenspace within the operational area.</p>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
10. To promote and enhance the sustainable and efficient use of resilient water resources.	<ul style="list-style-type: none"> • Will it improve efficiency in water consumption? • Will it increase the resilience of water resources, now and into the future? • Will it contribute towards improving the awareness of water sustainability? 	+++	Major/Significant Positive	The option would result in a major improvement in water efficiency and resilience.
		++	Moderate Positive	The option would result in a moderate improvement in water efficiency and resilience.
		+	Minor Positive	The option would result in a minor improvement in water efficiency and resilience.

		0	Neutral	The option will have no effect on sustainable and efficient use of resilient water resources.
		-	Minor Negative	The option would result in minor decreases in water efficiency and reduces resilience.
		--	Moderate Negative	The option would result in moderate decreases in water efficiency and reduces resilience.
		---	Major/Significant Negative	The option would result in major decreases in water efficiency and reduces resilience.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
11. To minimise waste, promote resource efficiency and move towards a circular economy.	<ul style="list-style-type: none"> Will it make use of existing infrastructure? Will it promote the re-use and recycling of waste materials and reduce the proportion of waste sent to landfill? Will it help to encourage sustainable design or use of sustainable materials (e.g., supplied from local resources)? 	+++	Major/Significant Positive	The option would make extensive reuse of existing built assets and infrastructure. The option will re-use or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials.
		++	Moderate Positive	The option would make reuse of existing built assets and infrastructure. The option would re-use or recycle moderate quantities of waste materials and any new infrastructure would incorporate some sustainable design measures and materials.
		+	Minor Positive	The option would re-use or recycle limited quantities of waste materials and any new infrastructure would incorporate limited sustainable design measures and materials.
		0	Neutral	The option would largely rely on existing infrastructure and only require small quantities of additional materials to realise design capacity.
		-	Minor Negative	The option would require new infrastructure. The option would have limited opportunities for the re-use or recycling of waste materials. There would be limited opportunities for sustainable design or the use of sustainable materials.
		--	Moderate Negative	The option would require new infrastructure. The option would have limited opportunities for the re-use or recycling of waste materials.
		---	Major/Significant Negative	The option would require significant new infrastructure that cannot be provided through the re-use or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials.

		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.	<ul style="list-style-type: none"> Will it avoid damage to, conserve or enhance the historic environment, including heritage assets and their settings such as historic buildings, conservation areas, features, places and spaces, that enhance local distinctiveness? Will it avoid or minimise damage to archaeologically important sites? Will the hydrological setting of water-dependent assets be altered, such as important wetland areas with potential for paleo-environmental deposits? Will it avoid damage to important wetland areas with potential for paleoenvironmental deposits? Will it improve access, value, understanding or enjoyment of heritage assets and culturally/historically important assets in the region? 	+++	Major/Significant Positive	The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as: Securing repairs or improvements to heritage assets, especially those identified in the Historic England/Historic Environment Scotland Buildings/Monuments at Risk Register, or the Cadw Listed Buildings at Risk; and improving interpretation and public access to important heritage assets.
		++	Moderate Positive	The option will result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.
		+	Minor Positive	The option will result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	The option will have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. There will be limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation
		--	Moderate Negative	The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. The option will diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.
		---	Major/Significant Negative	<p>The option would diminish the significance of designated heritage assets and/or their setting such as:</p> <ul style="list-style-type: none"> Demolition or further deterioration in the condition of designated heritage assets especially those identified in Historic England/Historic Environment Scotland Buildings/Monuments at Risk Register, or the Cadw Listed Buildings at Risk; Loss of public access to important heritage assets and lack of appropriate interpretation. <p>There would be major damage to known, designated archaeological sites/remains or geologically important sites with a consequent loss of significance only partly mitigated by archaeological investigation.</p>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain

13. To conserve, protect and enhance landscape and townscape character and visual amenity.	<ul style="list-style-type: none"> Will it avoid adverse effects to, and enhance where possible, protected/designated landscapes (including woodlands) such as National Parks or AONBs? 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? Will it protect and enhance landscape character, townscape, seascape and green infrastructure? Will it minimise adverse visual impacts? 	+++	Major/Significant Positive	The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape
		+	Minor Positive	The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	The option would not result in any effects on the local landscape, townscape or seascape
		-	Minor Negative	The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative	The option would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major/Significant Negative	The option would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain

Appendix E

Detailed Assessments



Assessment of Generic Interventions

6.4.7 A total of 34 generic option types are proposed in the draft DWMP to address the risks identified for drainage and wastewater management. These are categorised according to one of the following six key management areas, set out in Table E.1 below.

Table E.1 Summary of Option Types Assessed by Management Area

Management Area	Number of options
Combined and Foul Sewer Systems	9
Customer Side Management	7
Indirect Measures	3
Sludge	4
Surface Water Management	3
Wastewater Treatment	8
Total	34

6.4.8

A key to the meaning of the symbols used in the assessment matrices is presented in **Table E.2**.

Table E.2 Qualitative Scoring System

Score	Description	Symbol
Major/Significant Positive Effect	Significant positive effect of the option on this objective	+++
Moderate Positive Effect	Moderate positive effect of the option on this objective	++
Minor Positive Effect	Minor positive effect of the option on this objective	+
Neutral	Neutral effect of the option on this objective	0
Minor Negative Effect	Negative effect of the option on this objective	-
Moderate Negative Effect	Moderate effect of the option on this objective	--
Major/Significant Negative Effect	Significant negative effect of the option on this objective	---
Uncertain	The option has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?

The following sections summarise the generic assessments of the options under each management area listed above.

Combined and Foul Sewer Systems

The options assessed for the combined and foul sewer systems management area are:

- N1 - Intelligent network operation
- N2 - Increase the capacity of existing foul / combined networks
- N4 - Intelligent asset maintenance
- N5 - Sewer rehab
- N6 - Property Level Resilience (PLR)
- N7 - Enhanced operational maintenance
- N8 - Attenuation
- N9 - Sewer maintenance
- N10 - Cross boundary transfer

Combined and Foul Sewer Systems

N1 - Intelligent network operation

Option Assessment Information	
Option ID	N1
Option Name	Intelligent network operation
Option Description	Controlling flow movement in reaction to the current situation. Allows the system to be operated proactively, maximising the use of existing assets. These options cover a range of different approaches e.g. modifying the start-stop levels at strategic pumping stations, creation of new network control points.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Intelligent network operation	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction of any additional infrastructure/equipment for the option is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction of any additional infrastructure/equipment that there could be effects arising

either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Depending on the location of the option and land required for construction the option could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** Construction of additional infrastructure for the option may require greenfield land take (e.g. new network control points, storage, pumps etc.), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option), however, it is expected that any soils displaced during the construction of below ground infrastructure would be reinstated following completion. If the option is situated partially or entirely on previously developed land or would involve the replacement or refurbishment of existing network infrastructure without additional land take (e.g. pump replacement/upgrading etc.) this is considered to be a neutral effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of any additional infrastructure/equipment for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction of any additional infrastructure/equipment for the option may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of any additional infrastructure/equipment for the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction or upgrading of any additional infrastructure/equipment for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. access to monitoring points, connecting pipework or excavation for new control points), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.
9. **Health:** The construction of any additional infrastructure/equipment for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.
11. **Waste and resources:** Construction of any additional infrastructure/equipment for the option would require the use of materials such as concrete and steel, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.
12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.
13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the

designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.
3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** If the operation of the option requires additional energy input (e.g. increased frequency of pump operations) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.

10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by providing additional capacity in the drainage and wastewater system and subsequently reducing the frequency and severity of flooding and storm overflows.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not expected to introduce any new permanent above ground infrastructure, so operation of the option is considered to be neutral for the landscape objective.

Combined and Foul Sewer Systems

N2 - Increase the capacity of existing foul / combined networks

Option Assessment Information	
Option ID	N2
Option Name	Increase the capacity of existing foul / combined networks
Option Description	Replace sewer with a large diameter sewer to increase capacity.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Increase the capacity of existing foul / combined networks	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** The installation of the existing sewer system will have led to previous disturbance, albeit that this is likely to have occurred many years ago, with habitats recovered from the disturbance. If the option is more than 1km from any designated biodiversity sites, construction of the option is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat

loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Depending on the location of the option and land accessed for construction the option could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** Construction of the option is expected to be entirely on previously developed land, involving the replacement of existing below ground network infrastructure without additional land take, and soils would be reinstated following completion; this is considered to be a neutral effect for this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction activities may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and

contractors in the local economy. If construction involves works within the local road network (e.g. pipeline excavation), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of the option would require the replacement of existing sewer infrastructure and the use of materials such as concrete, plastic and steel for new sewer infrastructure, which would generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated following the reinstatement of land after the construction stage.
3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** If the operation of the option requires additional energy input (e.g. additional pumping for increased wastewater flows) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by providing additional capacity in the drainage and wastewater system and subsequently reducing the frequency and severity of flooding and storm overflows.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not expected to introduce any new permanent above ground infrastructure, so operation of the option is considered to be neutral for the landscape objective.

Combined and Foul Sewer Systems

N4 - Intelligent asset maintenance

Option Assessment Information	
Option ID	N4
Option Name	Intelligent asset maintenance
Option Description	Allows the system to be maintained proactively, maximising the use and longevity of existing assets (for example by repairing minor sewer damage before a collapse occurs).

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Intelligent asset maintenance	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction for the option (e.g. installation of monitoring equipment and proactive maintenance activities) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction for the option that there could be

effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Construction activities for the option are not expected to affect non-designated habitats and species through direct land take, so any effect in this regard is not expected to be significant.

2. **Soils:** Construction activities for the option are expected to be partially or entirely on previously developed land, involving the installation of equipment or maintenance of existing network infrastructure without additional land take, and any soils disturbed would be reinstated following completion; this is considered to be a neutral effect for this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction activities for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction for the option may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that construction activities for the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** Construction activities for the option (including proactive maintenance) would require the use of raw materials, for example steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** Construction activities for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. access to monitoring points and below ground infrastructure), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** Construction for the option (including maintenance activities) may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction for the option may require the use of materials such as concrete, plastic and steel and the repair or replacement of existing infrastructure, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste maintenance materials or replaced components could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction activities, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction activities, that it could affect the visual amenity of the designated features. More generally, construction activities could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

- 1. Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity by prompting preventative maintenance and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
- 2. Soils:** No effects on land use, soils or geodiversity are anticipated following any requirements for reinstatement of land following construction activities.
- 3. Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity through monitoring of the network and reduce incidents of flooding and storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
- 4. Flood Risk:** Operational monitoring would seek to maintain the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
- 5. Air Quality:** Operations for the option are not expected to have effects on air quality.
- 6. Greenhouse Gas Emissions:** If operation of the option requires additional energy input (e.g. for monitoring systems) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
- 7. Climate Change Resilience:** Monitoring operations for the option would seek to reduce the frequency and severity of flooding that could affect communities by prompting preventative maintenance, so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
- 8. Economic and Social Wellbeing:** Monitoring operations for the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing.
- 9. Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
- 10. Water resources:** The operation of the option may have a positive effect on network infiltration, by maintaining capacity in the system and subsequently reducing the frequency and severity of flooding and storm overflows.

11. **Waste and resources:** Monitoring operations for the option are not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects from monitoring activities on designated cultural heritage assets.
13. **Landscape:** Monitoring for the option would be carried out remotely and is not expected to introduce any new permanent above ground infrastructure, which is considered to be neutral for this objective.

Combined and Foul Sewer Systems

N5 - Sewer rehab

Option Assessment Information	
Option ID	N5
Option Name	Sewer rehab
Option Description	Sewer rehabilitation to improve asset health.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Sewer rehab	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction of the option is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but

which could be addressed through best practice and established scheme-level avoidance or mitigation measures (e.g. by adopting no-dig relining or repair of sewers). Depending on the location of the option and land accessed for construction the option could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** Construction of the option is expected to be entirely on previously developed land, involving the relining or repair of existing below ground infrastructure without additional land take, and soils would be reinstated following completion of any excavation work; this is considered to be a neutral effect for this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction activities may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and

contractors in the local economy. If construction involves works within the local road network (e.g. pipeline excavation), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of the option may require the use of materials such as concrete, plastic and steel for sewer relining or repair, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity, although techniques such as 'no-dig' relining technology may limit these effects.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity through preventative rehabilitation of the network and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a

positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated following any requirements for reinstatement of land after the construction stage.
3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity through preventative rehabilitation of the network and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network through preventative rehabilitation, to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The operation of the option is not expected to require any additional operational energy use, so is considered to be neutral for this objective.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding through preventative rehabilitation of the network, which may positively affect communities, so increasing economic and social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by improving capacity in the drainage and wastewater system and subsequently reducing the frequency and severity of flooding and storm overflows.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not expected to introduce any new permanent above ground infrastructure, so operation of the option is considered to be neutral for the landscape objective.

Combined and Foul Sewer Systems

N6 - Property Level Resilience (PLR)

Option Assessment Information	
Option ID	N6
Option Name	Property Level Resilience (PLR)
Option Description	Create additional volume to reduce storm impact (attenuation) or treatment of storm discharges Non return valves, pumps, flood gates etc.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Property Level Resilience (PLR)	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction of any additional infrastructure/equipment for the option is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction of any additional infrastructure/equipment that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA

may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Construction activities for the option are not expected to affect non-designated habitats and species through direct land take, so any effect in this regard is not expected to be significant.

2. **Soils:** Construction for the option is expected to be within existing developed land and infrastructure without additional land take and any soils displaced during access to infrastructure would be reinstated following completion, which is considered to be a neutral effect for this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of any additional infrastructure/equipment for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction of any additional infrastructure/equipment for the option may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of any additional infrastructure/equipment for the option would require the use of raw materials, for example steel and plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of additional infrastructure/equipment for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together

with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. excavation to access installation locations), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of any additional infrastructure/equipment for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of infrastructure/equipment for the option would require the use of materials such as plastics and steel, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity through attenuation of storm flows and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated following any requirements for reinstatement of land after the construction stage.
3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity through attenuation of storm flows and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** If the operation of the option requires additional energy input (e.g. operation of additional pumping equipment) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding, through attenuation of storm flows that could affect communities, so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding through attenuation of storm flows, which may positively affect communities, so increasing economic and social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by providing additional capacity in the system and subsequently reducing the frequency and severity of flooding and storm overflows.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not expected to introduce any new permanent above ground infrastructure, so operation of the option is considered to be neutral for the landscape objective.

Combined and Foul Sewer Systems

N7 - Enhanced operational maintenance

Option Assessment Information	
Option ID	N7
Option Name	Enhanced operational maintenance
Option Description	Pro-active and targeted operation and maintenance programmes

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Enhanced operational maintenance	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	-/?	-/?	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction for the option (i.e. maintenance activities) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction for the option that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance

or mitigation measures. Construction activities for the option are not expected to affect non-designated habitats and species through direct land take, so any effect in this regard is not expected to be significant.

2. **Soils:** Construction activities for the option are expected to be partially or entirely on previously developed land, involving maintenance or repair of existing network infrastructure without additional land take, and any soils disturbed would be reinstated following completion; this is considered to be a neutral effect for this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction activities for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction activities for the option may be liable to flooding (depending on the timing of maintenance activities), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction activities for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that maintenance activities for the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** Construction for the option may require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any maintenance activities may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of maintenance activities), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** Construction for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and contractors in the local economy. If maintenance activities involve works within the local road network (e.g. repair or replacement of below ground infrastructure), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** Construction for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction activities for the option may require the use of materials such as concrete, plastic and steel and the repair or replacement of existing infrastructure, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste maintenance materials or replaced components could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of maintenance activities, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of maintenance activities, that it could affect the visual amenity of the designated features. More generally, maintenance activities could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity by prompting enhanced maintenance and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated following any requirements for reinstatement of land following maintenance activities.

3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity through monitoring and assessment of the network and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** Operational monitoring and assessment would seek to maintain the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** If operation of the option requires additional energy input (e.g. for monitoring or assessment surveys) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** Monitoring operations for the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. If monitoring or assessment surveys involve access to the local road network, this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.
9. **Health:** Monitoring or assessment surveys may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present), however, effects are likely to be localised and temporary in nature. The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by maintaining capacity in the system and subsequently reducing the frequency and severity of flooding and storm overflows.
11. **Waste and resources:** Monitoring and assessment surveys for the option are not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** Monitoring and assessment surveys for the option are not expected to have any significant effects on cultural heritage assets.
13. **Landscape:** Monitoring and assessment surveys for the option are not expected to have any significant effects on the visual amenity of any landscape features.

Combined and Foul Sewer Systems

N8 – Attenuation

Option Assessment Information	
Option ID	N8
Option Name	Attenuation
Option Description	Creation of additional volume to reduce storm impact.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Attenuation	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, construction of additional storage capacity for the option (e.g. pipes, storage tanks and ancillary equipment) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction activities, that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction for the option could affect non-designated

habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** Construction of additional infrastructure for the option may require greenfield land take (e.g. new storage facilities etc.), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option), however, it is expected that any soils displaced during the construction of below ground infrastructure would be reinstated following completion. If the option is situated partially or entirely on previously developed land without additional land take, this is considered to be a neutral effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of any additional infrastructure for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction of any additional infrastructure for the option may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to a negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of additional infrastructure for the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of additional infrastructure for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend

by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. excavation for pipe connections or storage facilities), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of additional infrastructure for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of additional infrastructure for the option would require the use of materials such as concrete, steel and plastics, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation

sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** If the operation of the option requires additional energy input (e.g. operation of additional pumps or valve controls) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities, through the attenuation of storm flows, so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding through the attenuation of storm flows, which may positively affect communities, so increasing economic and social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.

10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by providing additional capacity in the system and subsequently reducing the frequency and severity of flooding and storm overflows.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. tanks, pumps) which may have adverse effects on landscape/townscape character, which may have a minor negative on effect this objective.

Combined and Foul Sewer Systems

N9 - Sewer maintenance

Option Assessment Information	
Option ID	N9
Option Name	Sewer maintenance
Option Description	Repair and rehabilitation to maintain service

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Sewer maintenance	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, construction for the option (repair and rehabilitation of the sewer network) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction for the option that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-

level avoidance or mitigation measures. Construction activities for the option are not expected to affect non-designated habitats and species through direct land take, so any effect in this regard is not expected to be significant.

2. **Soils:** Construction activities for the option are expected to be partially or entirely on previously developed land, involving the repair or rehabilitation of existing network infrastructure without additional land take, and any soils disturbed would be reinstated following completion; this is considered to be a neutral effect for this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction activities for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction for the option may be liable to flooding during the construction period (depending on the timing of maintenance activities), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that maintenance activities for the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** Construction for the option may require the use of raw materials, for example concrete steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** Construction for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and

contractors in the local economy. If maintenance activities involve works within the local road network (e.g. access to below ground infrastructure), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** Construction for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction for the option may require the use of materials such as concrete, plastic and steel and the repair or replacement of existing infrastructure, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste maintenance materials or replaced components could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of maintenance activities, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of maintenance activities, that it could affect the visual amenity of the designated features. More generally, maintenance activities could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

- 1. Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity through repair and rehabilitation of the network and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
- 2. Soils:** No effects on land use, soils or geodiversity are anticipated following any requirements for reinstatement of land following maintenance activities.
- 3. Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity through repair and rehabilitation of the network and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
- 4. Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network through repair and rehabilitation of the network, to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
- 5. Air Quality:** The operation of the option is not expected to have effects on air quality.
- 6. Greenhouse Gas Emissions:** The operation of the option is not expected to require any additional operational energy use, so is considered to be neutral for this objective.
- 7. Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities, so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
- 8. Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding through repair and rehabilitation of the network, which may positively affect communities, so increasing economic and social wellbeing.
- 9. Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
- 10. Water resources:** The operation of the option may have a positive effect on network infiltration, by improving capacity in the drainage and wastewater system and subsequently reducing the frequency and severity of flooding and storm overflows.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not expected to introduce any new permanent above ground infrastructure, so operation of the option is considered to be neutral for the landscape objective.

Combined and Foul Sewer Systems

N10 - Cross boundary transfer

Option Assessment Information	
Option ID	N10
Option Name	Cross boundary transfer
Option Description	The movement of flow to another area, or company.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Cross boundary transfer	Construction (negative)	--/?	-/?	0	-/?	--/?	--/?	-/?	-/?	-/?	0	-/?	--/?	--/?
	Construction (positive)	0	0	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction of any additional infrastructure for the option (e.g. network connections, storage tanks, pumps, monitoring and control equipment) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction of any additional infrastructure that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Given the

likely scale and route of any new transfer pipe, the potential for moderate construction effects is heightened. More generally construction for the option could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** Construction of additional infrastructure for the option may require greenfield land take (e.g. new storage facilities etc.), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option), however, it is expected that any soils displaced during the construction of below ground infrastructure would be reinstated following completion. If the option is situated partially or entirely on previously developed land without additional land take, this is considered to be a neutral effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of any additional infrastructure for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction of any additional infrastructure for the option may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be either minor or potentially moderate. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of additional infrastructure for the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. Given the likely scale and route of any new transfer pipe, the potential for moderate construction effects is heightened.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of additional infrastructure for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. access for connecting pipework or excavation for new infrastructure), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.
9. **Health:** The construction of any infrastructure for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.
11. **Waste and resources:** Construction of additional infrastructure for the option would require the use of materials such as concrete, plastics and steel, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.
12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction. However, given the likely scale and route of any new transfer pipe, the potential for moderate construction effects is heightened.
13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to divert excess drainage and wastewater flows and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.
3. **Water Quality:** The operation of the option would seek to divert excess drainage and wastewater flows and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective. Cross boundary transfers are expected to be conditional on the receiving network having sufficient capacity, so no adverse effects are expected elsewhere for this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities. Cross boundary transfers are expected to be conditional on the receiving network having sufficient capacity, so operation for the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** If the operation of the option requires additional energy input (e.g. operation of additional pumps and control equipment) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect for this objective. Cross boundary transfers are expected to be conditional on the receiving network having sufficient capacity, so no adverse effects are expected elsewhere for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Cross boundary transfers are expected to be conditional on the receiving network having sufficient capacity, so no adverse effects are expected elsewhere for this objective.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Cross boundary

transfers are expected to be conditional on the receiving network having sufficient capacity, so no adverse effects on health are expected elsewhere.

10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by maintaining capacity in the system and subsequently reducing the frequency and severity of flooding and storm overflows.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. tanks, pumps) which may have adverse effects on landscape/townscape character, which may have a minor negative effect on this objective.

Customer Side Management

The options assessed for the customer side management area are:

- CM1 - Water efficient appliances
- CM2 - Water efficiency measures
- CM3 - Rainwater harvesting
- CM4 - Customer incentives
- CM5 - Domestic and business customer education
- CM6 - Greywater treatment and reuse
- CM7 - Charging and bill incentives

Customer Side Management

CM1 - Water efficient appliances

Option Assessment Information	
Option ID	CM1
Option Name	Water efficient appliances
Option Description	Supplying customers with household appliances which are designed to reduce water consumption. Reduced consumption can also benefit the wastewater system by reducing the dry weather flow to be conveyed through the sewer network and through the STWs

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	-/?	-/?	0	0	0	0	-/?	0	0
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	++/?	+/?	+/?	+/?	++/?	0	0	0

Construction

1. **Biodiversity:** It is not expected that supplying customers with household appliances will involve any significant construction activity beyond minor installation activities within existing properties, hence it is not expected that there would be any affect designated or non-designated habitats or species, hence a neutral effect has been identified.

2. **Soils:** It is assumed that the installation of household appliances to reduce water consumption would take place within existing properties, hence there would be no effect on soils, geodiversity, or land use.

3. **Water Quality:** It is not expected that the installation of household appliances to reduce water consumption would affect water quality, due to location (within existing properties), the absence of connectivity and provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If properties where household appliances are to be installed are located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) there is the potential that installation works may be liable to flooding during the construction period (depending on the timing of installation); however, given the small scale nature of the works and their flexibility in installation, this is not considered to have any effects on this objective. If the properties are not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the properties where household appliances are to be installed are located within an Air Quality Management Area (AQMA), construction traffic (i.e. vehicle movements to transport appliances to customer properties) could contribute to negative effect on local air quality if a significant number of properties in the same area would be supplied with appliances, however, these effects are anticipated to be localised, temporary and of short duration.
6. **Greenhouse Gas Emissions:** There would be some carbon emissions as a result of the installation of household appliances designed to reduce water consumption, although these would be limited to that embodied within the appliances and vehicle movements to transport the appliances to customer properties. The scale of carbon emissions associated with this option have not been determined at present; however, it is possible to conclude that carbon emissions are likely to be greater in areas where the reduction in consumption is greatest.
7. **Climate Change Resilience:** It is not expected that the installation of household appliances to reduce water consumption would affect this objective.
8. **Economic and Social Wellbeing:** The installation of household appliances to reduce water consumption would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by appliance installers in the local economy.
9. **Health:** It is not expected that there would be any significant effects on human health, beyond very minor and temporary disturbance associated with the installation of appliances within properties.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** Appliances designed to reduce the consumption of water would require materials to be produced. The scale of resource use associated with this option has not been determined at present; however, it is possible to conclude that resource use is likely to be

greater in areas where reductions in water consumption are greater. There is the possibility that waste materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** Due to the nature of the option (installation of household appliances within residential properties), it is not expected that there would be any significant effects on heritage assets.

13. **Landscape:** It is not anticipated that there would be any effects on landscape/townscape as appliances would be installed within existing residential properties.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. During periods of high rainfall, this could reduce the frequency and severity of sewer flooding and spills to watercourses that could affect receiving water quality and impact on water dependent designated conservation sites and for which the HRA would likely conclude no operational effects which is assessed as a positive effect. There may be some indirect impacts associated with the reduction in water consumption and therefore a reduction in abstraction required, however any effects in this regard are uncertain.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operation of the option.

3. **Water Quality:** The operation of the option would seek to reduce the volume of water consumed, subsequently flows in the wastewater system. During periods of high rainfall, this could reduce the frequency and severity of sewer flooding and spills to watercourses that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.

4. **Flood Risk:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option may require energy for the operation of household appliances designed to reduce water consumption that may result in associated carbon emissions. However, reduced demand may also result in a reduction in the amount of

energy required to treat and pump fresh water to customers, as well as a reduction in the quantities of wastewater requiring treatment and therefore an additional reduction in energy requirements and carbon emissions.

7. **Climate Change Resilience:** As noted above, the operation of the option would potentially reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.

8. **Economic and Social Wellbeing:** The option could lead to reduced billing of customers (associated with reduced water consumption/wastewater production) which may have a positive effect on economic and social wellbeing.

9. **Health:** The operation of the option may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding and spills to watercourses by reducing flows in the wastewater network. This would have a positive effect on the health of the community.

10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently potentially reducing the frequency and severity of sewer flooding and spills to watercourses during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.

11. **Waste and resources:** The operation would have no effect on material use.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option would have no effects on landscape/townscape character and visual amenity.

Customer Side Management

CM2 - Water efficiency measures

Option Assessment Information	
Option ID	CM2
Option Name	Water efficiency measures
Option Description	Water efficiency measures can be installed within buildings with the purpose of reducing water consumption. Reduced consumption can also benefit the wastewater system by reducing the dry weather flow to be conveyed through the sewer network and through the STWs

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	-/?	-/?	0	0	0	0	-/?	0	0
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

- Biodiversity:** It is not expected that installing water efficiency measures within buildings would lead to any significant construction activity beyond minor installation activities within existing properties, hence it is not expected that there would be any affect designated or non-designated habitats or species, hence a neutral effect has been identified.
- Soils:** It is assumed that the installation of water efficiency measures would take place within existing properties, hence there would be no effect on soils, geodiversity, or land use.
- Water Quality:** It is not expected that the installation of water efficiency measures to reduce water consumption would affect water quality, due to location (within existing properties), the absence of connectivity and provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If properties where the installation of water efficiency to be installed are located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) there is the potential that installation works may be liable to flooding during the construction period (depending on the timing of installation); however, given the small scale nature of the works and their flexibility in installation, this is not considered to have any effects on this objective. If the properties are not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the properties where water efficiency measures are to be installed are located within an Air Quality Management Area (AQMA), construction traffic (i.e. vehicle movements to transport materials to site) could contribute to negative effect on local air quality if a significant number of properties in the same area would have such measures installed, however, these effects are anticipated to be localised, temporary and of short duration.
6. **Greenhouse Gas Emissions:** There would be some carbon emissions as a result of the installation of water efficiency measures to reduce water consumption, although these would be limited to that embodied within the materials/devices and vehicle movements to transport materials/devices. The scale of carbon emissions associated with this option have not been determined at present; however, it is possible to conclude that carbon emissions are likely to be greater in areas where the reduction in consumption is greatest.
7. **Climate Change Resilience:** It is not expected that the installation of household appliances to reduce water consumption would affect this objective.
8. **Economic and Social Wellbeing:** The installation of water efficiency measures to reduce water consumption would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by installers in the local economy.
9. **Health:** It is not expected that there would be any significant effects on human health, beyond very minor and temporary disturbance associated with the installation of measures within properties.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The installation of water efficiency measures to reduce the consumption of water would require materials such as steel and plastic. The scale of resource use associated with this option has not been determined at present; however, it is possible to conclude that resource use is likely to be greater in areas where reductions in water consumption are greater. There is the possibility that waste materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** Due to the nature of the option (installation of water efficiency measures within properties), it is not expected that there would be any significant effects on heritage assets.

13. **Landscape:** It is not anticipated that there would be any effects on landscape/townscape as measures would be installed within existing properties.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. During period of high rainfall, this could reduce the frequency and severity of storm overflows that could affect receiving water quality and impact on water dependent designated conservation sites and for which the HRA would likely conclude no operational effects which is assessed as a positive effect. There may be some indirect impacts associated with the reduction in water consumption and therefore a reduction in abstraction required, however any effects in this regard are uncertain.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. During period of high rainfall, this could reduce the frequency and severity of storm overflows that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.

4. **Flood Risk:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option may require energy for the operation of water efficiency measures designed to reduce water consumption that may result in associated carbon emissions. However, reduced water consumption and therefore demand, may also result in a reduction in the amount of energy required to treat and pump fresh water to customers, as well as a reduction in the quantities of wastewater requiring treatment and therefore an additional reduction in energy requirements and carbon emissions.

7. **Climate Change Resilience:** As noted above, the operation of the option would potentially reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.
8. **Economic and Social Wellbeing:** The option could lead to reduced billing of customers (associated with reduced water consumption) which may have a positive effect on economic and social wellbeing.
9. **Health:** The operation of the option may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding/spills to watercourses by reducing flows in the wastewater network. This would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently potentially reducing the frequency and severity of sewer flooding and spills to watercourses during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.
11. **Waste and resources:** The operation would have no effect on material use.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option would have no effects on landscape/townscape character and visual amenity.

Customer Side Management

CM3 - Rainwater harvesting

Option Assessment Information	
Option ID	CM3
Option Name	Rainwater harvesting
Option Description	Removing surface water from the system and making it available to re-use. By installing measures which collect and store the rainfall before it lands and is lost as runoff. Rainwater harvesting reduces the amount of flow that needs to be conveyed through the sewer network during a storm, thus reducing the likelihood of sewer flooding or spills to watercourse.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	0	-/?	-/?	0	0	-/?	0	-/?	0	0
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but

which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of rainwater harvesting systems, which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the option is situated partially or entirely on previously developed land or would involve rainwater harvesting systems being installed on existing properties without additional land take, this could have a positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If properties where the installation of rainwater harvesting measures are to be installed are located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) there is the potential that installation works may be liable to flooding during the construction period (depending on the timing of installation); however, given the small scale nature of the works and their flexibility in installation, this is not considered to have any effects on this objective. If the properties are not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality. If the option is located outside of an Air Quality Management Area (AQMA) the option may still have a negative effect on air quality, depending on the scale of works required.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery.

7. **Climate Change Resilience:** It is not expected that the installation of household appliances to reduce water consumption would affect this objective.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would require the use of materials such as concrete and steel, however, the quantities of such materials required are not expected to lead to a significant effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** Due to the nature of the option (installation of rainwater harvesting measures within properties), it is not expected that there would be any significant effects on heritage assets.
13. **Landscape:** Due to the nature of the option (installation of rainwater harvesting measures within properties), it is not expected that there would be any significant effects local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network during a storm, by harvesting/collecting rainwater for re-use during such events, thereby reducing the frequency and severity of sewer flooding and/or spills to watercourses, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA would then conclude no operational effects which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.
3. **Water Quality:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network during a storm, by harvesting/collecting rainwater for re-use during such events, thereby reducing the frequency and severity of sewer flooding and/or spills to watercourses, which could affect receiving water quality which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network during a storm, by harvesting/collecting rainwater for re-use during such events, thereby reducing the frequency and severity of sewer flooding, which could have a positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The operation of the option is not expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change which could have a positive effect against this objective. The collection of rainwater for re-use may also have a positive effect on this objective, by increasing the resilience of water supplies and reducing demand on the potable water network.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network during a storm, by harvesting/collecting rainwater for re-use during such events, thereby reducing the frequency and severity of sewer flooding and/or spills to watercourses may have positively affect communities so increasing economic and social wellbeing. The collection of rainwater for re-use may also have a positive effect on this objective, by increasing the resilience of water supplies and reducing demand on the potable water network and potentially reducing water bill costs to customers.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding and/or spills to watercourses and would have a positive effect on the health/mental health of the community.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of sewer flooding and/or spills to watercourses. The operation of the option would also result in a reduction in the consumption of water from the potable water network which would have a positive effect on this objective.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts) which are not considered to have any adverse effects on landscape/townscape character, which may have a minor negative effect on this objective.

Customer Side Management

CM4 - Customer incentives

Option Assessment Information	
Option ID	CM4
Option Name	Customer incentives
Option Description	Financially rewarding customers who sign up to a range of programs which are designed to help customers make smart choices in managing and/or utilising water and wastewater services. This for example could include use of metering/smart metering along with different tariff designs.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

As this option relates to financially rewarding customers who sign up to a range of water/wastewater programmes rather than the implementation of such programmes themselves, it is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the volume of water consumed/water entering the wastewater network, subsequently reducing flows into the wastewater network. During periods of high rainfall, this could reduce the frequency and severity of sewer flooding/spills to watercourses that could affect receiving water quality and impact on water dependent designated conservation sites and for which the HRA would likely conclude no operational effects which is assessed as a positive effect. There may be some indirect positive effect associated with the reduction in water consumption and therefore a reduction in raw water abstraction required, however, any effects in this regard are uncertain.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** The operation of the option would seek to reduce the volume of water consumed/water entering the wastewater network, subsequently reducing flows in the wastewater system. During period of high rainfall, this could reduce the frequency and severity of sewer flooding/spills to watercourses that could affect receiving water quality, which is assessed as a positive effect. There may also be indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.
4. **Flood Risk:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The operation of the option is not expected to directly impact upon carbon emissions, however, reduced water consumption and therefore demand, may result in a reduction in the amount of energy required to treat and pump fresh water to customers, as well as a reduction in the quantities of wastewater requiring treatment and therefore an additional reduction in energy requirements and carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would potentially reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also indirectly result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of water supply, thereby leading to a positive effect on this objective.
8. **Economic and Social Wellbeing:** The option could lead to reduced billing of customers (associated with reduced water consumption and reduced wastewater production) which may have a positive effect on economic and social wellbeing.

9. **Health:** The operation of the option may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding/spills to watercourses by reducing flows in the wastewater network. This would have a positive effect on the health of the community.

10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently potentially reducing the frequency and severity of sewer flooding and spills to watercourses during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.

11. **Waste and resources:** The operation would have no effect on material use.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option would have no effects on landscape/townscape character and visual amenity.

Customer Side Management

CM5 - Domestic and business customer education

Option Assessment Information	
Option ID	CM5
Option Name	Domestic and business customer education
Option Description	A roll out of an education programme to improve understanding of the importance of reduced flows and mis-use of the system, and the impact this has on the environment and sewerage system. Also, education programmes around storm overflows; the pros and cons and balancing investment choices (environment vs bill vs flooding)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

As this option relates to providing an educational programme with the aim of improving the understanding of the importance of reduced flows and mis-use of the system and the impact that this has on the environment and storm overflows, it is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. The option would also seek to reduce mis-use of the system (i.e. disposal of non-flushable items into the system) reducing blockage issues in the wastewater/sewage system. During periods of high rainfall, this could reduce the frequency and severity of storm overflows/sewer flooding that could affect receiving water quality and impact on water dependent designated conservation sites and for which the HRA concludes no operational effects which is assessed as a positive effect. There may be some indirect impacts associated with the reduction in water consumption and therefore a reduction in abstraction required, however any effects in this regard are uncertain.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operation of the option.
3. **Water Quality:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. The option would also seek to reduce mis-use of the system (i.e. disposal of non-flushable items into the system) reducing blockage issues in the wastewater/sewage system. During periods of high rainfall, this could reduce the frequency and severity of storm overflows/sewer flooding that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.
4. **Flood Risk:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** Reduced demand may result in a reduction in the amount of energy required to treat and pump fresh water to customers, as well as a reduction in the quantities of wastewater requiring treatment and therefore an additional reduction in energy requirements and carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would potentially reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.
8. **Economic and Social Wellbeing:** The option could lead to reduced billing of customers (associated with reduced water consumption/wastewater production) which may have a positive effect on economic and social wellbeing. The option would also seek to reduce

mis-use of the system (i.e. disposal of non-flushable items into the system) reducing blockage issues in the wastewater/sewage system and avoiding disruption to service, which could also have a positive effect.

9. **Health:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. The option would also seek to reduce mis-use of the system (i.e. disposal of non-flushable items into the system) reducing blockage issues in the wastewater/sewage system. This may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in storm overflows/sewer flooding, which would have a positive effect on the health of the community.

10. **Water resources:** The operation of the option would seek to reduce the volume of water consumed, subsequently reducing flows in the wastewater system. The option would also seek to reduce mis-use of the system (i.e. disposal of non-flushable items into the system) reducing blockage issues in the wastewater/sewage system. This could lead to a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and reducing the frequency and severity of storm overflows/sewer flooding during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.

11. **Waste and resources:** The operation would have no effect on material use.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option would have no effects on landscape/townscape character and visual amenity.

Customer Side Management

CM6 - Greywater treatment and reuse

Option Assessment Information	
Option ID	CM6
Option Name	Greywater treatment and reuse
Option Description	Install systems to treat and re-use household water (foul) for flushing toilets and gardening use, either at property level or larger scale to reduces both flow and load to the system. The treatment levels considered vary from treatment for potable use to pre-treatment for discharge into the combined or foul sewer network.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	-/?	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

1. Biodiversity: If the construction of the option (systems to treat and re-use household water) is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level

avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of greywater treatment and re-use systems, which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land or would be situated within properties, this could have a positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the flow and load in the wastewater system, by treating and re-using greywater for flushing toilets and gardening use. During periods of high rainfall, this could reduce the frequency and severity of spills to watercourses/sewer flooding that could affect receiving water quality and impact on water dependent designated conservation sites and for which the HRA concludes no operational effects which is assessed as a positive effect. There may be some indirect impacts associated with the reduction in water consumption and therefore a reduction in abstraction required, however any effects in this regard are uncertain.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operation of the option.

3. **Water Quality:** The operation of the option would seek to reduce the flow and load in the wastewater system, by treating and re-using greywater for flushing toilets and gardening use. During periods of high rainfall, this could reduce the frequency and severity of spills to watercourses/sewer flooding that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.

4. **Flood Risk:** The operation of the option would seek to reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** Reduced demand may result in a reduction in the amount of energy required to treat and pump fresh water to customers, as well as a reduction in the quantities of wastewater requiring treatment and therefore an additional reduction in energy requirements and carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would potentially reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.
8. **Economic and Social Wellbeing:** The option could lead to reduced billing of customers (associated with reduced water consumption/wastewater production) which may have a positive effect on economic and social wellbeing.
9. **Health:** The operation of the option would reduce the volume of water consumed, by treating and re-using greywater for flushing toilets and gardening use and would subsequently reduce flows in the wastewater system. This may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in spills to watercourses/sewer flooding, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option would reduce the volume of water consumed, by treating and re-using greywater for flushing toilets and gardening use and would subsequently reduce flows in the wastewater system. This could lead to a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and reducing the frequency and severity of spills to watercourses/sewer flooding during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for treatment of greywater, which may have a negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new above ground infrastructure which may have adverse effects on landscape/townscape character and a negative effect on this objective.

Customer Side Management

CM7 - Charging and bill incentives

Option Assessment Information	
Option ID	CM7
Option Name	Charging and bill incentives
Option Description	Reduction on bills or adapting charging e.g. for surface water removal

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	0	0	+/?	+/?	+/?	0	+/?	0	0	0

Construction

As this option relates to bill and charging incentives, it is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

1. **Biodiversity:** It is not anticipated that the operation of the option would have any direct impacts on biodiversity or designated biodiversity sites, however, there may be some indirect impacts associated with the reduction in water consumption (associated with charging and bill incentives) and therefore a reduction in raw water abstraction required, however, any effects in this regard are uncertain.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** It is not expected that the operation of the option would have any direct impact on water quality, however, there may be indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.
4. **Flood Risk:** The operation of the option would have no effect on flood risk.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The operation of the option is not expected to directly impact upon carbon emissions, however, reduced water consumption and therefore demand associated with charging and bill incentives, may result in a reduction in the amount of energy required to treat and pump fresh water to customers, as well as a reduction in the quantities of wastewater requiring treatment and therefore an additional reduction in energy requirements and carbon emissions.
7. **Climate Change Resilience:** The operation of the option would indirectly result in a reduction in water consumption (through charging and billing incentives) and therefore a reduction in the demand for water resources and increasing the security of water supply, thereby leading to a positive effect on this objective.
8. **Economic and Social Wellbeing:** The option could lead to reduced billing/charging of customers (associated with reduced water consumption and reduced wastewater production) which may have a positive effect on economic and social wellbeing.
9. **Health:** The operation of the option would have no effect on the health of the community.
10. **Water resources:** The operation of the option would indirectly result in a reduction in the consumption of water (through charging and billing incentives) which would have a positive effect on this objective. The option would also result in an indirect reduction in the quantity of water entering the wastewater system which would also result in a positive effect.
11. **Waste and resources:** The operation would have no effect on material use.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option would have no effects on landscape/townscape character and visual amenity.

Indirect Measures

The options assessed for the indirect measures management area are:

- IM1 - Influencing policy
- IM2 - Investigate and monitor
- IM3 - Future technology

Indirect Measures

IM1 - Influencing policy

Option Assessment Information	
Option ID	IM1
Option Name	Influencing policy
Option Description	Influencing national and local policy for example around growth and planning, surface water management etc. to provide benefit to the delivery of drainage and wastewater services

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

It is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

- 1. Biodiversity:** The implementation of the option would seek indirectly through policy changes to reduce the frequency and severity of storm overflows and flooding that could affect receiving water quality that could impact on water dependent designated conservation sites.
- 2. Soils:** No effects on land use, soils or geodiversity are anticipated.
- 3. Water Quality:** The implementation of the option would seek indirectly through policy changes to reduce the volume of water consumed, subsequently flows in the wastewater system. During periods of high rainfall, this could reduce the frequency and severity of sewer flooding and spills to watercourses that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.
- 4. Flood Risk:** The implementation of the option would seek indirectly through policy changes to reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.
- 5. Air Quality:** The implementation of the option is not expected to have effects on air quality.
- 6. Greenhouse Gas Emissions:** The implementation of the option may through policy changes reduce water consumption and associated energy consumption that may result in associated carbon emissions.
- 7. Climate Change Resilience:** As noted above, the implementation of the option would potentially and in the long term reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.
- 8. Economic and Social Wellbeing:** The option in the long term could lead to reduced billing of customers (associated with reduced water consumption/wastewater production) which may have a positive effect on economic and social wellbeing.
- 9. Health:** The operation of the option in the long term may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding and spills to watercourses by reducing flows in the wastewater network. This would have a positive effect on the health of the community.

10. **Water resources:** The implementation of the option could indirectly and in the long term have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently potentially reducing the frequency and severity of sewer flooding and spills to watercourses during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.
11. **Waste and resources:** The implementation would have no effect on material use.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The implementation of the option would have no effects on landscape/townscape character and visual amenity.

Indirect Measures

IM2 - Investigate and monitor

Option Assessment Information	
Option ID	IM2
Option Name	Investigate and monitor
Option Description	Improve understanding of root cause and risk relating to issues identified through BRAVA prior to implementing solutions

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

It is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

1. Biodiversity: The implementation of the option would contribute to the reduction in the frequency and severity of storm overflows and flooding that could affect receiving water quality that could impact on water dependent designated conservation sites.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated.

3. **Water Quality:** The implementation of the option could seek to reduce the volume of water consumed (depending on technologies), subsequently flows in the wastewater system. During periods of high rainfall, this could reduce the frequency and severity of sewer flooding and spills to watercourses that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.

4. **Flood Risk:** The implementation of the option would reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.

5. **Air Quality:** The implementation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The implementation of the option may reduce water consumption and associated energy consumption that may result in associated carbon emissions.

7. **Climate Change Resilience:** As noted above, the implementation of the option would contribute to the reduction in the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.

8. **Economic and Social Wellbeing:** The option in the long term could lead to reduced billing of customers (associated with reduced water consumption/wastewater production) which may have a positive effect on economic and social wellbeing.

9. **Health:** The operation of the option in the long term may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding and spills to watercourses by reducing flows in the wastewater network. This would have a positive effect on the health of the community.

10. **Water resources:** The implementation of the option would contribute to a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently potentially reducing the frequency and severity of sewer flooding and spills to watercourses during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.

11. **Waste and resources:** The implementation would have no effect on material use.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The implementation of the option would have no effects on landscape/townscape character and visual amenity.

Indirect Measures

IM3 - Future technology

Option Assessment Information	
Option ID	IM3
Option Name	Future technology
Option Description	Need to await or develop technology or approach

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

It is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

1. **Biodiversity:** The implementation of the option would contribute to the reduction in the frequency and severity of storm overflows and flooding that could affect receiving water quality that could impact on water dependent designated conservation sites.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated.

3. **Water Quality:** The implementation of the option could seek to reduce the volume of water consumed (depending on technologies), subsequently flows in the wastewater system. During periods of high rainfall, this could reduce the frequency and severity of sewer flooding and spills to watercourses that could affect receiving water quality, which is assessed as a positive effect. There may also be some indirect positive effects on water quality, resulting from reduced water consumption and therefore potential reduced raw water abstraction and hence a benefit on water quality, however, any effects in this regard are uncertain.

4. **Flood Risk:** The implementation of the option would reduce the amount of flow that needs to be conveyed through the sewer network, which could reduce the frequency and severity of sewer flooding (particularly during high rainfall/storm events), that could have a positive effect on communities.

5. **Air Quality:** The implementation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The implementation of the option may reduce water consumption and associated energy consumption that may result in associated carbon emissions.

7. **Climate Change Resilience:** As noted above, the implementation of the option would contribute to the reduction in the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change. The operation of the option would also result in a reduction in water consumption and therefore a reduction in the demand for water resources and increasing the security of supply, thereby leading to a positive effect on this objective.

8. **Economic and Social Wellbeing:** The option in the long term could lead to reduced billing of customers (associated with reduced water consumption/wastewater production) which may have a positive effect on economic and social wellbeing.

9. **Health:** The operation of the option in the long term may potentially help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in sewer flooding and spills to watercourses by reducing flows in the wastewater network. This would have a positive effect on the health of the community.

10. **Water resources:** The implementation of the option would contribute to a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently potentially reducing the frequency and severity of sewer flooding and spills to watercourses during high rainfall events. The operation of the option would also result in a reduction in the consumption of water which would have a positive effect on this objective.

11. **Waste and resources:** The implementation would have no effect on material use.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The implementation of the option would have no effects on landscape/townscape character and visual amenity.

Sludge

The options assessed for the sludge management area are:

- B1 - Resource recovery
- B2 - Sludge centre rationalisation
- B3 - Sludge centre decentralisation
- B4 - Increase treatment capacity

Sludge

B1 - Resource recovery

Option Assessment Information	
Option ID	B1
Option Name	Resource recovery
Option Description	Utilising technology to recycle valuable resources within sludge. [Typically, it would be assumed that the application of the option would take place on existing wastewater treatment works sites; however, it may require an increase in footprint of the existing works, or very rarely may require the development of a new site, which could be either greenfield or PDL. It is assumed that the processes would be consented and would not alter existing sludge disposal routes.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	0	-/?	0	0	0	-/?
	Operation (positive)	0	0	0	0	+/?	+/?	0	+/?	0	0	++/?	0	0

Construction

1. **Biodiversity:** If the location of the option is on an existing wastewater treatment works it is likely to be at distance from any designated conservation sites and features and as a result is unlikely to have any negative effects. If it is located on either an extended footprint or a new site more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures (confirmed by the HRA). If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these

circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective. If the option is situated partially or entirely on previously developed land this could have a minor positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete and steel, which, depending on the scale of construction would have a negative effect against this objective. There is the possibility that waste from building materials such as steel and plastic, which could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the location of the option is on an existing wastewater treatment works it is unlikely to have any negative effects on this objective. Similarly, if the option is an extension to a wastewater treatment works site or on a new site, which is located more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practise and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the location of the option is on an existing wastewater treatment works it is unlikely to have any negative effects on this objective, given that any new infrastructure will be with an existing industrial site. Similarly, if the option is an extension to a wastewater treatment works site or on a new site, that is located more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, and in particular if construction would introduce above ground infrastructure, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would involve the recovery of resources from sludge from sewage/wastewater treatment which is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise associated with the operation of infrastructure.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** The operation of the option would involve the recovery of resources from sludge from sewage/wastewater treatment, which is not expected to have any effect on water quality.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option involves the incineration of sludge to recover heat/energy this may result in a negative effect on local air quality, particularly if the option is located within an AQMA. If the option requires the transportation of sludge from a wastewater treatment works to a separate resource recovery facility, this would require vehicle movements which could also have a negative effect on local air quality. If the treatment processes reduced odour there could be beneficial effects on local air quality.
6. **Greenhouse Gas Emissions:** If the operation of the option requires energy for the recovery of materials from sludge or involves the incineration of sludge to recover energy/heat then this may lead to carbon emissions and a negative effect on this objective. If the option requires the transportation of sludge from a wastewater treatment works to a separate resource recovery facility, this would require vehicle movements which could also have a negative effect on carbon emissions. Recovery of resources could lead to carbon reductions of raw materials when compared to the energy required in winning the resource. Anaerobic digestion of sludge could provide methane gas, which can then be used to provide lower carbon sources of energy.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The recovery of resources from sludge could have a positive effect on the local economy, for example through the provision of energy and heat recovered from sludge, or raw materials (such as plastics, metals, and nutrients). The operation of the option may also require additional staff to operate the facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing.
9. **Health:** The operation of facilities and any vehicle movements may have localised effects on air quality and noise which could have negative effects on health.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.

11. **Waste and resources:** The operation of the option would involve the recovery of valuable resources from sludge from water treatment which would have a positive effect on this objective, which could be potentially significant depending on the volumes involved.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. resource recovery infrastructure or incinerators) which may have adverse effects on landscape/townscape character, which may have a negative effect on this objective.

Sludge

B2 - Sludge centre rationalisation

Option Assessment Information	
Option ID	B2
Option Name	Sludge centre rationalisation
Option Description	Close localised on-site sludge treatment and transfer for treatment at a central sludge centre (e.g. MBC). [It is assumed that if required, the new sludge centre would be consented and would not affect existing treatment and disposal routes.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	0	0	+/?	0	0

Construction

1. **Biodiversity:** If the construction of the central sludge centre is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely

significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure (centralised sludge treatment centre), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land or would be situated within the operational boundaries of an existing site this could have a positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. Depending on the scale of the new plant, the embodied carbon associated with construction could be significant.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. Depending on the scale of the new plant, the capex associated with construction could be significant.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics. Depending on the scale of the new plant, the resources and materials associated with construction could be significant. There is the possibility that waste from building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would involve the transfer of sludge from wastewater treatment works to a centralised sludge treatment centre for treatment, which is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from the transportation and treatment of sludge.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase.

3. **Water Quality:** The operation of the option would involve the transfer of sludge from wastewater treatment works to a centralised sludge treatment centre for treatment, which is not expected to have any effect on water quality, assuming that this would not affect existing treatment or disposal routes.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option would involve the transportation of sludge from wastewater treatment works to a separate central sludge centre, which would require vehicle movements and could have a negative effect on local air quality, particularly if the option is located within an AQMA.
6. **Greenhouse Gas Emissions:** The treatment of sludge would require energy with resulting carbon emissions in addition to emissions from the transportation of sludge to the centralised sludge centre. However, centralised treatment of sludge could result in a reduction in the energy required for sludge treatment when compared to on site treatment at wastewater treatment works sites, which could have a positive effect on this objective.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option may require additional staff to operate the centralised sludge treatment facility which could provide additional jobs, with a positive effect on the local economy and social wellbeing. Reduced energy requirements associated with the centralisation of sludge treatment could also have a positive effect on the local economy.
9. **Health:** The operation of the option would require the transportation of sludge from wastewater treatment works to a separate sludge treatment centre (requiring vehicle movements) this could have a negative effect on local air quality and hence health. The operation of facilities and any vehicle movements may also lead to noise which could also have a negative impact on health.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for the treatment of sludge, which may have a negative effect on this objective, however, centralising the process of sludge treatment may reduce the quantities of such materials required, compared to on site treatment at wastewater treatment works, which could have a positive effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option would introduce new permanent above ground infrastructure (centralised sludge treatment centre) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Sludge

B3 - Sludge centre decentralisation

Option Assessment Information	
Option ID	B3
Option Name	Sludge centre decentralisation
Option Description	Remove flows from a central treatment centre and create smaller localised treatment options. [It is unclear how many new sites would be required, and the extent to which treatment options would be on existing U UW assets but that it is assumed that the option would still require multiple new sites and that they would be dispersed across U UW's area serving a sub-regional area. It is assumed that the new sludge centres would be consented and would not affect existing treatment and disposal routes.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	--/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	--/?	--/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	+/?	+/?	0	+/?	0	0	0	0	0

Construction

1. Biodiversity: If the construction of the option (decentralised sludge treatment/storage facilities) involves sites situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option involved sites located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and

established scheme-level avoidance or mitigation measures. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure (localised sludge treatment options), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land or would be situated within the operational boundaries of an existing wastewater treatment works site this could have a positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. Depending on the scale of the new localised treatment works required, the embodied carbon associated with construction could be significant.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. Given the dispersed number of sites, it is possible that economic benefits

would be spread across the region. Depending on the scale and number of new works required, the capex associated with construction could be significant.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics. Depending on the number and scale of the new treatment works, the resources associated with construction could be significant. There is the possibility that waste from building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated landscapes, the potential for effects is heightened.

Operation

1. **Biodiversity:** The operation of the option is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from the transportation (if required) and treatment of sludge. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated, however, if the option involves temporary/mobile treatment facilities (as opposed to permanent infrastructure), there is the possibility that land would eventually be reinstated.
3. **Water Quality:** The operation of the option would involve the treatment of sludge either on site or nearby to wastewater treatment works, which is not expected to have any effect on water quality.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option would involve the transportation of sludge from wastewater treatment works to separate sludge treatment facilities, this could require vehicle movements and could have a negative effect on local air quality, particularly if the option is located within an AQMA. However, if new sludge treatment facilities are located on site at wastewater treatment works sites (and therefore would not require transportation) or would result in a reduction in the distance sludge would be transported then there could be a positive effect on this objective.
6. **Greenhouse Gas Emissions:** The treatment of sludge would require energy with resulting carbon emissions in addition to any emissions from the transportation of sludge from the wastewater treatment works to the sludge treatment facilities (if required). However, if new sludge treatment facilities are located on site at wastewater treatment works sites (and therefore would not require transportation) or would result in a reduction in the distance sludge would be transported then there could be a positive effect on carbon emissions.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option may require additional staff to operate sludge treatment facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing.
9. **Health:** The operation of the option may require vehicle movements to transport sludge from wastewater treatment works to separate sludge treatment facilities, if not located on site, this could have a negative effect on local air quality and hence health. The operation of facilities and any vehicle movements may also lead to noise which could also have a negative impact on health.

10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for the treatment of sludge, which may have a negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option would introduce new above ground infrastructure (sludge treatment facilities) which may have adverse effects on landscape/townscape character and a negative effect on this objective.

Sludge

B4 - Increase treatment capacity

Option Assessment Information	
Option ID	B4
Option Name	Increase treatment capacity
Option Description	Increase the efficient use of the existing capacity with the existing assets or invest in new assets to provide additional capacity within site footprint.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	+/?	0	+/?	0	0	+/?	0	+/?	+/?	0	+/?	0	0

Construction

1. **Biodiversity:** If the option involves the efficient use of existing capacity of existing assets rather than the construction of additional new infrastructure then it is not anticipated that there will be any effects on biodiversity during construction. If the option requires the construction of additional new infrastructure to provide additional capacity within existing sites, and construction is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that

there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if additional greenfield land is required) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** If construction of new infrastructure is required, the construction of the option may require greenfield land take, which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective, however it is noted that the option description states that new assets would be situated within existing site footprint, which could have a positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that any construction of the option (if required) would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) and construction is required, construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction activity would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If construction activity is required, then construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA). If no construction is required (i.e. if the option would involve the efficient utilisation of existing capacity rather than construction of new capacity) then the effect would be neutral.

6. **Greenhouse Gas Emissions:** If construction activity is required, then the construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. If no additional construction is required (i.e. utilisation of existing capacity), then the effect would be neutral.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) and requires construction then construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** Construction of the option (if required) would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** If construction is required, construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option (if required) would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of the option (if required) would require the use of materials such as concrete, steel and plastics. There is the possibility that waste from building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the location of the option is on an existing asset e.g. wastewater treatment works it is unlikely to have any negative effects on this objective. Similarly, if the option is an extension to a wastewater treatment works site or on a new site, it is located more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practise and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the location of the option is on an existing asset e.g. wastewater treatment works it is unlikely to have any negative effects on this objective, given that any new infrastructure will be with an existing industrial site. Similarly, if the option is an extension to a wastewater treatment works site or on a new site, it is located more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, and in particular if construction would introduce above ground infrastructure, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from the treatment of sludge or transportation of sludge to treatment sites (if required, for example if importing sludge from other regions). It is assumed that any increase in effluent discharged would be consented, and as a result would not affect downstream water bodies or water dependent conservation sites. If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in concentrations of nutrients being discharged with resultant positive effects on biodiversity.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** The operation of the option would involve the treatment/processing of sludge. It is assumed that any increase in effluent discharged would be consented, and as a result would not affect the water quality of downstream water bodies. If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in concentrations of nutrients being discharged with resultant positive effects on water quality.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option involves the incineration of sludge this may result in a negative effect on local air quality, particularly if the option is located within an AQMA. If the option requires the transportation of sludge (e.g. if importing sludge from other regions) this would require vehicle movements which could also have a negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The operation of the option would require energy for the treatment/processing of sludge, which would lead to carbon emissions. If option involves the incineration of sludge, then this may lead to carbon emissions and a negative effect on this objective. If the option requires the transportation of sludge, this would require vehicle movements which could also have a negative effect on carbon emissions. If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in power requirements and carbon emission with resultant positive effects.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The treatment/processing of sludge could have a positive effect on the local economy, for example through the provision of energy and heat recovered from sludge if the option involves incineration. The operation of the option may also require additional staff to operate the facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing.
9. **Health:** If the operation of the option involves the incineration of sludge or requires the transportation of sludge (requiring vehicle movements) this could have a negative effect on local air quality and hence health. The operation of facilities and any vehicle movements may also lead to noise which could also have a negative impact on health. The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.

11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for the treatment of sludge, which may have a negative effect on this objective. If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in resource use which could have a positive effect.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. new treatment infrastructure) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Surface Water Management

The options assessed for the surface water management area are:

- SW1 - Surface water source control measures
- SW2 - Surface water pathway interception measures
- SW3 - Attenuation

Surface Water Management

SW1 - Surface water source control measures

Option Assessment Information	
Option ID	SW1
Option Name	Surface water source control measures
Option Description	Managing surface water and maximising its potential for re-use. Opportunities for large-scale source control installation such as retrofitting in highways and around buildings, as well as aligning with ongoing programmes like local authority highway upgrades or major opportunity area developments.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Surface water source control measures	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, construction of SuDS or blue/green infrastructure is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely

significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of SuDS technology and blue/green corridors (e.g. wetlands, rain gardens, swales). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of SuDS technology and blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, rain gardens, soakaways, bioretention, tree pits, permeable paving), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology and blue/green infrastructure being retrofitted to existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.) this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option may require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to construction locations and potentially the operation of plant and machinery. However, for the majority of options, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, plastic and steel, however, the quantities of such materials required are not expected to lead to a significant effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

- 1. Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
- 2. Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.
- 3. Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.
- 4. Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.
- 5. Air Quality:** The operation of the option is not expected to have effects on air quality.
- 6. Greenhouse Gas Emissions:** The introduction of surface water control measures is aimed at reducing stormwater and run-off entering the wastewater treatment network, and so requiring pumping and treatment. They will be associated with an energy saving proportionate to the surface water diverted from the system. This will be associated with an operational carbon saving. Retrofitting blue/green infrastructure on existing properties (e.g. green roofs, rain gardens etc.) may also improve uptake of carbon dioxide in the atmosphere, which could contribute to a minor positive effect on this objective (due to the scale of works). If the operation of the option requires additional energy input (e.g. pumping of stored rainfall) this may also have a minor negative effect on this objective.
- 7. Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.
- 8. Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of additional green areas in urban environments (e.g. rain gardens, wetlands, blue/green corridors) may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of additional green areas in urban environments (e.g. rain gardens, wetlands, blue/green corridors) may also have a positive effect on health.

10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention. Rainfall harvesting may reduce the use alternative water resources (e.g. potable, river or groundwater supplies), which would be a positive effect for this objective.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts) which may have adverse effects on landscape/townscape character, which may have a minor negative effect on this objective. However, certain SuDS features and blue/green infrastructure, such as swales, wetlands, attenuation ponds, rain gardens, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Surface Water Management

SW2 - Surface water pathway interception measures

Option Assessment Information	
Option ID	SW2
Option Name	Surface water pathway interception measures
Option Description	The need to provide safe conveyance (as opposed to storage) for floodwater during an extreme rainfall event (when the capacity of the sewer network is exceeded). Could, significantly mitigate the risk of considerable damage to public and private property and even loss of life that could result from an extreme rainfall event.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Surface water pathway interception measures	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	-/?	-/?	0	-/?	0	-/?	0	-/?	0	0	0	0	-/?
	Operation (positive)	+/?	+/?	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, construction of the option is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but

which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the introduction of SuDS technology or land-use changes (e.g. rain gardens, street trees, swales, river and floodplain restoration). More generally construction of infrastructure for the option could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant (due to scale).

2. **Soils:** Construction of the option may require greenfield land take for the separation of surface and foul water networks, change in land-use, or introduction of SuDS technology, which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology being introduced to existing sites without additional land take, this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction activities may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Construction activities would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option may require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have

a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. pipeline excavation), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option may require the use of materials such as concrete, plastic and steel for additional infrastructure, which would generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

- 1. Biodiversity:** The operation of the option would seek to reduce the impact of surface water flooding through enhanced interception of water during extreme rainfall events, which could reduce flooding of designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. If the operation of the option would have no effect on any designated features, then the effect would be neutral. Depending on the location and type of potential land-use changes (e.g. river and floodplain restoration) and timing/extent of rainfall events, operation of the option has the potential to adversely impact non-designated habitats and species that were not previously affected by flooding, however, any effect in this regard is not expected to be significant (due to scale).
- 2. Soils:** Depending on the location and type of potential changes to land-use or agricultural practices (e.g. river and floodplain restoration, changing arable land to grassland), operation of the option has the potential to positively affect soils through enhanced management or less intensive use. Land-use change may adversely affect soil quality and structure if this involves sacrificial flooding of previously unaffected areas (e.g. a change in soil conditions, contamination from diverted urban water run-off), however, any effect in this regard is not expected to be significant (due to scale).
- 3. Water Quality:** The operation of the option would seek to divert surface water from foul water networks and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
- 4. Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities. Land-use changes for the option may introduce flooding on previously unaffected agricultural land, however, this is expected to be managed to reduce the overall effects of flooding from extreme rainfall event, and any effect in this regard is not expected to be significant.
- 5. Air Quality:** The operation of the option is not expected to have effects on air quality.
- 6. Greenhouse Gas Emissions:** Introducing SuDS technology or changing agricultural practices (e.g. rain gardens, street trees, riparian tree planting etc.) may improve uptake of carbon dioxide in the atmosphere, which could have a minor positive effect on this objective (due to the scale of works). If the operation of the option requires additional energy input (e.g. additional pumping for diverted surface water flows) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
- 7. Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Changes in land-use or agricultural practices to divert surface water under this option may adversely impact economic returns for agricultural businesses, particularly if viable alternative uses are not identified or compensation is not available for loss of land, however, any effect in this regard it not expected to be significant (due to scale).
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by separating surface water from foul water networks and subsequently reducing the frequency and severity of flooding and storm overflows.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. pumping stations) which may have adverse effects on landscape/townscape character, which may have a minor negative effect on this objective. However, certain SuDS features, such as tree planting, swales, and rain gardens, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Surface Water Management

SW3 - Attenuation

Option Assessment Information	
Option ID	SW3
Option Name	Attenuation
Option Description	Regional level surface water management.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Attenuation	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, construction of additional attenuation capacity for the option (e.g. tanks, ponds, connecting pipework and ancillary equipment) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction activities, that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional

habitats through the use of SuDS technology (e.g. wetlands, attenuation ponds). More generally construction for the option could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of attenuation infrastructure (e.g. wetlands, ponds, SuDS features), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land without additional land take, this could have a minor positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of any additional infrastructure for the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction of any additional infrastructure for the option may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to a negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of additional infrastructure for the option may require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) any construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of additional infrastructure for the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. excavation for pipe connections to the drainage network), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of additional infrastructure for the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction aspects for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of additional infrastructure for the option may require the use of materials such as concrete, steel and plastics, which may generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to optimise drainage capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.
3. **Water Quality:** The operation of the option would seek to optimise drainage capacity and reduce the frequency and severity of storm overflows that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The introduction of surface water management measures could reduce the volume of stormwater and run-off entering the wastewater treatment network, and so requiring pumping and treatment. They will be associated with an energy saving proportionate to the surface water diverted from the system. This will be associated with an operational carbon saving. However, if the operation of the option requires additional energy input (e.g. operation of pumps or valve controls for the controlled release of attenuated surface water) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities, through the attenuation of storm flows, so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding through the attenuation of storm flows, which may positively affect communities, so increasing economic and social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect on network infiltration, by optimising capacity in the system and subsequently reducing the frequency and severity of flooding and storm overflows.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. tanks, pumps) which may have adverse effects on landscape/townscape character, which may have a minor negative effect on this objective. However, certain SuDS features such as wetlands or attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Wastewater Treatment

The options assessed for the wastewater treatment management area are:

- W1 - Treat or pre-treat wastewater in the network
- W2 - Increase treatment capacity
- W3 - Intelligent treatment works operation
- W4 - Treatment works rationalisation
- W5 - Treatment works de-centralisation
- W6 - Modification of consent / permits
- W7 - Catchment management initiatives
- W8 - Effluent reuse

Wastewater Treatment

W1 - Treat or pre-treat wastewater in the network

Option Assessment Information	
Option ID	W1
Option Name	Treat or pre-treat wastewater in the network
Option Description	Chemical dosing prior to flow reaching the treatment works to relieve the load transferred to the STW or to remove contaminants. [Assessment assumes pre-treatment occurs at either new sites or on existing wastewater treatment works but before water enters existing treatment processes.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	0	0	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	0	0	0	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the location of the option is on an existing wastewater treatment works it is likely to be at distance from any designated conservation sites and features and as a result is unlikely to have any negative effects. If a new site is needed and construction of the option is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these

circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure (chemical dosing equipment), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land or would be situated within the operational boundaries of existing infrastructure (e.g. pumping stations) this could have a positive effect on this objective. If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics for any new infrastructure (with the effects of chemicals for dosing addressed in operation. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the location of the option is on an existing wastewater treatment works it is unlikely to have any negative effects on this objective. Similarly, if the option is an extension to a wastewater treatment works site or on a new site that is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the location of the option is on an existing wastewater treatment works it is unlikely to have any negative effects on this objective. Similarly, if the option is an extension to a wastewater treatment works site or on a new site that is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from chemical dosing equipment, however, this is expected to be negligible.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** The operation of the option would involve pre-treating sewage/wastewater flows prior to flows reaching the treatment works, which is not expected to have any effect on water quality.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option may require the transportation of chemicals/materials for pre-treatment to the chemical dosing sites, this would require vehicle movements which could have a negative effect on local air quality, however, this is likely to be minor.
6. **Greenhouse Gas Emissions:** The operation of the option would require energy for chemical dosing, which would lead to carbon emissions. If the option requires the transportation of chemicals/materials for pre-treatment to the chemical dosing infrastructure/sites, this would require vehicle movements which could also have a negative effect on carbon emissions.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option would involve an increase in the wastewater treatment capacity provided to the community, which would have a positive effect on this objective. The operation of the option may require additional staff to operate the facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing.
9. **Health:** The operation of the option would involve an increase in the wastewater treatment capacity provided to the community, which would have a positive effect on this objective.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.

11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for the pre-treatment of wastewater/sewage, which may have a negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. new pre-treatment infrastructure) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Wastewater Treatment

W2 - Increase treatment capacity

Option Assessment Information	
Option ID	W2
Option Name	Increase treatment capacity
Option Description	Increase the efficient use of the existing capacity with the existing assets or invest on new assets to provide additional capacity within site footprint.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	0	-/?	-/?	?	-/?	0	-/?	0	-/?
	Operation (positive)	+/?	0	0	0	0	+/?	0	+/?	+/?	0	0	0	0

Construction

1. Biodiversity: If the option involves the efficient use of existing capacity of existing assets rather than the construction of additional new infrastructure then it is not anticipated that there will be any effects on biodiversity during construction. Additionally, if the option requires the construction of additional new infrastructure to provide additional capacity within existing sites, and construction is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be indirect effects from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures.

More generally construction of the scheme could affect non-designated habitats and species; however, any effect in this regard is not expected to be significant.

2. **Soils:** If construction of new infrastructure is required, the construction of the option may require greenfield land take, which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective, however it is noted that the option description states that new assets would be situated within existing site footprint, which could have a positive effect on this objective. If the option is not located in or adjacent to a designated geological site (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that any construction of the option (if required) would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) and construction is required, construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Any construction activity would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If construction activity is required, then construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA). If no construction is required (i.e. if the option would involve the efficient utilisation of existing capacity rather than construction of new capacity) then the effect would be neutral.

6. **Greenhouse Gas Emissions:** If construction activity is required, then the construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. If no additional construction is required (i.e. utilisation of existing capacity), then the effect would be neutral.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) and requires construction then construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** Construction of the option (if required) would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** If construction is required, construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option (if required) would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** Construction of the option (if required) would require the use of materials such as concrete, steel and plastics. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible (if construction is required), depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.
13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible (if construction is required), depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from the treatment operations or transportation (tankering) of flows to treatment sites (if required, for example if sending flows to larger wastewater treatment works to support smaller wastewater treatment works during peak times (e.g. tourist season)). If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in concentrations of nutrients being discharged with resultant positive effects on biodiversity.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** The operation of the option would involve increasing wastewater/sewage treatment at existing/enhanced sites, which is not expected to have any effect on water quality.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option requires the transportation (tankering) of flows to treatment sites (if required, for example if sending flows to larger wastewater treatment works to support smaller wastewater treatment works during peak times (e.g. tourist season)) this would require vehicle movements which could have a negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The operation of the option would require energy for wastewater/sewage treatment which would lead to carbon emissions. If the option requires the transportation of flows to treatment sites (as described above), this would require vehicle movements which could also have a negative effect on carbon emissions. If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in power requirements and carbon emission with resultant positive effects.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option would involve an increase in the wastewater treatment capacity provided to the community, which would have a positive effect on this objective. The operation of the option may require additional staff to operate the facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing.
9. **Health:** The operation of the option would involve an increase in the wastewater treatment capacity provided to the community, which would have a positive effect on this objective. The operation of the option may also help to ensure that surface water and bathing water quality is maintained within statutory limits. The operation of facilities and any vehicle movements may however, lead to noise/impacts on air quality which could have a negative impact on health.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for the treatment of wastewater/sewage, which may have a negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. new treatment infrastructure) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Wastewater Treatment

W3 - Intelligent treatment works operation

Option Assessment Information	
Option ID	W3
Option Name	Intelligent treatment works operation
Option Description	Optimising the site to improve efficiency [Assumption that if any construction is required, it would be small in scale and situated on the existing treatment works site.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	0	0	-/?	-/?	-/?	-/?	0	-/?	0	-/?	0	0
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	0	-/?	-/?	0	0	0	0	0	0
	Operation (positive)	+/?	0	+/?	+/?	0	+/?	+/?	+/?	+/?	+/?	0	0	0

Construction

1. Biodiversity: If the option involves the efficient use of an existing site assets rather than the construction of additional new infrastructure then it is not anticipated that there will be any effects on biodiversity during construction. Additionally, if the option requires the construction of additional new infrastructure to improve efficiency within existing sites, and construction is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be indirect effects from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but

which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species; however, any effect in this regard is not expected to be significant.

2. **Soils:** It is assumed that if any construction is required, it would be small in scale and situated on the existing treatment works site.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works (if required) may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA), however, the scale of construction (if required) and associated effect, is anticipated to be minor.
6. **Greenhouse Gas Emissions:** Construction (if required) would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is anticipated that any construction (if required) would be minor in scale.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works (if required) may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option (if required) would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. However, it is noted that if construction is required it is likely to be small in scale and hence the effect would be minor.
9. **Health:** If construction is required, construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be minor, localised, and temporary in nature.

10. **Water resources:** It is not expected that construction of this option (if required) would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option (if required) would require use of materials such as concrete, steel and plastics. However, it is anticipated that the scale of construction and associated material requirements would be minor. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** Any construction if required would be small in scale, temporary and situated in the existing treatment works site and as such any effects would be very limited.
13. **Landscape:** Any construction if required would be small in scale, temporary and situated in the existing treatment works site and as such any effects would be very limited.

Operation

1. **Biodiversity:** The operation of the option could potentially include measures to improve site efficiency including remote monitoring and control to reduce the impact of discharges (e.g. tidal discharge to allow for dispersion), which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA may conclude no operational effects which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase.
3. **Water Quality:** As noted above, the operation of the option could potentially include remote monitoring and control to reduce the impact of discharges (e.g. tidal discharge to allow for dispersion), that could affect receiving water quality which could have a positive effect on this objective.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, more intelligent operation of treatment works could include limiting discharges during high rainfall/storm events to reduce flooding, which may have a positive effect on this objective. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is not expected to have any significant effect on carbon emissions, however, there may be minor effects related to carbon emissions associated with energy requirements of improvements. If the option improves the efficiency or functioning of the existing treatment, it may contribute to a reduction in power requirements and carbon emission with resultant positive effects.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, as noted above, the operation of the option may help to reduce the frequency and severity of flooding that could affect communities (through improved monitoring and control) so increasing the resilience to the effects of climate change which could have a positive effect against this objective.
8. **Economic and Social Wellbeing:** The operation of the option would involve an improvement in the efficiency in the wastewater treatment capacity provided to the community, which could have a positive effect on this objective. The operation of the option may also require additional staff, which could provide additional jobs, with a positive effect on the local economy and social wellbeing. Additionally, as noted above, the operation of the option may help to reduce the frequency and severity of flooding that could affect communities (through improved monitoring and control), which would also have a positive effect on this objective.
9. **Health:** The option would involve an improvement in the efficiency in the wastewater treatment capacity provided to the community provided to the community, with a positive effect on this objective. Additionally, as noted above, the operation of the option may help to reduce the frequency and severity of flooding that could affect communities (through improved monitoring and control), which would also have a positive effect on this objective.
10. **Water resources:** The option would involve an improvement in the efficiency in the wastewater treatment capacity provided to the community provided to the community, with a positive effect on this objective.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** There would be no operational effects on designated landscape assets.

Wastewater Treatment

W4 - Treatment works rationalisation

Option Assessment Information	
Option ID	W4
Option Name	Treatment works rationalisation
Option Description	Close smaller treatment works and transfer flows to a larger one. [It is assumed that if required, a new wastewater treatment works would be consented.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	0	-/?	-/?	0	-/?	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	+/?	0	0

Construction

1. **Biodiversity:** If the option involves the construction of a new centralised treatment works/transfer pipelines which are situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option involves the construction of a new centralised treatment works/transfer pipelines and is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation

measures. More generally construction of the scheme (if required) could affect non-designated habitats and species through direct land take (if situated on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure, (centralised treatment works/transfer pipelines), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. However, it is noted that any soils displaced during pipeline works would be reinstated following completion. If the construction of the option is situated partially or entirely on previously developed land or would be situated within the operational boundaries of an existing site this could have a positive effect on this objective. If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. Depending on the scale of the new plant (if required), the embodied carbon associated with construction could be significant.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. Depending on the scale of the new plant (if required), the capex associated with construction could be significant.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown. Depending on the scale of the new plant (if required), the material and resource use associated with construction could be significant.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would involve the transfer of wastewater/sewage flows for treatment at a centralised treatment works, which is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from the treatment of wastewater/sewage.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase.

3. **Water Quality:** The operation of the option would involve the transfer of flows to a centralised treatment works for treatment, which is not expected to have any effect on water quality.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The transfer (pumping) and treatment of wastewater/sewage would require energy with resulting carbon emissions. However, centralised treatment could result in a reduction in the energy required, when compared to treatment at multiple smaller wastewater treatment works sites, which could have a positive effect on this objective.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option would involve an increase/improvement in the wastewater treatment capacity provided to the community. The operation of the option may also require additional staff to operate the centralised treatment facility which could provide additional jobs, with a positive effect on the local economy and social wellbeing. Reduced energy requirements associated with the centralisation of treatment works could also have a positive effect on the local economy.
9. **Health:** The operation of the option would potentially involve an increase/improvement in the wastewater treatment capacity provided to the community, with a positive effect on this objective. The operation of treatment facilities may however, lead to noise which could have a negative impact on health.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for wastewater/sewage treatment, which may have a negative effect on this objective, however, centralising the process of treatment may reduce the quantities of such materials required, compared to treatment at a number of smaller wastewater treatment works, which could have a positive effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option would introduce new permanent above ground infrastructure (centralised treatment works) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Wastewater Treatment

W5 - Treatment works de-centralisation

Option Assessment Information	
Option ID	W5
Option Name	Treatment works de-centralisation
Option Description	Remove flows from a treatment works and create localised treatment works. [It is unclear how many new sites would be required, and the extent to which treatment options would be on existing UuW assets but it is assumed that the option would still require multiple new sites and that they would be dispersed across UuW's area serving a sub-regional area. It is assumed that the new localised treatment works would be consented.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	--/?	-/?	0	-/?	-/?	--/?	-/?	0	-/?	0	--/?	--/?	--/?
	Construction (positive)	0	+/?	0	0	0	0	0	++/?	0	0	+/?	0	0
	Operation (negative)	-/?	0	0	-/?	0	-/?	-/?	0	0	0	-/?	0	-/?
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	0	0	0

Construction

1. **Biodiversity:** If the construction of the localised treatment works required by the option is situated on sites more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option involves sites located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then

conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Given the assumed increase in the number sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure (localised treatment works), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land this could have a positive effect on this objective. If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. Depending on the scale and number of the new localised treatment works, the embodied carbon associated with construction could be significant.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. Given the dispersed number of sites, it is possible that economic benefits

would be spread across the region. Depending on the scale and number of new works required, the capex associated with construction could be significant.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics. Depending on the number and scale of the new treatment works, the resources associated with construction could be significant.

There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option is not expected to lead to any significant effects on designated or non-designated habitats or species, beyond any noise arising from the treatment works at localised treatment sites. Given the assumed increase in the number of sub-regional sites, and the potential for some to be located in proximity to designated sites, the potential for effects is heightened.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase.
3. **Water Quality:** The operation of the option would involve localised treatment of wastewater/sewage, which is not expected to have any effect on water quality.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** Sewage/wastewater treatment would energy with resulting carbon emissions However, if the option would result in a reducing in the distance that sewage/wastewater would need to be transferred (e.g. through pumped pipelines) this could result in a reduction in the energy required and associated carbon emissions.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option would involve an increase/improvement in the wastewater treatment capacity provided to the community. The operation of the option may also require additional staff to operate the centralised treatment facility which could provide additional jobs, with a positive effect on the local economy and social wellbeing.
9. **Health:** The operation of the option would potentially involve an increase/improvement in the wastewater treatment capacity provided to the community, with a positive effect on this objective. The operation of treatment facilities may however, lead to noise which could have a negative impact on health.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for wastewater/sewage treatment, which may have a negative effect on this objective.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option would introduce new above ground infrastructure (water treatment works) which may have adverse effects on landscape/townscape character and a negative effect on this objective.

Wastewater Treatment

W6 - Modification of consent / permits

Option Assessment Information	
Option ID	W6
Option Name	Modification of consent / permits
Option Description	Review the permit with the Environment Agency and agree new permit conditions. [It is assumed that the new permit conditions would lead to tighter discharge standards.]

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	-/?	0	0
	Operation (positive)	+/?	0	+/?	0	0	0	0	+/?	+/?	0	0	0	0

Construction

As this option relates to reviewing permits, it is assumed that no construction would directly arise from the implementation of this option. Therefore, a neutral effect has been determined against all objectives.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce permitted discharge concentrations could impact positively on water dependent designated conservation sites.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated following the reinstatement of land following the construction stage.
3. **Water Quality:** The operation of the option would seek to reduce permitted discharge concentrations, which could impact positively on receiving water quality.
4. **Flood Risk:** The operation of the option would have no effect on flood risk.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The operation of the option may require additional treatment in order to meet the new permit conditions which may increase energy use and associated carbon emissions.
7. **Climate Change Resilience:** The operation of the option would have no effect on flood risk and climate resilience.
8. **Economic and Social Wellbeing:** The operation of the option would involve an increase in the wastewater treatment provided to the community. It could help address issues associated with nutrient neutrality which are affecting planning permissions of new housing developments.
9. **Health:** The operation of the option would involve an increase in the wastewater treatment provided to the community and could ensure that surface water and bathing water quality is maintained within statutory limits.
10. **Water resources:** The operation of the option would have no effect on water resources.
11. **Waste and resources:** The operation of the option could materials such as chemical dosing to meet the new permit conditions.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option is not within or in close proximity to any landscape and would have no effects on landscape/townscape character and visual amenity.

Wastewater Treatment

W7 - Catchment management initiatives

Option Assessment Information	
Option ID	W7
Option Name	Catchment management initiatives
Option Description	These options are concerned with treating either diffuse or point-source non-domestic elements of wastewater before they enter the sewer system, or by treating and controlling the other contributors to the environment. This includes working with Environment Agency and other stakeholders on nutrient balancing and other integrated catchment solutions.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	-/?	-/?	-/?	-/?	-/?	0	0	-/?	0	-/?
	Operation (positive)	+/?	0	+/?	0	0	0	0	0	+/?	+/?	0	0	0

Construction

1. **Biodiversity:** If the construction of the option (e.g. treatment or control infrastructure) is situated more than 1km from any designated biodiversity sites, construction is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for option construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there

would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of infrastructure (treatment/control infrastructure), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land this could have a positive effect on this objective. If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** Construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, particularly if the option is located within an Air Quality Management Area (AQMA).

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. If construction involves works within the local road network (e.g. installation of control infrastructure or pipework), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of materials such as concrete, steel and plastics. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option could potentially reduce pollutant loads from diffuse and point sources, which could impact positively on water dependent designated conservation sites and for which the HRA may conclude no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** As noted above, the operation of the option could potentially reduce the impact of pollutant loads from diffuse and point sources, which could affect receiving water quality which could have a positive effect on this objective.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) it may be liable to flooding during operation which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The operation of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option may require the transportation of chemicals/materials for treatment and control equipment, this would require vehicle movements which could have a negative effect on local air quality, however, this is likely to be minor.
6. **Greenhouse Gas Emissions:** The operation of the option may require energy for treatment equipment or pumps, which would lead to carbon emissions. If the option requires the transportation of chemicals/materials for treatment/control infrastructure, this would require vehicle movements which could also have a negative effect on carbon emissions.
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) the operation of the option may be at risk to the effects of climate change (flooding), which could have a negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The operation of the option would seek to improve the quality of discharges and receiving watercourses, which may positively affect communities, so increasing economic and social wellbeing. Changes in land-use or agricultural practices to limit nutrient loads under this option may adversely impact economic returns for agricultural businesses, however, any effect in this regard is not expected to be significant (due to scale).
9. **Health:** The operation of the option may involve an improvement to the quality of discharges and receiving watercourses (e.g. bathing waters) used by the community, which would have a positive effect on this objective.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option may require raw materials/chemicals for ongoing maintenance and operation of treatment and control infrastructure, which may have a negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. new treatment/control infrastructure) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Wastewater Treatment

W8 - Effluent reuse

Option Assessment Information	
Option ID	W8
Option Name	Effluent reuse
Option Description	Recycle wastewater treatment works flow within the catchment

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	-/?	-/?	-/?	-/?	-/?	-/?	0	-/?	-/?	-/?
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, construction of the option (i.e. new distribution and pumping infrastructure) is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction activities, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. Depending on the location of the option and land accessed for construction the option could affect non-

designated habitats and species through disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of new distribution infrastructure, which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting negative effect on this objective. If the construction of the option is situated partially or entirely on previously developed land this could have a positive effect on this objective. If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** The option is assumed to be situated outside of a Source Protection Zone and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction activities may be liable to flooding during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. Construction for the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, however, due to the scale of works any effect is likely to be minor. If the option is located outside an Air Quality Management Area (AQMA) it is not anticipated that the construction of the option would be of sufficient scale and duration to have a significant effect, however, it may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw materials, for example concrete, steel, plastics, which would have embodied carbon. There would also be carbon emissions associated with the transportation of materials to site and potentially the operation of plant and machinery. However, it is not anticipated that there would be any significant effect against this objective due to the scale of works.

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk due to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure, which may have a positive effect on the local economy associated with potential employment opportunities and supply chain benefits, together with spend by construction workers and

contractors in the local economy. If construction involves works within the local road network (e.g. pipeline installation), this may cause delays and disruption to third parties, which could have a minor negative effect for this objective.

9. **Health:** The construction of the option may generate emissions, noise, and disturbance, which may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction for this option would affect water resources, so the construction effects are assessed as neutral.

11. **Waste and resources:** Construction of the option may require the use of materials such as concrete, plastic and steel for new distribution and pumping infrastructure, which would generate waste, however, the quantities of such materials are not expected to lead to a significant adverse effect against this objective. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled, however, the significance of this is currently uncertain.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to improve drainage and wastewater capacity that could affect receiving water quality/quantity, which could impact positively on water dependent designated conservation sites, and for which the HRA concludes no

operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** The operation of the option would seek to improve drainage and wastewater capacity that could affect receiving water quality, which could have a positive effect on this objective.
4. **Flood Risk:** The operation of the option would seek to optimise the overall capacity of the drainage and wastewater network to reduce the frequency and severity of flooding, which could have a minor positive effect on communities.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** If the operation of the option requires additional energy input (e.g. additional pumping for distribution of recycle wastewater) this may result in carbon emissions, which may have a minor negative effect on this objective. If the option does not require any additional operational energy use it would not be expected to have any effect on carbon emissions.
7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities, so increasing the resilience to the effects of climate change, which could have a positive effect for this objective.
8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, and may provide an alternative source of water resource (e.g. for crop irrigation), so increasing economic and social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding, which would have a positive effect on the health of the community.
10. **Water resources:** The operation of the option may have a positive effect by increasing the availability of water resources, either by direct use of recycled wastewater for appropriate applications (e.g. crop irrigation) or replacing abstraction from other water sources.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. storage tanks) which may have adverse effects on landscape/townscape character, and a negative effect on this objective.

Assessment of Strategic and Complex Options

6.4.9 Table E.3 below identifies the strategic or complex TPU catchments and the number of options that have been assessed to identify, describe, and evaluate their likely significant environmental effects.

Table E.3 Summary of Options Assessed by TPU Catchment

TPU Catchment	Number of options screened in
Altrincham	1
Blackburn	2
Bromborough	1
Burscough	1
Carlisle	1
Carnforth	1
Davyhulme	2
Ellesmere Port	1
Fleetwood	2
Hillhouse	1
Knutsford	1
Lancaster	1
Macclesfield	1
Partington	1
Penrith	2
Preston	4
Sale	1
Salford	1
Stretford	1
Whitehaven	3
Wigan	3
Workington	1

TPU Catchment	Number of options screened in
Total	33

6.4.10

A key to the meaning of the symbols used in the assessment matrices is presented in **Table E.4**.

Table E.4 Qualitative Scoring System

Score	Description	Symbol
Major/Significant Positive Effect	Significant positive effect of the option on this objective	+++
Moderate Positive Effect	Moderate positive effect of the option on this objective	++
Minor Positive Effect	Minor positive effect of the option on this objective	+
Neutral	Neutral effect of the option on this objective	0
Minor Negative Effect	Negative effect of the option on this objective	-
Moderate Negative Effect	Moderate effect of the option on this objective	--
Major/Significant Negative Effect	Significant negative effect of the option on this objective	---
Uncertain	The option has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?

The following sections summarise the assessment of the options within each TPU catchment listed in the table above.

TPU Catchment: Altrincham

Option Assessment Information	
Option ID	ALTRI-ALTRI_001_Std-W2.n
Option Name	ALTRI-ALTRI_001_Std-W2.n
Option Description	Increased treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	--	--	--	-	0	--	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** The option is not situated within 1km of any European/international sites. The HRA of the DWMP option concludes that for option construction there are no likely significant effects (as no pathways present). The option is within 1km of Brookheys Covert SSSIs (626m) and two areas of Ancient Woodland (339m and 626m). Construction of the scheme could affect these designated features through noise and disturbance, although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The construction of the option would involve works immediately adjacent to the Sinderland Brook which could introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of plant and machinery could contribute to a moderate negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zone 3 and in consequence, the site of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example residential estates to the east of the site) and recreational receptors (for example at Stamford Brook Community Woodland).
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The development site is not in close proximity to any heritage assets and therefore is not anticipated to have any effects on the historic environment.
13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (> 1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zone 3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.
8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a moderate or significant increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Blackburn

Option Assessment Information	
Option ID	BLACK-BLACK_001_Std-W2.n
Option Name	BLACK-BLACK_001_Std-W2.n
Option Description	Increased treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

Construction

It is assumed that no construction would be required as part of this option. Therefore, a neutral effect has been determined against all objectives. However, it is noted that the need for any additional construction will be reviewed during the plan cycle.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality. The wastewater treatment works is not situated within an AQMA.
6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zone 3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.
8. **Economic and Social Wellbeing:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require minor quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a minor negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not situated within or in close proximity to any designated landscapes and would not result in any additional above ground infrastructure, hence would have no effects on landscape/townscape character and visual amenity.

Option Assessment Information	
Option ID	BLACK-Blackburn-1-SW1.3.2
Option Name	BLACK-Blackburn-1-SW1.3.2
Option Description	Surface water source control measures: Strategic blue / green corridors: supporting and influence the development of blue and green spaces in urban environments during master planning process. Particularly in strategic developments (such as garden villages) - landscape led approach.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
BLACK-Blackburn-1-SW1.3.2	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, development of blue/green corridors and spaces is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of blue/green corridors (e.g. wetlands). More generally

construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, bioretention), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting moderate negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land this could have a moderate positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSIs, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential moderate effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a moderate negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO_{2e}).

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would involve moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a moderate negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on health.

10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure, which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of blue/green infrastructure, such as swales, wetlands, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Bromborough

Option Assessment Information	
Option ID	BROMB-BROMB_001_Std-W2.n
Option Name	BROMB-BROMB_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	0	---	--	0	0	--	0	---	0	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	-	---	0	0	0	0	---	0	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0

Construction

1. **Biodiversity:** The option is within 1km of the Mersey Estuary Ramsar (18m) and the Mersey Estuary SPA (197m). However, as works will take place within the existing wastewater treatment works site, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of New Ferry SSSI (18m). Construction of the scheme could affect this designated feature through noise and disturbance, particularly given the proximity to the wastewater treatment works, although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The wastewater treatment works site is situated adjacent to the banks of the River Mersey. Construction could therefore introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is not located within an area at risk of flooding, however, it is noted that it is located immediately adjacent to a large area of Flood Zone 3. Construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option construction traffic and the operation of plant and machinery could contribute to a significant negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a significant capital expenditure (>£25m), resulting in a significant positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate/adjacent residential receptors and recreational users (e.g. at the adjacent Port Sunlight River Park, Shorefields Nature Park and sports pitches).
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve significant quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of one Scheduled Monument (Bromborough Court House moated site and fishponds, Wirral (556m)); over 200 Listed Buildings, the closest of which is 200-210, New Chester Road (339m), whilst a number of other listed Buildings on New Chester Road are situated at a similar distance from the wastewater treatment works site; and, one Registered Park and Garden (The Dell, The Diamond And The Causeway, Port Sunlight (643m)). However, due to the distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational w site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The operation of the option would have no effect on flood risk.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).

8. **Economic and Social Wellbeing:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

9. **Health:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Burscough

Option Assessment Information	
Option ID	BURSC-BURSC_001_Std-W2.n
Option Name	BURSC-BURSC_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	0	--	--	0	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	-	--	0	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction

1. **Biodiversity:** The option is within 1km of Martin Mere Ramsar (401m) and SPA (593m). However, as works will take place within the existing wastewater treatment works site, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of Martin Mere SSSI (401m). Construction of the scheme could affect this designated feature through noise and disturbance, although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.

3. **Water Quality:** The construction of the option would involve works adjacent to wetlands which could introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is not located within an area at risk of flooding, however, it is noted that it is situated immediately adjacent to an area of Flood Zone 2. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option construction traffic could contribute to a moderate negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example at New Lane). However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of three Listed Buildings (Wood House Farmhouse (692m), Barn South of Wood House Farmhouse (707m), and Barn South West of Martin Hall Farmhouse (898m)). However, due to the distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.
13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The operation of the option would have no effect on flood risk.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.
9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Carlisle

Option Assessment Information	
Option ID	CARLI-CARLI_001_Std-W2.n
Option Name	CARLI-CARLI_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	0	---	--	-	--	0	--	0	--	---	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	---	--	0	0	0	--	--	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction

1. **Biodiversity:** The option is within 1km of the River Eden SAC (105m). However, as works will take place within the existing wastewater treatment works site, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of the River Eden and Tributaries SSSI, Kingsmoor Sidings LNR (516m) and Kingsmoor South LNR (933m). Construction of the scheme could affect these designated features through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.

3. **Water Quality:** It is not expected that construction of this option would affect water quality, due to location, the absence of connectivity and provided best practices are adhered to and mitigation implemented. It is noted that the wastewater treatment works is located in close proximity (approx. 0.13km) from the River Eden, however, any effects on this river are likely to be avoided through appropriate mitigation.
4. **Flood Risk:** The wastewater treatment works site is situated almost entirely within Flood Zone 3, whilst the sections of the site not within Flood Zone 3 are situated within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of machinery and plant could contribute to a moderate negative effect on air quality
6. **Greenhouse Gas Emissions:** The construction of the option would require materials (concrete and steel) with a minor quantity of embodied carbon (100 to <1000tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated mainly within Flood Zone 3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors surrounding the site, and recreational users (for example at the adjacent sports facilities). It is also noted that there is a hospital located just south of the wastewater treatment works site. However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The construction site is within 1km of Hadrian's Wall World Heritage Site (crosses the wastewater treatment works site), 8 Scheduled Ancient Monuments (Hadrian's Wall and vallum in wall mile 66, Stanwix Bank to Stainton (crosses the wastewater treatment works site) Carlisle Castle; medieval tower keep castle, two lengths of city wall, a 16th century battery, and part of an earlier Roman fort known as Luguvalium (525m), Hadrian's Wall between the east end of Davidson's Banks and road to Grinsdale and vallum between Davidson's Banks and dismantled railway in wall miles 67 and 68 (690m), Area of Roman and medieval towns, bounded by Annetwell Street, Abbey Street, Castle Street and Paternoster Row (801m), Town wall, section on West Walls (869m), Hadrian's Wall and vallum between the field boundary west of Wall Knowe and Scotland Road including the Roman fort at Stanwix in wall mile 65 (878m), City wall, NE side (895m), Carlisle Cathedral precinct (957m)), over 100 Listed Buildings, the closest of which are three Listed Buildings associated with Cumberland Infirmary (Cumberland Infirmary

(312m), Entrance Gate Piers and Wall to East of Cumberland Infirmary (313m), Crozier Lodge, Cumberland Infirmary (318m)) and one Registered Park and Garden (Rickerby Park, Carlisle (867m)). Due to the potential for effects on the setting/integrity of the section of Hadrian's Wall WHS and Scheduled Monument, the option has been assessed as having a significant negative effect.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is situated almost entirely within Flood Zone 3, whilst the sections of the site not within Flood Zone 3 are situated within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated mainly within Flood Zone 3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.
12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, new above ground infrastructure may have moderate effects on the setting of Hadrian's Wall WHS and Scheduled Monument.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Carnforth

Option Assessment Information	
Option ID	CRNFT-CRNFT_001_Std-W2.n
Option Name	CRNFT-CRNFT_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	0	--	--	--	-	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** The option is within 1km of the Morecambe Bay and Duddon Estuary SPA, Morecambe Bay SAC and Ramsar (233m). However, as works will take place within the existing wastewater treatment works site, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of Morecambe Bay SSSI (233m) and Crag Bank SSSI (792m). Construction of the scheme could affect these designated features through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.

3. **Water Quality:** It is not expected that construction of this option would affect water quality, due to location, the absence of connectivity and provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** A small section of the wastewater treatment works site is situated within Flood Zone 3 (<40%) whilst another small section of the site is situated within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of machinery and plant could contribute to a moderate negative effect on air quality
6. **Greenhouse Gas Emissions:** The construction of the option would require materials (concrete and steel) with a moderate quantity of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors to the immediate south of the site and to the south east of the site (south west Carnforth). However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The construction site is within 1km of 13 Listed Buildings (Carnforth: the former wagon repair workshop (566m), Carnforth: the water tower (585m), Nos 1 and 2 Hagg Cottages and Hagg Farmhouse (595m), Carnforth: the coaling plant (617m), Carnforth: engine shed and associated facilities including the locomotive turntable (626m), Carnforth: the ash plant (629m), Carnforth: the former Selside signal box (669m), Carnforth Station Junction Signal Box (716m), Former signal box, north end of platform at Carnforth Station (728m), Milestone 150 Metres South of the Junction With Alexandra Road (842m), Keer Bridge House (914m), 10, North Road (919m), Christ Church (946m)). However, due to the distance between the works and these heritage assets and as works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The construction site is within 1km of Arnside & Silverdale AONB (318m) and would introduce above ground infrastructure that could affect the visual amenity of the designated feature. Construction could also have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** A small section of the wastewater treatment works site is situated within Flood Zone 3 (<40%) whilst another small section of the site is situated within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Davyhulme

Option Assessment Information	
Option ID	DAVYH-DAVYH_001_Std-W2.n
Option Name	DAVYH-DAVYH_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	--	---	---	-	0	--	0	---	-	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	--	---	-	0	0	0	---	-	-
	Operation (positive)	0	0	0	0	0	0	0	0	+++	+++	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. There are no national or local biodiversity sites within 1km of the wastewater treatment works site. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The construction of the option would involve works immediately adjacent to the Manchester Ship Canal, which could introduce pollution/debris into the canal (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** A small section of the wastewater treatment works site is situated within Flood Zone 3 (<40%) whilst another small section of the site is situated within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is located partially within/immediately adjacent to Trafford AQMA (along the M60 and B5214 leading to the site are situated within the AQMA) and given the scale of construction, construction traffic could contribute to a significant negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a significant amount of embodied carbon (>7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a significant capital expenditure (>£25m), resulting in a significant positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users, particularly given the scale of the option and number of proximate receptors. However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve significant quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The construction site is within 1km of 9 Listed Buildings (Yew Tree Farmhouse (108m), War Memorial in St Mary's Churchyard, Davyhulme (348m), Church of St Mary The Virgin, Including Boundary Wall & Railings (363m), Commemorative Urn Opposite Junction with Lowood Avenue (391m), Davyhulme Circle War Memorial (403m), Office at Barton Aerodrome (678m), Main Hangar and Workshops at Barton Aerodrome (752m), Control Tower at Barton Aerodrome (833m), Irlam and Cadishead War Memorial (940m))

Due to the distance between the works and the majority of these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any significant effects on these assets, however, there may be some minor effects on the setting of Yew Tree Farmhouse, given it is in closer proximity to the works and due to the scale of works.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** A small section of the wastewater treatment works site is situated within Flood Zone 3 (<40%) whilst another small section of the site is situated within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a negative effect on local air quality and potentially on air quality within the Trafford AQMA.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

9. **Health:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.
12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, new above ground infrastructure may have minor effects on the settings of nearby assets and features.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Option Assessment Information	
Option ID	DAVYH-Davyhulme-1-SW1.3.2
Option Name	DAVYH-Davyhulme-1-SW1.3.2
Option Description	<p>Surface water source control measures:</p> <p>Strategic blue / green corridors: supporting and influence the development of blue and green spaces in urban environments during masterplanning process. Particularly in strategic developments (such as garden villages) - landscape led approach.</p>

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
DAVYH-Davyhulme-1-SW1.3.2	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of blue/green corridors and spaces is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of blue/green corridors (e.g. wetlands). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, bioretention), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting moderate negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land this could have a moderate positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential moderate effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a moderate negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a moderate negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure, which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of blue/green infrastructure, such as swales, wetlands, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Ellesmere Port

Option Assessment Information	
Option ID	ELLES-ELLES_001_Std-W2.n
Option Name	ELLES-ELLES_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	--	--	--	-	0	-	0	--	-	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	--	---	-	0	0	0	--	-	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. There are no national or local biodiversity sites within 1km of the wastewater treatment works site. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The construction of the option would involve works on/adjacent to Mill Brook and the Shropshire Union Canal which could affect water flows and/or introduce pollution/debris into the canal/brook (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is partially situated within/immediately adjacent to Thornton le Moors AQMA No. 4 and construction traffic could contribute to a moderate negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require materials (concrete and steel) with a moderate quantity of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect the limited number of proximate residential receptors to the south/south west of the wastewater treatment works site (Stoak). However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of one Scheduled Monument (Standing cross in St Lawrence's churchyard, Stoak (685m)) and 11 Listed Building (Mason's Bridge (140) (7m), Meadow Lane Bridge (139) (71m), Densions Bridge (138) (629m), Stoak Farmhouse (666m), Church of St Lawrence (667m), Sundial, South West of Church of St Lawrence (695m), Yew Tree Farmhouse (769m), Lime Tree Farmhouse and Attached Shippon (805m), Stoak Bridge (137) (832m), Shropshire Union Canal Weaver's Bridge (905m) and Picton Lane Bridge (136) (946m)). Given the proximity of the two closest Listed Buildings to the wastewater treatment works site and therefore the potential for effects on the setting of these heritage assets, the option has been assessed as having a minor negative effect on this objective. Due to the distance between the works and the remaining heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects on these assets.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a negative effect on local air quality and potentially on air quality within the Thornton le Moors AQMA No. 4.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.

12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, new above ground infrastructure may have minor effects on the settings of nearby assets and features.

13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Fleetwood

Option Assessment Information	
Option ID	FLEET-FLEET_001_Std-W2.n
Option Name	FLEET-FLEET_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	-	---	0	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

Construction

It is assumed that no construction would be required as part of this option. Therefore, a neutral effect has been determined against all objectives. However, it is noted that the need for any additional construction at this wastewater treatment works site will be reviewed during the plan cycle

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The option is not located within an area at risk of flooding. The operation of the option would have no effect on flood risk.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality. The wastewater treatment works is not situated within an AQMA.
6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require minor quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a minor negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not situated within or in close proximity to any designated landscapes and would not result in any additional above ground infrastructure, hence would have no effects on landscape/townscape character and visual amenity.

Option Assessment Information	
Option ID	FLEET-Fleetwood-1-SW1.3.2
Option Name	FLEET-Fleetwood-1-SW1.3.2
Option Description	<p>Surface water source control measures:</p> <p>Strategic blue / green corridors: supporting and influence the development of blue and green spaces in urban environments during masterplanning process. Particularly in strategic developments (such as garden villages) - landscape led approach.</p>

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
FLEET-Fleetwood-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. **Biodiversity:** If the option is more than 1km from any designated biodiversity sites, development of blue/green corridors and spaces is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of blue/green corridors (e.g. wetlands). More generally

construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, bioretention), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to a negative effect on local air quality, which is considered to be a potential minor effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a minor negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO_{2e}).

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would involve minor capital expenditure (£1m to <£5m), resulting in a minor positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a minor negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on health.

10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.

11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure, which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of blue/green infrastructure, such as swales, wetlands, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Hillhouse

Option Assessment Information	
Option ID	HILLH-HILLH_001_Std-W2.n
Option Name	HILLH-HILLH_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	---	--	--	--	0	-	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	---	--	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. There is one area of Ancient Woodland within 1km of the wastewater treatment works site. Construction of the scheme could affect this designated feature, through noise and disturbance although any effects are expected to be minor due to the distance between the feature and the works. Such effects could also be reduced through appropriate mitigation and best practice construction measures., More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The construction of the option would involve works immediately adjacent to the Cheshire Lines Brook, which could introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of machinery and plant could contribute to a moderate negative effect on air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect the limited number of proximate residential receptors and farmsteads. However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The construction site is within 1km of two Listed Buildings New Hill House (436m), Delph Farm Cottage and Hillhouse Farm (472m). Due to the distance between the works and the remaining heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects on these assets.
13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.
2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The wastewater treatment works site is located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.
8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.
9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Knutsford

Option Assessment Information	
Option ID	KNUTF-KNUTF_001_Std-W2.n
Option Name	KNUTF-KNUTF_001_Std-W2.n
Option Description	Increased treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	---	-	--	--	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

Construction

It is assumed that no construction would be required as part of this option. Therefore, a neutral effect has been determined against all objectives. However, it is noted that the need for any additional construction at this wastewater treatment works site will be reviewed during the plan cycle.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The wastewater treatment works site is situated almost entirely within Flood Zone 3 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality. The wastewater treatment works is not situated within an AQMA.
6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated mainly within Flood Zone 3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.
8. **Economic and Social Wellbeing:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require minor quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a minor negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not situated within or in close proximity to any designated landscapes and would not result in any additional above ground infrastructure, hence would have no effects on landscape/townscape character and visual amenity.

TPU Catchment: Lancaster

Option Assessment Information	
Option ID	LANCA-LANCA_001_Std-W2.n
Option Name	LANCA-LANCA_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	?	+	+	0	0	0	0

Construction

It is assumed that no construction would be required as part of this option. Therefore, a neutral effect has been determined against all objectives. However, it is noted that the need for any additional construction at this wastewater treatment works site will be reviewed during the plan cycle.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality. The wastewater treatment works is not situated within an AQMA.
6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.
8. **Economic and Social Wellbeing:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require minor quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a minor negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not situated within or in close proximity to any designated landscapes and would not result in any additional above ground infrastructure, hence would have no effects on landscape/townscape character and visual amenity.

TPU Catchment: Macclesfield

Option Assessment Information	
Option ID	MACCL-MACCL_001_Std-W2.n
Option Name	MACCL-MACCL_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	--	--	0	-	0	-	0	--	0	-
	Construction (positive)	0	+	0	?	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of one area of Ancient Woodland (43m). Construction of the scheme could affect this designated feature, particularly given the proximity to the wastewater treatment works site, through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The construction of the option would involve works on/adjacent to the River Bollin, which could introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of machinery and plant could contribute to a moderate negative effect on air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require materials (concrete and steel) with embodied carbon; however, it is not anticipated that there would be any effect on carbon emissions (embodied carbon would be below the lower threshold for minor effect (100tCO₂e)).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (e.g. in northern Prestbury). However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of two Scheduled Monuments (Foxtwist moated site, two fishponds and connecting channels (598m), Bowl barrow 60m north of junction of London Road and Bonis Hall Lane (852m)) and 20 Listed Buildings (Plant House Farmhouse (181m), Spittle House (North Range Only) (194m), Spittle House (West Range Only) (216m), Dod's Marsh (399m), Shippon, North Range of Farm Buildings to Rear of Woodend Farmhouse (427m), Woodend Farmhouse (455m), Woodside Farmhouse (699m), Bonis Hall (713m), South Entrance Arch to Prestbury Railway Tunnel (806m), Mottram Hall Hotel (817m), Pre Conquest Cross at SJ 9007 7968 (830m), Legh Hall Cottage (859m), Mottram Old Hall (878m), Legh Hall (880m), Butley Hall (881m), Mottram Hall Farmhouse (924m), Farmers Green (967m), Brooks Cottages (972m), The Vicarage (985m) and Greendale Farmhouse (986m)). However, due to the

distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Partington

Option Assessment Information	
Option ID	PARTI-PARTI_001_Std-W2.n
Option Name	PARTI-PARTI_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	--	--	-	-	0	--	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of three connected areas of Ancient Woodland, two of which the wastewater treatment works site is situated partially within. Construction of the scheme could affect these designated features, particularly given the proximity to the works, through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The wastewater treatment works site is situated immediately adjacent to Red Brook (which flows into the Manchester Ship Canal just downstream of the wastewater treatment works) and in close proximity to the Manchester Ship Canal. Construction could therefore introduce pollution/debris into the brook and the canal (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of machinery and plant could contribute to a moderate negative effect on air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a minor amount of embodied carbon (100 to <1000tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example in west Partington and a limited number of other scattered residential properties) and recreational users, for example users of the Manchester Ship Canal. However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of 7 Listed Buildings (Milestone (652m), Church of St Helen (709m), War Memorial (738m), Timber Framed Farm Building, South Side of Warburton Park Farmyard (739m), Heathlands Farmhouse (899m), Barn North East of Heathlands Farmhouse (900m), Erlam Farmhouse (971m)). However, due to the distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction may have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Penrith

Option Assessment Information	
Option ID	PENRT-PENRT_002_Std-W2.n
Option Name	PENRT-PENRT_002_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	0	--	--	--	-	0	0	0	--	-	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	--	-	0	0	0	--	-	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** The option is within 1km of the River Eden SAC (65m). However, as works will take place within the existing wastewater treatment works site, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of the River Eden and Tributaries SSSI (65m). Construction of the scheme could affect this feature, particularly given the proximity to the wastewater treatment works site, through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through direct land take or disturbance (e.g. noise, vibration, dust).

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** It is not expected that construction of this option would affect water quality, due to location, the absence of connectivity and provided best practices are adhered to and mitigation implemented. It is noted that the wastewater treatment works is located in close proximity (approx. 0.07km) to the River Eamont, however, any effects on this river are likely to be avoided through appropriate mitigation.
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction traffic and the operation of machinery and plant could contribute to a moderate negative effect on air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Due to the isolated semi-rural location of the option, away from any residential and recreational receptors, it is not anticipated there would be any effects on health during construction.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of 6 Listed Buildings (Alms Table Beside Countess's Pillar (62m), Countess's Pillar (64m), Fremington (704m), Brougham Castle Bridge (823m), Church of St Ninian (920m) and Moorhouse Farmhouse (962m)) and 7 Scheduled Monuments (The Countess Pillar (58m), Settlement 1/3 mile (540m) ENE of Brougham Castle (118m), Brougham Roman fort (Brovacum) and civil settlement and Brougham Castle (193m), Settlement 100yds (90m) SE of Sceugh Farm (278m), Roman marching camp 450yds (410m) NE of Brovacum (372m), St Ninian's preconquest monastic site, site of nucleated medieval settlement, St Ninian's Church and churchyard (847m), Roman road and enclosures SE of Frenchfield (952m). Given the proximity of the two closest Listed Buildings and the closest Scheduled Monument to the wastewater treatment works site and therefore the potential for effects on the setting of this

heritage asset, the option has been assessed as having a minor negative effect on this objective. Due to the distance between the works and the remaining heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects on these assets.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, however, given the semi-rural location of the option, construction may have short term, temporary negative effects on local landscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.
12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, new above ground infrastructure may have minor effects on the settings of nearby assets and features.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Option Assessment Information	
Option ID	PENRT-Penrith-1-SW1.2.1
Option Name	PENRT-Penrith-1-SW1.2.1
Option Description	Surface water source control measures: SuDS delivered through partnerships (e.g. with local authorities during highways upgrades)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
PENRT-Penrith-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of SuDS is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of SuDS technology (e.g. rain gardens). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of SuDS technology (e.g. swales, rain gardens, soakaways, bioretention, tree pits, permeable paving), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting moderate negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology being retrofitted to existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.), this could have a moderate positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential moderate effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a moderate negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a moderate negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts), which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of SuDS features, such as swales, green roofs, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Preston

Option Assessment Information	
Option ID	PREST-PREST_001_Std-W2.n
Option Name	PREST-PREST_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	---	-	---	--	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

Construction

It is assumed that no construction would be required as part of this option. Therefore, a neutral effect has been determined against all objectives. However, it is noted that the need for any additional construction at this wastewater treatment works site will be reviewed during the plan cycle

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The wastewater treatment works site is located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality. The wastewater treatment works is not situated within an AQMA.
6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.
8. **Economic and Social Wellbeing:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require minor quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a minor negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not situated within or in close proximity to any designated landscapes and would not result in any additional above ground infrastructure, hence would have no effects on landscape/townscape character and visual amenity.

Option Assessment Information	
Option ID	PREST-Preston-1-SW1.1.3
Option Name	PREST-Preston-1-SW1.1.3
Option Description	Surface water source control measures: Installation of source control SuDS at strategic locations (e.g. rain gardens, bioretention, permeable paving, green roof, soakaway, swale, tree pit, water butt)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
PENRT-Penrith-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of SuDS is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of SuDS technology (e.g. rain gardens). More generally construction of the scheme

could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard is not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of SuDS technology (e.g. swales, rain gardens, soakaways, bioretention, tree pits, permeable paving), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting moderate negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology being retrofitted to existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.), this could have a moderate positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.

3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.

4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to a negative effect on local air quality, which is considered to be a potential moderate effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a moderate negative effect on this objective.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).

7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.

8. **Economic and Social Wellbeing:** The construction of the option would involve moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a moderate negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts), which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of SuDS features, such as swales, green roofs, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Option Assessment Information	
Option ID	PREST-Preston-1-SW1.2.1
Option Name	PREST-Preston-1-SW1.2.1
Option Description	Surface water source control measures: SuDS delivered through partnerships (e.g. with local authorities during highways upgrades)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
PREST-Preston-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	---	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of SuDS is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of SuDS technology (e.g. rain gardens). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of SuDS technology (e.g. swales, rain gardens, soakaways, bioretention, tree pits, permeable paving), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting moderate negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology being retrofitted to existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.), this could have a moderate positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential moderate effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a moderate negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a moderate negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in significant carbon emissions (> 1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts), which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of SuDS features, such as swales, green roofs, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Option Assessment Information	
Option ID	PREST-Preston-1-SW1.3.2
Option Name	PREST-Preston-1-SW1.3.2
Option Description	Surface water source control measures: Strategic blue / green corridors: supporting and influence the development of blue and green spaces in urban environments during masterplanning process. Particularly in strategic developments (such as garden villages) - landscape led approach.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
PREST-Preston-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of blue/green corridors and spaces is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of blue/green corridors (e.g. wetlands). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, bioretention), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential minor effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a minor negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve minor capital expenditure (£1m to <£5m), resulting in a minor positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a minor negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure, which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of blue/green infrastructure, such as swales, wetlands, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Sale

Option Assessment Information	
Option ID	SALEZ-SALEZ_002_Std-W2.n
Option Name	SALEZ-SALEZ_002_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	-	---	--	-	0	--	0	---	0	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	-	-	---	-	0	0	0	---	0	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. There are no national or local biodiversity sites within 1km of the wastewater treatment works site. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The wastewater treatment works site is situated immediately adjacent to Stromford Brook (which flows into the River Mersey just downstream of the wastewater treatment works) and in close proximity (approx. 0.15km) from the River Mersey itself. Construction could therefore introduce pollution/debris into the brook and the river (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is partially located within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA); however, it is noted that sections of the A6144 and the M60 leading to the wastewater treatment works site are situated within the Trafford AQMA and given the scale of the option, construction traffic and the operation of plant and machinery could contribute to a significant negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zone 2 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a significant capital expenditure (>£25m), resulting in a significant positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example in north west Ashton Upon Mersey) and recreational users at the number of recreational facilities in close proximity to the wastewater treatment works site (particularly the sports facilities which are immediately adjacent to the site).
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve significant quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of 10 Listed Buildings (St Martin's, Ashton-Upon-Mersey War Memorial (209m), Barracks Farmhouse and Cottage (229m), Church of St Martin (254m), Sundial, Saint Martin's Church Graveyard (266m), Lychgate, Church of Saint Martin (287m), Ashton New Hall (312m), Marsh Farm (417m), Brooks' Institute (697m), Saint Martin's School The Old School House (698m), Church of St Clement (987m)). However,

due to the distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is partially located within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zone 2 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

9. **Health:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Salford

Option Assessment Information	
Option ID	SALFO-SALFO_002_Std-W2.n
Option Name	SALFO-SALFO_002_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	0	0	---	--	0	0	--	0	---	0	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	--	---	0	0	0	0	---	0	-
	Operation (positive)	?	0	0	0	0	0	0	+++	+++	0	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of Trafford Ecology Park Local Nature Reserve (468m). Construction of the scheme could affect this designated feature through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures (particularly given the presence of existing built development and the Manchester Ship Canal between the wastewater treatment works and the LNR). More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g.

noise, vibration, dust), however, effects in this regard are anticipated to be minor given the urban location of the wastewater treatment works and as works will take place at the existing wastewater treatment works site.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.

3. **Water Quality:** It is not expected that construction of this option would affect water quality, due to location, the absence of connectivity and provided best practices are adhered to and mitigation implemented. It is noted that the wastewater treatment works is located in close proximity (approx. 0.06km) to the River Mersey, however, any effects on this river are likely to be avoided through appropriate mitigation.

4. **Flood Risk:** The option is not located within an area at risk of flooding. The construction of the option would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The option is partially located within/adjacent to the Salford AQMA and additionally, roads in the vicinity of the wastewater treatment works site are also situated within the AQMA (e.g. the A57 and M602) and given the scale of the option, construction traffic and the operation of plant and machinery could contribute to a significant negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a moderate amount of embodied carbon (1000 to <7500tCO_{2e}).

7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).

8. **Economic and Social Wellbeing:** The construction of the option would involve a significant capital expenditure (>£25m), resulting in a significant positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors. However, it is noted that the wastewater treatment works site is situated within an area that is occupied mainly by commercial/industrial properties.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would involve significant quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** The wastewater treatment works site is within 1km of 11 Listed Buildings (Coach & Horses Public House, 350 Eccles New Road, Salford (321m), Ashworth Memorial in Weaste Cemetery (372m), Rusden Memorial in Weaste Cemetery (375m), Brotherton Memorial in Weaste Cemetery (384m), Burnett Memorial in Weaste Cemetery (388m), Lodge of Weaste Cemetery (442m), Mark Addy Memorial in Weaste Cemetery (461m), Railings, Walls, Gate Piers and Gates of Weaste Cemetery (472m), Charles Halle Memorial in Weaste Cemetery (489m), Church of St Luke (518m) and the Church of St James (812m)) and two Registered

Parks And Gardens (Weaste Cemetery (238m), Buile Hill Park (870m)). However, due to the distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction could have short term, temporary negative effects on local townscape character and visual amenity. However, as the wastewater treatment works site is situated within an area of commercial/industrial properties, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The operation of the option would have no effect on flood risk.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a negative effect on local air quality and potentially on air quality within the Salford AQMA.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).

8. **Economic and Social Wellbeing:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

9. **Health:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Stretford

Option Assessment Information	
Option ID	STRET-STRET_001_Std-W2.n
Option Name	STRET-STRET_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	---	--	-	--	0	--	0	--	0	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	--	--	0	0	0	--	0	-
	Operation (positive)	0	0	0	0	0	0	0	0	++	++	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. There are no national or local biodiversity sites within 1km of the wastewater treatment works site. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The wastewater treatment works site is situated adjacent (0.02km) to the River Mersey and to Kickety Brook. The site is also situated in close proximity (approx. 0.07km) from the Ousel Brook. Construction could therefore introduce pollution/debris into the river and the canal (although this is likely to be avoided through appropriate mitigation).
4. **Flood Risk:** The wastewater treatment works site is situated almost entirely within Flood Zone 3 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA); however, it is noted that sections of the A6144 and the M60 leading to the wastewater treatment works site are situated within the Trafford AQMA and construction traffic could contribute to a moderate negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a minor amount of embodied carbon (100 to <1000tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated mainly within Flood Zone 3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example in north east Aston Upon Mersey/northern Sale) and recreational users at the number of recreational facilities in close proximity to the wastewater treatment works site (particularly the sports facilities adjacent to the site).
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of 10 Listed Buildings (Lychgate, Church of Saint Martin (727m), Sundial, Saint Martin's Church Graveyard (743m), Church of St Martin (744m), Ashton New Hall (761m), The Volunteer Hotel (762m), 118 and 120, Cross Street (777m), St Martin's, Ashton-Upon-Mersey War Memorial (807m), Saint Martin's School The Old School House (946m), Brooks' Institute (976m), Tatton Cinema (981m)). However, due to the distance between the works and these heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is situated almost entirely within Flood Zone 3 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated mainly within Flood Zone 3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.

12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.

13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

TPU Catchment: Whitehaven

Option Assessment Information	
Option ID	WHTHA-WHTHA_001_Std-W2.n
Option Name	WHTHA-WHTHA_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	---	--	-	--	0	-	0	--	--	-
	Construction (positive)	0	+	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	---	-	--	--	0	0	0	--	-	-
	Operation (positive)	0	0	0	0	0	0	0	++	++	0	0	0	0

Construction

1. **Biodiversity:** The option is within 1km of the Solway Firth Special Protection Area (734m). However, as works will take place within the existing wastewater treatment works site, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of one area of Ancient Woodland (619m). Construction of the scheme could affect this designated feature through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.
3. **Water Quality:** The construction of the option would involve works immediately adjacent to Lowca Beck which could introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation). It is also noted that the option is less than 0.1km from the sea.
4. **Flood Risk:** The wastewater treatment works site is located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option, construction could contribute to a moderate negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a minor amount of embodied carbon (100 to <1000tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example in Parton, south of the site and Lowca, north east of the site) and recreational receptors (for example on Providence Bay Beach/Parton Beach). However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve moderate quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of one World Heritage Site (Frontiers of the Roman Empire (Hadrian's Wall) (33m)), one Scheduled Monument (Parton Roman Fort (33m)) and 8 Listed Buildings (Church of St Bridget (193m), Chancel Arch to South of Church of St Bridget (207m), Britton's Tomb to South of St Bridget's Chancel (208m), Farm Outbuilding Immediately North of Moresby Hall (and Farmhouse) (272m), Moresby Hall (277m), Entrance Walls and Gate Piers to Moresby Hall (283m), Milestone to East of Parton Police Station (438m) and Lowca War Memorial (515m)). Given the proximity of the World Heritage Site and the Scheduled Monument to the wastewater treatment works site and therefore the potential for effects on the setting of these high value heritage assets, the option has been assessed as having a moderate negative effect on this objective. Due to the distance between the works and the remaining

heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects on these assets.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, however, it is noted that it is within 0.1km of the coast (Providence Bay Beach/Parton Beach). Construction would have short term, temporary negative effects on local landscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is located partially (>40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

9. **Health:** The operation of the option would involve a moderate increase in the wastewater treatment capacity provided to the community, with a moderate positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.

11. **Waste and resources:** The operation of the option would likely require moderate quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a moderate negative effect on this objective.
12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, new above ground infrastructure may have minor effects on the settings of nearby assets and features, particularly given the close proximity of high value heritage assets (World Heritage Site and Scheduled Monument).
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape/townscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Option Assessment Information	
Option ID	WHTHA-Whitehaven-1-SW1.2.1
Option Name	WHTHA-Whitehaven-1-SW1.2.1
Option Description	Surface water source control measures: SuDS delivered through partnerships (e.g. with local authorities during highways upgrades)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
WHTHA-Whitehaven-1-SW1.2.1	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of SuDS is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of SuDS technology (e.g. rain gardens). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of SuDS technology (e.g. swales, rain gardens, soakaways, bioretention, tree pits, permeable paving), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology being retrofitted to existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.), this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential minor effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a minor negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve minor capital expenditure (£1m to <£5m), resulting in a minor positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a minor negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts), which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of SuDS features, such as swales, green roofs, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Option Assessment Information	
Option ID	WHTHA-Whitehaven-1-SW1.3.2
Option Name	WHTHA-Whitehaven-1-SW1.3.2
Option Description	<p>Surface water source control measures:</p> <p>Strategic blue / green corridors: supporting and influence the development of blue and green spaces in urban environments during masterplanning process. Particularly in strategic developments (such as garden villages) - landscape led approach.</p>

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
WHTHA-Whitehaven-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of blue/green corridors and spaces is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of blue/green corridors (e.g. wetlands). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, bioretention), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential minor effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a minor negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO_{2e}).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve minor capital expenditure (£1m to <£5m), resulting in a minor positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a minor negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure, which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of blue/green infrastructure, such as swales, wetlands, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Wigan

Option Assessment Information	
Option ID	WIGAN-WIGAN_001_Std-W2.n
Option Name	WIGAN-WIGAN_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-	0	-	--	---	---	-	0	--	0	---	-	-
	Construction (positive)	0	+	0	0	0	0	0	+++	0	0	+/?	0	0
	Operation (negative)	0	0	0	--	-	---	-	0	0	0	---	-	-
	Operation (positive)	0	0	0	0	0	0	0	+++	+++	0	0	0	0

Construction

1. **Biodiversity:** There are no European/international sites within 1km of the wastewater treatment works site. As such, and as it is assumed that works will take place within the existing wastewater treatment works site, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. There are no national or local biodiversity sites within 1km of the wastewater treatment works site. More generally construction of the scheme could affect non-designated habitats and species through disturbance (e.g. noise, vibration, dust), however, as works will take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

2. **Soils:** It is assumed that the option would be constructed within the existing operational boundary of the wastewater treatment works site and would not require any additional land take, hence a minor positive effect has been identified.

3. **Water Quality:** The wastewater treatment works site is situated on/adjacent to two unnamed watercourses which appear to flow into the River Douglas and is situated approximately 0.11km from the River Douglas itself. Construction could therefore introduce pollution/debris into the river (although this is likely to be avoided through appropriate mitigation) It is also noted that the wastewater treatment works site is situated approximately 0.18km from the Leeds and Liverpool Canal, however, it is assumed that given the distance from this watercourse any effects could be avoided with standard mitigation/best practice.
4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA), however, given the scale of the option construction traffic and the operation of plant and machinery could contribute to a significant negative effect on local air quality.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (concrete and steel) with a significant amount of embodied carbon (>7500tCO₂e).
7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the sites of the construction of this infrastructure would be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would involve a significant capital expenditure (>£25m), resulting in a significant positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors (for example in north Newburgh and west Parbold) and recreational users. However, effects are likely to be temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would involve significant quantities of material (concrete and steel). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The wastewater treatment works site is within 1km of 43 Listed Buildings (Gate House at Railway Level Crossing (13m), Gate House at Railway Level Crossing (24m), Canal Aqueduct, Leeds and Liverpool Canal (185m), Giant's Hall (230m), Tawd Bridge (254m), Stocks Farmhouse (260m), Canal Aqueduct (276m), White Cottages (460m), Ivy Cottage Farmhouse (492m), Snape Cottage (565m), Tyrer's Farmhouse (602m), Kathry (613m), Barn Approximately 20 Metres West of Tyrer's Farmhouse (632m), Barn Approximately 30 Metres South of Fairhurst Hall (680m), Fairhurst Hall (692m), War Memorial (719m), Post Office (724m), Vicarage Farmhouse (747m), Sherleen Wayside (778m), Doe House (796m), Red Lion Inn (797m), Lynley Cottage The Cottage (808m), Ivy Dene and School Villas (810m), Spring Cottage (813m), Cross View (814m), The Gables (815m), Derby House (821m), Greenhill Farmhouse (822m), Rosehill Cottage (822m), Braden Cottage North View Sun Dew (829m), Newburgh Aqueduct, Leeds and Liverpool Canal (831m), Lys Cottage (849m), Village Cross on the Green (851m), Moorcroft House (851m), K6 Telephone Kiosk on the Green (858m), Stone Cross, with Attached Garden Wall (858m), The Retreat (872m), Rose Cottage (879m), Parbold Cabin

Signal Box (909m), Farm Building to West of Boundary Farmhouse (929m), Boundary Farmhouse (934m), Tawd Culvert Approximately 250 Metres West of Spencer's Bridge (961m), Brookside (974m)). Given the proximity of the two railway crossing gatehouses to the wastewater treatment works site and therefore the potential for effects on the setting of these heritage assets, the option has been assessed as having a minor negative effect on this objective. Due to the distance between the works and the remaining heritage assets and as the works will take place within the existing wastewater treatment works site, it is not anticipated that there would be any effects on these assets.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction could have short term, temporary negative effects on local landscape character and visual amenity. However, as works are expected to take place within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.

3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The wastewater treatment works site is located partially (<40%) within Flood Zone 3 and partially within Flood Zone 2 and therefore may be liable to flooding during the operational period, however, it would be unlikely to increase flood risk elsewhere.

5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality.

6. **Greenhouse Gas Emissions:** The operation of the option would involve significant carbon emissions (>1000tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the site of the option would be situated partially within Flood Zones 2/3 and in consequence, the option would be vulnerable to the effects of climate change (flooding) during operation.

8. **Economic and Social Wellbeing:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

9. **Health:** The operation of the option would involve a significant increase in the wastewater treatment capacity provided to the community, with a significant positive effect on this objective.

10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require significant quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a significant negative effect on this objective.
12. **Historic environment:** It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, new above ground infrastructure may have minor effects on the settings of nearby assets and features.
13. **Landscape:** New permanent above ground infrastructure associated with this option may have adverse effects on landscape character and visual amenity, however, as new infrastructure would be situated within the existing wastewater treatment works site, any effects in this regard are anticipated to be minor.

Option Assessment Information	
Option ID	WIGAN-Wigan-1-SW1.2.1
Option Name	WIGAN-Wigan-1-SW1.2.1
Option Description	Surface water source control measures: SuDS delivered through partnerships (e.g. with local authorities during highways upgrades)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
WIGAN-Wigan-1-SW1.2.1	Construction (negative)	-/?	--/?	0	-/?	--/?	---	-/?	0	-/?	0	--	-/?	-/?
	Construction (positive)	+/?	++/?	0	0	0	0	0	++	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	---	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of SuDS is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of SuDS technology (e.g. rain gardens). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of SuDS technology (e.g. swales, rain gardens, soakaways, bioretention, tree pits, permeable paving), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting moderate negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land or would involve SuDS technology being retrofitted to existing properties without additional land take (e.g. green roofs, downpipe disconnection, gravel paving, permeable paving, water butts, etc.), this could have a moderate positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential moderate effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a moderate negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve moderate capital expenditure (£5m to <£25m), resulting in a moderate positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a moderate negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in significant carbon emissions (> 1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on social wellbeing.
9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of additional green areas in urban environments (e.g. rain gardens, green roofs) may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts), which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of SuDS features, such as swales, green roofs, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Option Assessment Information	
Option ID	WIGAN-Wigan-1-SW1.3.2
Option Name	WIGAN-Wigan-1-SW1.3.2
Option Description	Surface water source control measures: Strategic blue / green corridors: supporting and influence the development of blue and green spaces in urban environments during masterplanning process. Particularly in strategic developments (such as garden villages) - landscape led approach.

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
WIGAN-Wigan-1-SW1.3.2	Construction (negative)	-/?	-/?	0	-/?	-/?	---	-/?	0	-/?	0	-	-/?	-/?
	Construction (positive)	+/?	+/?	0	0	0	0	0	+	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	--	0	0	0	0	0	0	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	+/?

Construction

1. Biodiversity: If the option is more than 1km from any designated biodiversity sites, development of blue/green corridors and spaces is not expected to have any significant effects on such sites. In consequence, in this circumstance, it is assumed that the HRA would conclude that for construction, there would be no likely significant effects or that significant adverse effects would be clearly avoidable with established scheme-level avoidance or mitigation measures. If the option is located within 1km of SACs, SPAs, SSSIs, it is possible, depending on the proximity, scale, and duration of construction that there could be effects arising either directly (in terms of direct habitat loss/deterioration) or indirectly from noise, vibration, and disturbance. In these circumstances, the HRA may then conclude that there would be risks of likely significant effects on European sites, but which could be addressed through best practice and established scheme-level avoidance or mitigation measures. The construction of the option may introduce additional habitats through the use of blue/green corridors (e.g. wetlands). More generally construction of the scheme could affect non-designated habitats and species through direct land take (if on greenfield land) or disturbance (e.g. noise, vibration, dust), however, any effect in this regard it not expected to be significant.

2. **Soils:** The construction of the option may require greenfield land take for the development of blue/green infrastructure (e.g. swales, wetlands, attenuation ponds, bioretention), which could potentially result in the loss of agricultural land in ALC Grade 1 - 3, with a resulting minor negative effect on this objective (due to the scale of the option). If the option is situated partially or entirely on previously developed land this could have a minor positive effect on this objective (due to the scale of works). If the option is not located in or adjacent to any designated geological sites (SSSI, RIGs), such sites will be unaffected by construction.
3. **Water Quality:** It is assumed that the option would not be situated within a Source Protection Zone, and it is not expected that construction of the option would affect water quality provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be liable to flooding during the construction period (depending on the timing of works), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** If the option is located within an Air Quality Management Area (AQMA), construction traffic and the use of plant and machinery could contribute to negative effect on local air quality, which is considered to be a potential minor effect due to the scale of works. If the option is located outside an Air Quality Management Area (AQMA) it is anticipated that the construction of the option would not be of sufficient scale and duration to have a significant effect, however, construction activities may have a minor negative effect on this objective.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of materials (i.e. concrete and steel) with a significant amount of embodied carbon (>7500 tCO₂e).
7. **Climate Change Resilience:** If the option is located within an area at risk of flooding (i.e. Flood Zone 2 and 3a/b) construction works may be at risk to the effects of climate change (flooding) during the construction period (depending on the timing of installation), which could have a minor negative effect on this objective. However, if the option is not located within an area at risk of flooding, then the effect would be neutral.
8. **Economic and Social Wellbeing:** The construction of the option would involve minor capital expenditure (£1m to <£5m), resulting in a minor positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors and recreational users (if present). However, effects are likely to be localised and temporary in nature.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** It is expected that construction of the option would require the use of materials such as concrete, plastic and steel, which would lead to a minor negative effect against this objective (due to the scale of the works). There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** If the option is more than 1km from any designated heritage assets such as WHS, Scheduled Ancient Monuments, Listed Buildings, registered parks and gardens and registered battlefields, it is not expected to have any effect on such sites. If the option is located within 1km of such assets, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the construction location), scale and duration of construction, that there may be effects on the settings of these heritage assets, resulting in a negative effect. It is expected that standard construction best practice and mitigation would avoid damage to any assets if situated within the area of construction.

13. **Landscape:** If the option is more than 1km from designated landscapes such as National Parks and AONBs it is not expected to have any effect on such areas. If the option is located within 1km of such areas, it is possible, depending on the proximity (in particular where such assets are located on or adjacent to the site of construction), scale and duration of construction, that it could affect the visual amenity of the designated features. More generally, construction could have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** The operation of the option would seek to reduce the frequency and severity of storm overflows, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could affect receiving water quality/quantity that could impact positively on water dependent designated conservation sites and for which the HRA concludes no operational effects, which could have a positive effect on this objective. However, if the operation of the option would have no effect on any designated features, then the effect would be neutral.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated beyond any land take assessed during the construction phase or following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would seek to reduce the frequency and severity of storm overflows that could affect receiving water quality, by reducing the frequency of surface water flooding through increased infiltration and retention of water, which could have a positive effect on this objective.

4. **Flood Risk:** The operation of the option would seek to reduce the frequency and severity of flooding through increased infiltration and retention of water, which could have a minor positive effect on communities.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The operation of the option is identified to result in moderate carbon emissions (100 to <1000 tCO₂e/year).

7. **Climate Change Resilience:** As noted above, the operation of the option would seek to reduce the frequency and severity of flooding that could affect communities so increasing the resilience to the effects of climate change, which could have a positive effect against this objective.

8. **Economic and Social Wellbeing:** The operation of the option would seek to reduce the frequency and severity of flooding, which may positively affect communities, so increasing economic and social wellbeing. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on social wellbeing.

9. **Health:** The operation of the option may help to ensure that surface water and bathing water quality is maintained within statutory limits through a reduction in flooding and storm overflows, which would have a positive effect on the health of the community. Creation of blue/green corridors and spaces in urban environments may also have a positive effect on health.
10. **Water resources:** The operation of the option would have a positive effect on network infiltration, by reducing the quantity of water entering the wastewater system and subsequently reducing the frequency and severity of storm overflows by increasing infiltration and water retention.
11. **Waste and resources:** The operation of the option is not expected to have any significant effects on material use or waste generation.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option may introduce new permanent above ground infrastructure, which may have adverse effects on landscape/townscape character that may have a minor negative on this objective. However, certain types of blue/green infrastructure, such as swales, wetlands, attenuation ponds, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

TPU Catchment: Workington

Option Assessment Information	
Option ID	WORKI-WORKI_001_Std-W2.n
Option Name	WORKI-WORKI_001_Std-W2.n
Option Description	Increase treatment capacity

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (negative)	0	0	0	0	-	--	0	0	0	0	-	0	0
	Operation (positive)	0	0	0	0	0	0	0	+	+	0	0	0	0

Construction

It is assumed that no construction would be required as part of this option. Therefore, a neutral effect has been determined against all objectives. However, it is noted that the need for any additional construction at this wastewater treatment works site will be reviewed during the plan cycle

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present). The option may result in an increase in noise disturbance to nearby habitats and species, however, as the option would involve an increase in treatment capacity at the existing operational wastewater treatment works site, any effects in this regard are anticipated to be negligible.

2. **Soils:** No effects on land use, soils or geodiversity are anticipated during the operational phase of the option.
3. **Water Quality:** Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The option is not located within an area at risk of flooding. The operation of the option would have no effect on flood risk.
5. **Air Quality:** The operation of the option would likely require a minor number of vehicle movements for the maintenance of the wastewater treatment works, in addition to the transfer/disposal of sludge, which could have a minor negative effect on local air quality. The wastewater treatment works is not situated within an AQMA.
6. **Greenhouse Gas Emissions:** The operation of the option would involve moderate carbon emissions (100 to 1000tCO₂e/year).
7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
9. **Health:** The operation of the option would involve a minor increase in the wastewater treatment capacity provided to the community.
10. **Water resources:** It is not expected that the operation of this option would affect water resources and the operational effects are assessed as neutral.
11. **Waste and resources:** The operation of the option would likely require minor quantities of raw materials/chemicals and electricity for the treatment of wastewater/sewage, which would have a minor negative effect on this objective.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The option is not situated within or in close proximity to any designated landscapes and would not result in any additional above ground infrastructure, hence would have no effects on landscape/townscape character and visual amenity.



Assessment of Transfer Options

6.4.11 The following two transfer options have been identified in the draft DWMP:

- Askham to Sockbridge;
- Mowpen Brow to High Legh.

These options have been assessed to identify, describe, and evaluate their likely significant environmental effects. The following sections summarise the assessment of the two transfer options listed above.

Askham to Sockbridge

Option Assessment Information	
Option ID	Askham to Sockbridge Transfer
Option Name	Askham to Sockbridge Transfer
Option Description	Askham to Sockbridge Transfer (new pumping station and rising main)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	--/?	--/?	-	--/?	-/?	-/?	-/?	0	-	0	-/?	---/?	--
	Construction (positive)	0	0	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	-/?	0	-/?	0	-
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	+/?	0	0

Construction

1. Biodiversity: The option is within 1km of the River Eden SAC (the end of the pipeline at Askham is situated within the SAC). However, significant or significant adverse effects are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of the River Eden and Tributaries SSSI (the end of the pipeline at Askham is situated within the SSSI) and five areas of Ancient Woodland, the closest of which is situated 54m from the pipeline route (the remaining areas are situated 390m or more from the works). Construction of the scheme could affect these designated features through direct land take, noise and disturbance although such effects could be reduced through appropriate mitigation or avoided if siting and routing were modified, and best practice construction measures employed. More generally construction of the scheme could affect non-designated habitats and species through direct land

take (e.g. excavation of the pipeline route or siting of the pumping station) or disturbance (e.g. noise, vibration, dust). However, any soil displaced during the excavation of the pipeline would be reinstated following completion. It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change, however, it is assumed that any detailed design/engineering would seek to avoid where possible designated and non-designated habitats and species.

2. **Soils:** The construction of the option would be situated mainly on greenfield land and would result in the loss of land in ALC Grade 3. It is however noted that any soils displaced during the excavation of the pipeline route would be reinstated following completion. It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change.

3. **Water Quality:** The construction of the option would involve works adjacent to the River Lowther (the new pumping station and some of the pipeline route) and Lady Beck (which flows into the River Eamont, just downstream of the end of the pipeline at Sockbridge), which could introduce pollution/debris into the river(s) (although this is likely to be avoided through appropriate mitigation).

4. **Flood Risk:** A small section of the pipeline route (<40%) as well as the Askham wastewater treatment works/discharge would be situated within Flood Zone 3 and therefore may be liable to flooding during the construction period (depending on the timing of installation). The construction of the option would be unlikely to increase flood risk elsewhere. It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change, however, it is assumed that any detailed design/engineering would seek to avoid where possible areas at risk of flooding.

5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA); however, construction traffic could contribute to negative effect on local air quality. However, as the scale of the works (in terms of CAPEX value) and associated vehicle movements required are currently unknown, there remains some uncertainty.

6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw material (concrete and steel) with embodied carbon. However, as the scale of the option (in terms of CAPEX value) and associated material requirements are currently unknown, there remains some uncertainty.

7. **Climate Change Resilience:** As noted above, a small section of the pipeline route (<40%) as well as the Askham wastewater treatment works/discharge would be situated within Flood Zone 3 and in consequence, construction of this infrastructure would be vulnerable to the effects of climate change (flooding). It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change, however, it is assumed that any detailed design/engineering would seek to avoid where possible areas at risk of flooding.

8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure resulting in a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. However, as the scale of the option (in terms of CAPEX value), is currently unknown, there remains some uncertainty.

9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors, for example in Askham and Sockbridge and a limited number of scattered residential properties nearby to the pipeline route.

10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.

11. **Waste and resources:** The construction of the option would require the use of raw material (concrete and steel). However, as the scale of the option (in terms of CAPEX value) and associated material requirements are currently unknown, there remains some uncertainty. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.

12. **Historic environment:** Approximately half of the transfer pipeline route is situated within the Lake District World Heritage site. The option is also situated within 1km of: two Scheduled Monuments (Castlesteads multivallate prehistoric defended enclosure (670m) and Bowl barrow 850m WSW of Yanwath Woodhouse Farm (895m); 89 Listed Buildings, including 25 within 0.1km (Cross Bank and Greystones (7m), Wall Railings and Gate to Front Garden of Cross Bank and Greystones (10m), Hall Croft (14m), Askham Hall (18m), Willow Cottage and Thwaite Cottage (18m), Terrace Walls and Steps to South of Askham Hall (22m), Yew Tree House (23m), Former Barn Immediately to East of Hall Croft (36m), Base of Cross in Centre of Village Green (38m), Barn Immediately to West of Thwaite Cottage (40m), Stable Cottage (41m), The Green (41m), Queens Head Hotel (46m), Lime Grove and Barn Adjoining (57m), The Old Post Office (60m), Tirril Hall (60m), Grove Farmhouse (61m), Hall Cottage and Front Garden Wall (80m), Chest Tomb to West Of Path Approximately 24.5 Metres to South Of St Peters Church (82m), Bowman Monument on East Side of Path Approx. 28 Metres to South of St Peter's Church (84m), Chest Tomb on East Side of Path Approximately 27.5 Metres to South of St Peters Church (87m), Mounsey Monument to East of Path Approximately 15 Metres to South of St Peters Church (87m), Gatepiers to Askham Hall (88m), Barn to West of Askham Hall (93m), Punch Bowl Hotel Public House (96m)); and, two Registered Parks and Gardens (Askham Hall (crossed by the pipeline route) and Lowther Castle (18m)).

Due to the potential for effects on the settings of these heritage assets, the option has been assessed as having a significant negative effect on this objective. It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change, however, it is assumed that any detailed design/engineering would seek to avoid where possible designated and non-designated heritage assets.

13. **Landscape:** Just under half of the proposed transfer route and the pumping station is situated within the Lake District National Park and World Heritage Site. Excavation of the pipeline route and construction of any above ground infrastructure requires as part of this option could affect the landscape/visual amenity of the National Park/World Heritage Site and more generally the rural location of the works. It is noted however, that any soil displaced during the construction of the pipeline route would be reinstated following completion.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present).

2. **Soils:** No effects on land use, soils or geodiversity are anticipated following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would involve the transfer of effluent from Askham wastewater treatment works to Sockbridge and Tirril wastewater treatment works. Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty
4. **Flood Risk:** The operation of the option would have no effect on flood risk.
5. **Air Quality:** The operation of the option is not expected to have effects on air quality.
6. **Greenhouse Gas Emissions:** The transfer (pumping) and treatment of effluent would require energy with resulting carbon emissions. However, transferring flows from Askham wastewater treatment works to Sockbridge and Tirril wastewater treatment works may reduce the amount energy required, which could have a positive effect on this objective. However, due to the lack of information on energy requirements and operational carbon emissions, there is uncertainty.
7. **Climate Change Resilience:** The operation of the option would have no effect on flood risk and climate resilience.
8. **Economic and Social Wellbeing:** The operation of the option would potentially involve an improvement in the wastewater treatment capacity provided to the community. The operation of the option may also require additional staff to operate the facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing. However, there remains some uncertainty.
9. **Health:** The operation of the option would potentially involve an improvement in the wastewater treatment capacity provided to the community, with a positive effect on this objective. The operation of treatment/pumping facilities may however, lead to noise which could have a negative impact on health. However, there remains some uncertainty.
10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for effluent treatment, in addition to energy for pumping and treatment, which may have a negative effect on this objective. However, transferring flows from Askham wastewater treatment works to Sockbridge and Tirril wastewater treatment works may reduce the quantities of such materials/energy required, which could have a positive effect on this objective. However, due to the lack of information on material/energy requirements, there is uncertainty.
12. **Historic environment:** There would be no operational effects on designated cultural heritage assets.
13. **Landscape:** The operation of the option would introduce new permanent above ground infrastructure (pumping station) within the Lake District National Park, which may have adverse effects on the character/setting of the National Park and a negative on this objective.

Mowpen Brow to High Legh

Option Assessment Information	
Option ID	Mowpen Brow to High Legh
Option Name	Mowpen Brow to High Legh
Option Description	Mowpen Brow to High Legh (new pumping station and rising main)

Option	Stage	1. Biodiversity	2. Soils, Geodiversity and Land Use	3. Water Quality	4. Flood Risk	5. Air Quality	6. Greenhouse Gas Emissions	7. Climate Change Resilience	8. Economic and Social Wellbeing	9. Human Health	10. Water Resources	11. Waste and Materials	12. Cultural Heritage	13. Landscape
Option Name	Construction (negative)	-/?	-/?	0	0	-/?	-/?	0	0	-	0	-/?	-	-
	Construction (positive)	0	+/?	0	0	0	0	0	+/?	0	0	+/?	0	0
	Operation (negative)	0	0	0	0	0	-/?	0	0	-/?	0	-/?	0	-
	Operation (positive)	0	0	0	0	0	+/?	0	+/?	+/?	0	+/?	0	0

Construction

1. **Biodiversity:** The option is not within 1km of any European/international sites. As such, significant or significant adverse effects on European/international sites are expected to be avoidable or mitigable with established scheme-level avoidance or mitigation measures. The option is within 1km of three areas of Ancient Woodland (509m, 628m and 706m). Construction of the scheme could affect these areas through noise and disturbance although such effects could be reduced through appropriate mitigation and best practice construction measures, particularly given the distance to these features. More generally construction of the scheme could affect non-designated habitats and species through direct land take (e.g. excavation of the pipeline route or siting of the pumping station) or disturbance (e.g. noise, vibration, dust). However, any soil displaced during the excavation of the pipeline would be reinstated following completion. It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any

detailed design/engineering and could be subject to change, however, it is assumed that any detailed design/engineering would seek to avoid where possible designated and non-designated habitats and species.

2. **Soils:** The construction of the pipeline which crosses fields rather than following the routes of roads, would be situated mainly on greenfield land and would result in the loss of land in ALC Grade 3, with an associated negative effect on this objective. However, the route that follows the road route could potentially have a positive effect on this objective as it would be situated mainly within previously developed land (the roads). It is however noted that some uncertainty remains regarding the exact route of the pipeline and the location of the pumping station.
3. **Water Quality:** It is not expected that construction of this option would affect water quality, due to location, the absence of connectivity and provided best practices are adhered to and mitigation implemented.
4. **Flood Risk:** The option is not located within an area at risk of flooding. The construction of the option would be unlikely to increase flood risk elsewhere.
5. **Air Quality:** The option is not located within an Air Quality Management Area (AQMA); however, construction traffic could contribute to negative effect on local air quality. However, as the scale of the works (in terms of CAPEX value) and associated vehicle movements required are currently unknown, there remains some uncertainty.
6. **Greenhouse Gas Emissions:** The construction of the option would require the use of raw material (concrete and steel) with embodied carbon. However, as the scale of the option (in terms of CAPEX value) and associated material requirements are currently unknown, there remains some uncertainty.
7. **Climate Change Resilience:** As noted above, the site of the option would be located outside an area at risk of flooding and so would not be vulnerable to the effects of climate change (flooding).
8. **Economic and Social Wellbeing:** The construction of the option would require capital expenditure resulting in a positive effect on the local economy associated with potential employment opportunities and supply chain benefits generated by the development together with spend by construction workers and contractors in the local economy. However, as the scale of the option (in terms of CAPEX value), is currently unknown, there remains some uncertainty.
9. **Health:** Construction emissions, noise and disturbance may affect proximate residential receptors, for example in High Legh and a limited number of scattered residential properties nearby to the pipeline route.
10. **Water resources:** It is not expected that construction of this option would affect water resources and the construction effects are assessed as neutral.
11. **Waste and resources:** The construction of the option would require the use of raw material (concrete and steel). However, as the scale of the option (in terms of CAPEX value) and associated material requirements are currently unknown, there remains some uncertainty. There is the possibility that waste building materials such as steel and plastic, could potentially be re-used or recycled. However, the significance of this is currently unknown.
12. **Historic environment:** The construction site is within 1km of ten Listed Buildings (West Hall Farmhouse (275m), Church of St John (292m), Chapel of St Mary (318m), Old Farm (502m), Front Lodge (523m), Lime Tree Farmhouse (545m), Broad Oak Farm (602m), Apple Tree Cottage (741m), Dairy Farm House (849m),

Cooper's Square (892m)). Due to the distance between these assets and the works, it is not expected that there would be a significant effect, however, there may be some minor negative effects on the setting of those that are closest to the works. It is however noted that some uncertainty remains regarding the exact route of the pipeline as the current alignment represents a preliminary route which has not yet been taken through any detailed design/engineering processes and could be subject to change, however, it is assumed that any detailed design/engineering would seek to avoid where possible designated and non-designated heritage assets.

13. **Landscape:** The development site is not within or in close proximity to any landscape designations, but construction would have short term, temporary negative effects on local landscape/townscape character and visual amenity.

Operation

1. **Biodiversity:** Any increase in discharges resulting from this option are assumed to be consented and as such it is not expected that there would be any effects on any downstream sites/features (if present).

2. **Soils:** No effects on land use, soils or geodiversity are anticipated following the reinstatement of land following the construction stage.

3. **Water Quality:** The operation of the option would involve the transfer of effluent from Mowpen Brow wastewater treatment works to High Legh wastewater treatment works. Any increase in discharge volumes associated with the operation of this option is assumed to be consented (in terms of volumes and concentrations of pollutants) and as such it is assumed there would be no effect on water quality, however, due to the lack of information on discharge volumes, there remains some uncertainty

4. **Flood Risk:** The operation of the option would have no effect on flood risk.

5. **Air Quality:** The operation of the option is not expected to have effects on air quality.

6. **Greenhouse Gas Emissions:** The transfer (pumping) and treatment of effluent would require energy with resulting carbon emissions. However, transferring flows from Mowpen Brow wastewater treatment works to High Legh wastewater treatment works may reduce the amount energy required, which could have a positive effect on this objective. However, due to the lack of information on energy requirements and operational carbon emissions, there is uncertainty.

7. **Climate Change Resilience:** The operation of the option would have no effect on flood risk and climate resilience.

8. **Economic and Social Wellbeing:** The operation of the option would potentially involve an improvement in the wastewater treatment capacity provided to the community. The operation of the option may also require additional staff to operate the facilities which could provide additional jobs, with a positive effect on the local economy and social wellbeing. However, there remains some uncertainty.

9. **Health:** The operation of the option would potentially involve an improvement in the wastewater treatment capacity provided to the community, with a positive effect on this objective. The operation of treatment/pumping facilities may however, lead to noise which could have a negative impact on health. However, there remains some uncertainty.

10. **Water resources:** It is not expected that the operation of this option would have any effect on water resources.
11. **Waste and resources:** The operation of the option would likely require raw materials/chemicals for effluent treatment, in addition to energy for pumping and treatment, which may have a negative effect on this objective. However, transferring from Mowpen Brow wastewater treatment works to High Legh wastewater treatment works may reduce the quantities of such materials/energy required, which could have a positive effect on this objective. However, due to the lack of information on material/energy requirements, there is uncertainty.
12. **Historic environment:** It is not anticipated that there would be any operational effects on designated cultural heritage assets during the operational period.
13. **Landscape:** The operation of the option would introduce new permanent above ground infrastructure (pumping station), which may have adverse effects on local landscape/townscape character.

Appendix F Quality Assurance Checklist

The Government’s Guidance on SEA¹³⁷ contains a quality assurance checklist to help ensure that the requirements of the SEA Regulations are met. Those requirements relevant to the scoping stage of the SEA of draft DWMP have been set out below.

Quality Assurance Checklist	
Objectives and Context	
The plan’s or programme’s purpose and objectives are made clear.	The purpose of the draft DWMP is set out in Section 1.3 of this Environmental Report. The objectives of the draft DWMP are set out in Section 1.3 .
Environmental issues and constraints, including international and EC environmental protection objectives, are considered in developing objectives and targets.	Key environmental issues identified through a review of relevant plans and programmes (see Section 2 and Appendix B of this report) and analysis of baseline conditions (see Section 3) have informed the development of the assessment framework presented in Section 4.3 .
SEA objectives, where used, are clearly set out and linked to indicators and targets where appropriate.	SEA objectives and guide questions are set out in Section 4.3 of this report. Quantitative and qualitative thresholds of effects provide values for neutral, minor, moderate and significant effects (Appendix D).
Links with other related plans, programmes and policies are identified and explained.	Links are identified in Section 2 and Appendix B .
Conflicts that exist between SEA objectives, between SEA and plan objectives and between SEA objectives and other plan objectives are identified and described.	The relationships between the SEA, DWMP and other plan objectives have been identified in the review of plans and programmes included in Appendix B .
Scoping	
Consultation Bodies are consulted in appropriate ways and at appropriate times on the content and scope of the Environmental Report.	The SEA Scoping Report was consulted upon and responses to this are included in this Environmental Report (see Appendix A).
The assessment focuses on significant issues.	The scope of the assessment reflects the geographic extent of the U UW area and provides a comprehensive approach to assessment (reflecting the large number of interactions dependent on the continued supply of water). This enables the assessment to determine which impacts will be considered significant.
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	General difficulties, limitations and assumptions are set out in Section 4.6 of this report. Baseline data limitations are discussed in Section 3.3 .
Reasons are given for eliminating issues from further consideration.	The proposed scope of the assessment is set out in Section 4.2 . All SEA topics have been scoped in to the assessment.

¹³⁷ Office of the Deputy Prime Minister (2005) *A Practical Guide to the Strategic Environmental Assessment Directive*.



Quality Assurance Checklist	
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented.	All options were assessed as set out in Section 5 and Appendix E of this report.
Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant.	A 'do minimum' and/or 'business as usual' scenario is not appropriate for the draft DWMP due to the need to provide sufficient water to customers.
The environmental effects (both adverse and beneficial) of each alternative are identified and compared.	This is included in Section 5 and Appendix E of this report.
Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained.	No inconsistencies were identified.
Reasons are given for selection or elimination of alternatives.	This is set out in Section 1.3 , and as relevant of this report.
Baseline Information	
Relevant aspects of the current state of the environment and their likely evolution without the plan or programme are described.	Section 3 and Appendix C of this report characterises the current environmental baseline conditions, along with how these are likely to change in the future.
Environmental characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan.	The environmental characteristics of the U UW area are described in Section 3 and Appendix C of this report.
Difficulties such as deficiencies in information or methods are explained.	Baseline data limitations are discussed in Section 3.3 . Further difficulties and limitations are set out in Section 4.6 .
Prediction and Evaluation of Likely Significant Environmental Effects	
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage and landscape), as relevant; other likely environmental effects are also covered, as appropriate.	The potential effects of the options are identified in Section 5 and Appendix E .
Both positive and negative effects are considered, and the duration of effects (short, medium or long-term) is addressed.	The nature and duration of potential effects has been set out in the detailed assessment matrices contained in Appendix E of this report.
Likely secondary, cumulative and synergistic effects are identified where practicable.	Information on secondary, cumulative and synergistic effects is set out in Section 5.4 . Where identified, effects are also set out in the detailed assessment matrices contained in Appendix E of this report.
Inter-relationships between effects are considered where practicable.	These relationships are identified where appropriate in the detailed assessment matrices contained in Appendix E of this report.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations, and thresholds.	Relevant standards have been used where appropriate in undertaking the assessment.
Methods used to evaluate the effects are described.	Information on the methods used for evaluation of potential effects is included in Section 4 and in the detailed assessment matrices contained in Appendix E of this report. The definitions of significance used in the assessment are set out in Appendix D .

Quality Assurance Checklist	
Mitigation Measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated.	Mitigation measures for potential negative effects are set out in Section 5.6 and in the commentary to the matrices in Appendix E .
Issues to be taken into account in project consents are identified.	Issues to be taken into account in project consents are included in the appraisal matrices in Appendix E .
The Environmental Report	
Is clear and concise in its layout and presentation.	We believe the report is clear and concise, reflective of the information in the draft DWMP.
Uses simple, clear language and avoids or explains technical terms.	The report uses accessible language wherever possible.
Uses maps and other illustrations where appropriate.	Maps and illustrations have been utilised in the report.
Explains the methodology used.	The method used is set out in the report in Section 4 .
Explains who was consulted and what methods of consultation were used.	Appendix A of this report outlines the consultation that has been carried out to-date.
Identifies sources of information, including expert judgement and matters of opinion.	Sources of information are included throughout the report.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main options considered, and any changes to the plan resulting from the SEA.	A Non-Technical Summary has been included as part of the report.
Consultation	
The SEA is consulted on as an integral part of the plan-making process.	The previously issued SEA Scoping Report was consulted upon and responses are included in this Environmental Report (see Appendix A).
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and Environmental Report.	Consultation on the draft DWMP and this Environmental Report will be undertaken by UUW.
Decision-making and Information on the Decision	
The Environmental Report and the opinions of those consulted are taken into account in finalising and adopting the plan or programme.	This will be incorporated following consultation on draft DWMP and Environmental Report.
An explanation is given of how they have been taken into account.	This will be provided following consultation on the draft DWMP and Environmental Report.
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered.	This will be set out following consultation on the draft DWMP and Environmental Report.
Monitoring Measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA.	The report sets out potential monitoring measures that UUW could use in Section 6.4 .
Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA.	The suggestions for monitoring are included in Section 6.4 of the report.

Quality Assurance Checklist	
Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects may include predictions which prove to be incorrect.)	The suggestions for monitoring made in Section 6.4 are for U UW to act on, with monitoring taking place following implementation of the DWMP.
Proposals are made for action in response to significant adverse effects.	Mitigation methods are outlined for the preferred options in Section 5.6 of this report and Appendix E .



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