Dŵr Cymru Welsh Water
Drainage and Wastewater Management Plan
Strategic Environmental Assessment

Environmental Report

REVISED

Wood Group UK Limited – May 2022

Report for

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Document revisions

No.	Details	Date
1	SEA Environmental Report - Draft	April 2022
2	SEA Environmental Report - Revised	May 2022

Non-Technical Summary

Introduction

Dŵr Cymru Welsh Water (Welsh Water) is currently preparing its first Drainage and Wastewater Management Plan (DWMP). The DWMP is new, and whilst not currently a statutory obligation[1], Welsh Water, as one of the thirteen UK's water and sewerage companies (WaSCs), has committed to produce a DWMP in accordance with the Water UK DWMP Framework[2] (the Framework) and the Government's guiding principles[3].

The DWMP sets out how Welsh Water 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 then finalised following consultation to support business plans for the 2024 Price Review.

DWMPs are not currently a statutory requirement[4], and as such, they do not necessarily fall within the scope of Strategic Environmental Assessment (SEA) regulations[5] or the Habitats Regulations[6]; 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 and the specific performance requirements to complete a plan, Welsh Water are undertaking an SEA and Habitat Regulations Assessment (HRA) 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 October 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.

[1] Welsh Government, Defra, Ofwat, EA 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]

[2] 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*

[3] Welsh Government, Defra, Ofwat, EA and NRW (2022) *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]

[4] However, Welsh Water also has a performance requirement to undertake a DWMP from Welsh Government and NRW.

[5] Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004 (if effects more than one country in the UK) or Statutory Instrument 2004 No.1656 - The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (if effects only in Wales)

[6] Statutory Instrument 2017 No 1012 - The Conservation of Habitats and Species Regulations (2017

What is the Drainage and Wastewater Management Plan?

The DWMP will set out how Welsh Water intends to extend, improve and maintain a robust and resilient drainage and wastewater system. The DWMP builds on Welsh Water's current Sustainable Drainage Plans. It takes a long-term view, setting out a planning period that is appropriate to the risks faced by Welsh Water, covering at least 25 years.

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

- **Level 1 - Company Operational Level**: An operational area which consolidates the more localised mapping in a published strategic report which will address the challenges Welsh Water has identified and how the long-term wastewater and drainage aims will be realised.
- **Level 2 - Strategic Planning Unit**: A subdivision of the Company operational area. Originally set at the River Basin Management District Catchment (RBMD) level and revised to take into account drainage from sewers. Through catchment wide partnership and stakeholder engagement, the DWMP presents opportunities to identify new solutions to issues.
- **Level 3 - Tactical Planning Unit**: A consolidation of Wastewater Treatment Works (WwTW) and its catchments joined together by its river drainage system. This will include a detailed assessment of risks and opportunities as well as setting out long-term plans for the interventions needed.

Welsh Water has identified 13 Level 2 Strategic Planning Units (SPUs), 106 Level 3 Tactical Planning Units (TPUs), with further levels used to provide detail and granularity for proposals e.g. L4 drainage area.

To address these challenges, a range of options are being considered for the varying spatial levels, where selected combinations of these options will provide intervention strategies to be achieved corporately by 2050. The category of options include *inter alia*.:

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

Detailed modelling, engineering and optioneering works has been undertaken to determine the most appropriate, effective and best value response.

Welsh Water has prioritised the works reflecting levels of service coincident with the risks to designated sites with the highest risk reflecting where there are multiple incidents of internal sewer flooding of properties. Through this process, Welsh Water has identified 18 prioritised TPU's (covering 19 L4 drainage areas) which will be the focus of the first iteration of the DWMP.

To address the risks in these areas, the broad categories of intervention identified were refined, taking into account, network assessments, resilience, catchment strategy and localised option tests to:

- **Sustainable options**, which seek to redirect flows of water from the wastewater/sewer network by mimicking more natural drainage regimes.
- **Traditional options**, which involve increasing the capacity of the drainage and wastewater network.
- **Mixed options** that combine sustainable and traditional interventions**.**

Welsh Water is proposing 160 interventions across the relevant TPUs, with each option reflecting one of the broad categories above. It is the effects of these options that have been subject to consideration and assessment within the SEA.

What is Strategic Environmental Assessment (SEA)?

SEA became a statutory requirement following the adoption[7] of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. In Wales, this was transposed into legislation on 12th July 2004 as Statutory Instrument 2004 No.1656 - The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004. These apply to plans and programmes whose effects are wholly within Wales; however, if plans or programmes could affect more than one country in the UK, then The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No.1633) would apply.

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.

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 Welsh Water 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 Welsh Water'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:

[7] 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 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).

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 (this Scoping Report).

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 22nd October to 26th November 2021 (responses are summarised in **Appendix B**). 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**). The draft DWMP and accompanying documents including the Environmental Report have been published (**Stage D**). Following consultation, Welsh Water 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. Welsh Water will then publish the final DWMP and implement it accordingly. In conjunction with publishing the final DWMP, Welsh Water 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 Environmental Report describes in further detail the requirement for SEA of the DWMP and the SEA process including its relationship with the preparation of Welsh Water's 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. These issues 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	• The need to maintain and enhance biodiversity and the resilience of ecosystems, including sites designated for their nature conservation value. • The need to address the climate emergency and nature emergencies together. • 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 protected species. • The need to prevent pollution of freshwater habitats, from sources such as (inter alia) slurry, sewage and soil erosion • The need to prevent the spread/introduction of invasive non-native species. • The need to maintain/enhance ecological connectivity. • The need to maintain/enhance connectivity between rivers and their floodplains. • The need to sustainably manage biodiversity assets, taking into account the effects of climate change. • The need to recognise the key role that green infrastructure plays in supporting (inter alia) biodiversity, landscape, wellbeing and climate change resilience. • The need to protect and enhance the green infrastructure network.

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
	• The need to prevent/enhance physical modifications to freshwater ecosystems. • The need to continue monitoring biodiversity and ecological indicators. • The need to work within environmental limits and capacities.
Geology Land Use and Soils	• The need to protect, maintain and enhance geomorphological functions and services. • The need to influence how land is managed, promoting sustainable patterns of land use. • The need to conserve and enhance soil quality and function (including carbon sequestration). • The need to protect and avoid damage to Wales' geodiversity and conserve and enhance sites designated for geological interest. • The need to manage impacts on soil resources, including control of pollution and remediation of contaminated land.
Water	• The need to maintain and improve water quality. • The need to maintain seasonal flows in groundwater and surface water. • The need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively. • The potential effects of climate change and the need to build climate change resilience into the water environment and water management. • The need to prevent the deterioration of Water Framework Directive waterbodies, achieve protected area objectives and achieve water body status objectives.
Air Quality	• The need to minimise emissions of pollutant gases and particulates and enhance air quality
Climatic Factors	• The need to reduce travel and promote sustainable modes of transport. • The need to reduce GHG 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	• The need to ensure that water services requirements of people and visitors can be met at all times, in a sustainable way; • The need to ensure that water services remain affordable; • The need to ensure that measures to manage drainage and wastewater do not adversely affect the health and well-being of any member of the community; • The need to ensure that vulnerable people are not affected by implementation of measures to manage drainage and wastewater; • The need to ensure that measures undertaken to manage drainage and wastewater do not have an adverse economic impact; • The need to avoid disruption through effects on the transport network; and • The need to ensure resilience of wastewater treatment and drainage infrastructure against climate change effects.
Material Assets and Resource Use	• The need to promote water efficiency measures. • The need to ensure that infiltration is managed. • The need to maintain the balance between wastewater capacity, use and constraints. • The need to reduce energy consumption and support low carbon and renewable energy production. • 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	• 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 promote access to Wales' cultural heritage sites within Welsh Water's ownership where possible and safe to do so. • The need to avoid damage to important wetland areas with potential for paleoenvironmental deposits.

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
Landscape	• The need to protect, conserve and enhance landscape character, taking into account the effects of climate change; • The need to ensure the special qualities of designated landscapes are protected; and • 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 assessment framework that has been used to assess the effects of the draft DWMP.

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

Section 3 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**, which also maps the SEA objectives to the Well-being Goals from the Well-being and Future Generations Act 2015. For each objective, guide questions are provided.

The performance of the proposed interventions within the draft DWMP and any reasonable alternatives have been assessed against these objectives to ensure that each option is assessed in a robust and consistent manner. The assessment framework is shown in **Table NTS.2**.

Table NTS.2 Assessment Framework for the Draft DWMP

Topic	Objective	Welsh Government Well-being Goal(s)
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.	*A prosperous Wales* *A resilient Wales* *A healthier Wales* *A globally responsible Wales*
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.	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Water – Quantity and Quality	3. To protect and enhance the quality and quantity of surface and groundwater resources.	*A prosperous Wales* *A resilient Wales* *A healthier Wales*
Water – Flood Risk	4. To reduce or manage flood risk.	*A resilient Wales* *A healthier Wales*
Air	5. To minimise emissions of pollutant gases and particulates and enhance air quality.	*A resilient Wales* *A healthier Wales*
Climatic Factors	6. To reduce greenhouse gas emissions.	*A resilient Wales* *A globally responsible Wales*

Topic	Objective	Welsh Government Well-being Goal(s)
	7. To adapt and improve resilience to the threats of climate change.	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Population	8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.	*A prosperous Wales* *A resilient Wales* *A more equal Wales* *A globally responsible Wales* *A Wales of cohesive communities*
Human Health	9. To protect and enhance human health and well-being.	*A prosperous Wales* *A globally responsible Wales* *A resilient Wales* *A healthier Wales* *A more equal Wales* *A Wales of cohesive communities*
Material Assets - Water Resources	10. To promote and enhance the sustainable and efficient use of resilient water resources.	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Material Assets – Waste and Resource Use	11. To minimise waste, promote resource efficiency and move towards a circular economy.	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Cultural Heritage	12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.	*A Wales of vibrant culture and thriving Welsh language* *A globally responsible Wales*
Landscape	13. To conserve, protect and enhance landscape and townscape character and visual amenity.	*A Wales of vibrant culture and thriving Welsh language* *A globally responsible Wales*

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 used to capture the assessment of each measure in a consistent manner.

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

Summary of Effects

Intervention Effects

Assessments of the generic option types has been undertaken and are summarised in **Table NTS.3**. Further information is presented in **Section 5.2** of the main report and 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, there are uncertainties associated with the scale and location of the

option, proximity to sensitive receptors and sensitivity of potential receptors, which are then reflected in the magnitude and significance of effects identified. No likely significant positive or negative effects have been identified.

Table NTS.3 Generic Assessment of the Effects of the Broad Option Types

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
Sustainable	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	+/?
Traditional	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	-/?	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Welsh Water has identified 160 options for the 19 prioritised L4 areas, located within 18 TPUs which are within 10 river basin catchments to manage flooding and pollution from the wastewater assets in the future. These options have then been screened in a two-stage process to identify where there is the potential for the option to have a likely significant effect based on sensitivity of the location (reflecting the number, nature and extent of environmental designations) and the nature and design of the proposed scheme to determine factors that could affect the deliverability of the option. As a consequence, 90 of the proposed 160 options were screened from further assessment, as it was considered that there were no likely significant effects when locational and scheme factors were taken into account.

Of those 70 options that remain, **Table NTS.4** provides a breakdown of the number of options per L4 drainage area and a summary of the likely significant positive and negative effects that have been identified.

Table NTS.4 Summary of the Options Screened in for Assessment and Summary Findings

L2 River basin catchment	L4 drainage area	Number of options screened in	Likely significant effects identified	Comments
Carmarthen Bay and the Gower	Gowerton	2	☒	No likely significant effects identified. A range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the small scale of the proposed schemes
	Llanelli Coastal	1	☒	
Clwyd	Kinmel Bay	2	☑	Two proposed schemes with likely significant negative effects against one SEA objective during construction.
Conway	Ganol STW	6	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction.
Dee	Five Fords (Wrexham)	2	☑	Two proposed schemes with likely significant negative effects against one SEA objective during construction. In operation, likely significant positive effects against one SEA objective.
	Llanasa (Nr Prestatyn)	5	☑	Two proposed schemes with likely significant negative effects against one SEA objectives during construction.
Llyn and Eryri	Bangor Treborth	9	☑	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant positive effects against four SEA objectives
	Porthmadog	4	☒	No likely significant effects identified.
Meirionydd	Tywyn	3	☑	One proposed scheme with likely significant negative effects against one SEA objective during operation.
South East Valleys	Cardiff Bay	2	☒	No likely significant effects identified.
	Cilfynydd	1	☒	No likely significant effects identified.
	Newport Nash	29	☑	17 proposed schemes with likely significant negative effects against up to five SEA objectives and one likely significant positive effect during construction. In operation, likely significant positive effects against up to five SEA objectives.

L2 River basin catchment	L4 drainage area	Number of options screened in	Likely significant effects identified	Comments
Tawe to Cadoxton	Pen-Y-Bont	2	☒	No likely significant effects identified.
	Swansea Bay	2	☑	One proposed scheme with likely significant negative effects against three SEA objectives and one likely significant positive effect during construction. In operation, likely significant positive effects against five SEA objectives.
Total		70		

Further information is presented in **Section 5.3** (Screening) and **5.4** (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 5.5** 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 L4 drainage area, a L2 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 5.7**). 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 options included in the draft DWMP will deliver against one or more of the three strategic objectives (Water Quality, Water Quantity and Resilience and Maintenance). In consequence, in operation, the options 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 NEP).

Section 5.6 considers the contribution that the Draft DWMP would make to the well-being goals for Wales contained in the Well-being of Future Generations (Wales) Act 2015 and the objective for the sustainable management of natural resources established in Environment (Wales) Act 2016. It concludes that the draft

DWMP is likely to support the achievement of the majority of the well-being goals for Wales. This principally reflects the contribution of the DWMP to the three strategic objectives (water quality, water quantity and resilience and maintenance).

Section 5.7 presents an outline of mitigation and enhancement measures to be applied.

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 Welsh SEA bodies (Natural Resources Wales, Cadw and the Welsh Government) and the English SEA bodies (the Environment Agency, Historic England and Natural England). The consultation will run from **27th July to 7th October 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 Midnight on 7th October 2022. You can e-mail your responses to DWMP@dwrcymru.com.

Contents

1. Introduction

1.1 Overview

1.1.1 Dŵr Cymru Welsh Water (Welsh Water), as one of the thirteen UK water and sewerage companies (WaSCs), is currently preparing its first Drainage and Wastewater Management Plan[8] (DWMP). The DWMP is new, and whilst not currently a statutory obligation[9], Welsh Water has committed to produce a DWMP in accordance with the Water UK DWMP Framework[10] (the Framework) and the Government's guiding principles[11].

1.1.2 The DWMP sets out how Welsh Water 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) regulations[12]; however, as Section 6.3 of the Framework notes, completing such an assessment would be best practice, would inform option assessments and in consequence, is recommended to support plan preparation. Reflecting this, and specific performance requirements to complete a plan, Welsh Water has determined to undertake an SEA 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 purposes of the report are

- 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;

[8] Welsh Water (2020) *Introduction to the Drainage and Wastewater Management Plan: Strategic Context*

[9] Welsh Government, Defra, Ofwat, EA 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]

[10] 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*

[11] Welsh Government, Defra, Ofwat, EA and NRW (2022) *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]

[12] Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004 (if effects more than one country in the UK) or Statutory Instrument 2004 No.1656 - The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (if effects only in Wales)

- 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 Welsh Water'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.

1.3 Welsh Water Drainage and Wastewater Management Plan

Overview

1.3.1 Welsh Water provide drainage and wastewater services to 3.2 million customers living in Wales and adjoining parts of England.

1.3.2 It owns and is responsible for the management of some 30,000km of sewers and some 830 wastewater treatment works collecting wastewater before it is cleaned and safely returned to the environment.[13]

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 Currently, Welsh Water already undertake long-term planning of their wastewater services via their five-yearly business plans through the completion of Sustainable Drainage Plans (SDPs). The DWMP sets out how Welsh Water intends to extend, improve and maintain a robust and resilient drainage and wastewater systems. The DWMP will build on Welsh Waters current SDP programme and takes a long-term view, setting out a planning period that is appropriate to the risks faced by Welsh Water, covering at least 25 years.

1.3.5 Every company has created targets and planning objectives that are used to manage performance. These planning objectives are often related to the quantification of events or incidences or exceedances at a company level. In this first DWMP it was important to establish both an Environmental Destination and a Customer Destination which has brought together all of the planning objectives in a locality. For this DWMP, Welsh Water has identified the following three strategic objectives for wastewater management planning:

- Water Quantity - Reduce the risk of (internal and external) flooding to communities;
- Water Quality - Management of water quality, services and the environment; and
- Resilience & Maintenance - Adaptiveness to change while maintaining critical services and protecting the environment.

1.3.6 These high-level objectives are underpinned by the National Planning Objectives and by the initial DWMP action plan.

[13] [13] Welsh Water ((2019) *Our Plan: PR19 Business Plan 2020 – 2025.* Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2020 [Accessed September 2021]

Drainage and Wastewater Management Plans

1.3.7 WaSCs are drawing on the guidance of the Water UK Framework to support the preparation of the first cycle of DWMPs. The Framework follows several distinct stages:

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

1.3.8 In supporting the business planning process, the Framework has been developed such that, through DWMPs, companies will:

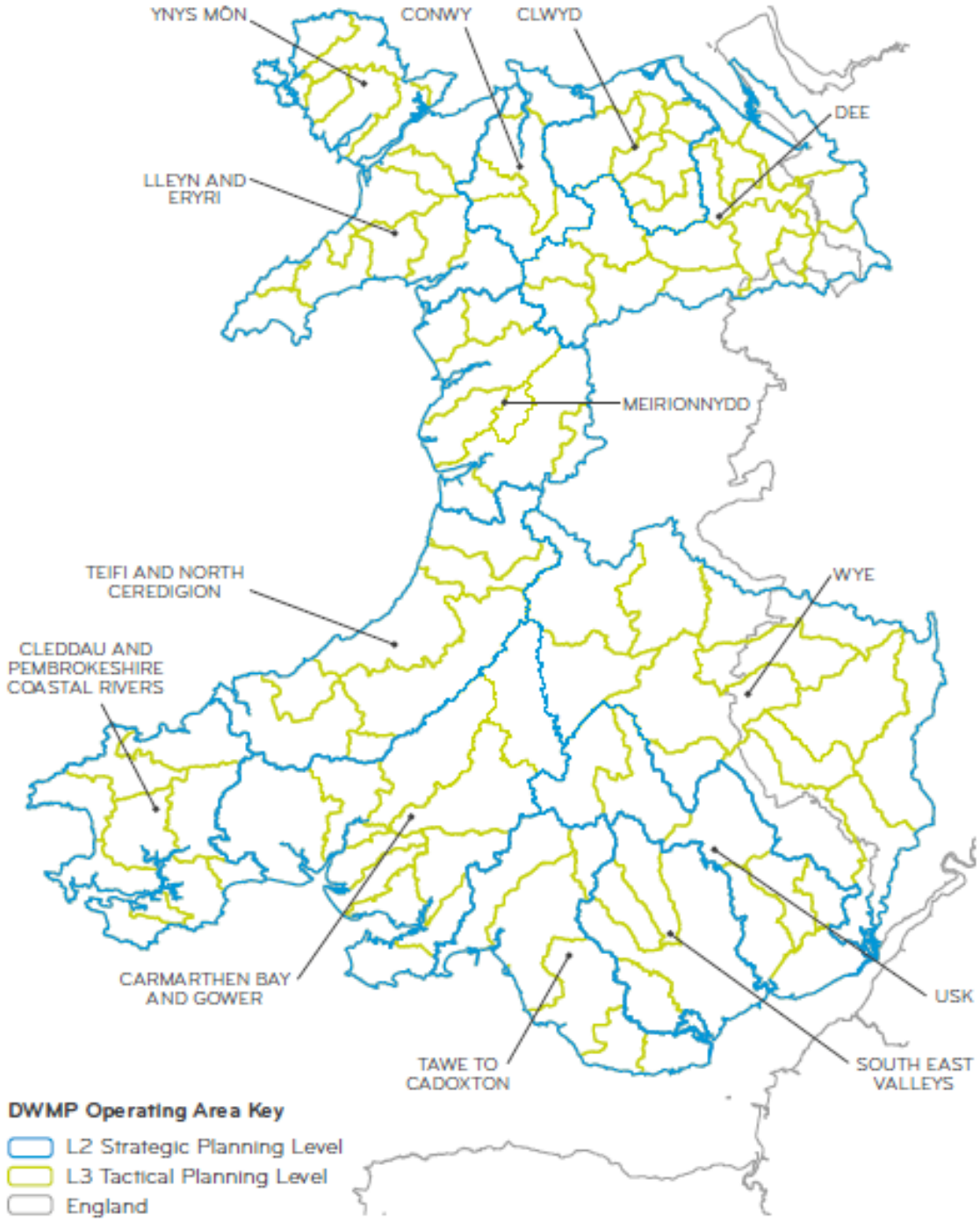
- Set out the company's assessment of long-term drainage and wastewater capacity and the drivers, risks and scenarios being considered.
- Assess where (largely drainage) infrastructure managed by other stakeholders may impose additional risks to drainage and wastewater services.
- Identify those options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

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

- **Level 1 - Company Operational Level**: An operational area which consolidates the more localised mapping in a published strategic report which will address the challenges Welsh Water has identified and how the long-term wastewater and drainage aims will be realised.
- **Level 2 - Strategic Planning Unit**: A subdivision of the Company operational area. Originally set at the River Basin Management District Catchment (RBMD) level and revised to take into account drainage from sewers. Through catchment wide partnership and stakeholder engagement, the DWMP presents opportunities to identify new solutions to issues.
- **Level 3 - Tactical Planning Unit**: A consolidation of Wastewater Treatment Works (WwTW) and its catchments joined together by its river drainage system. This will include a detailed assessment of risks and opportunities as well as setting out long-term plans for the interventions needed.

1.3.10 Welsh Water has identified 13 Level 2 Strategic Planning Units (SPUs), 106 Level 3 Tactical Planning Units (TPUs) (with further levels used to provide detail and granularity to planning e.g. Level 4 Drainage area). Levels 1 – 3 are illustrated in **Figure 1.1**.

Figure 1.1 DWMP Operating Areas Level 1 to 3



1.3.11 To address these challenges, a range of options to inform the strategic direction of the TPU and SPU has been considered which include *inter alia*:

- **Combined and Foul Sewer Systems**:
  - Attenuation;
  - Cross boundary transfer;
  - Enhanced operational maintenance;

- Increase capacity existing foul/combined networks;
- Intelligent asset maintenance;
- Intelligent network operation;
- New sewerage.

- **Customer Side Management**:
  - Customer Education;
  - Water efficient appliances;
  - Water efficient measures (domestic/commercial/industrial);
  - Rainwater harvesting;
  - Customer incentive;
  - Domestic and business customer education.
- **Indirect measures influencing policy**.
- **Wastewater Treatment**:
  - Bio re-use management;
  - Treat/pre-treat in network;
  - Increase treatment capacity;
  - Expand existing site;
  - New wastewater treatment works;
  - Modify consents/permits.
- **Surface Water Management:**
  - Surface water source control measures;
  - Surface water networks;
  - Surface water pathway measures.

1.3.12 Given the number of catchments, Welsh Water are looking to prioritise works reflecting where there are multiple incidents of internal flooding of properties with adverse effects on European sites (combining service levels, risks to customers and risks to the environment). The approach is outlined in the **Figure 1.2**. Through this process, Welsh Water has identified 18 prioritised TPU's (covering 19 L4 drainage areas) which will be the focus of the first iteration of the DWMP.

Figure 1.2 Catchment Prioritisation

		Customer Service Priority			
		Repeatedly flooded customers	Internally Flooded	Externally Flooded	All Other unplanned escapes
Environmental Protection Priority	SAC				
	SSSI				
	Bathing Water Other amenity				
	All remaining Water courses				

Key: Priority 1 – Brown; Priority 2 – Salmon and Priority 3 - Green

1.3.13 To address the risks in these areas, the broad categories of intervention identified have been refined, taking into account, network assessments, resilience, catchment strategy and localised option tests to:

- **Sustainable options**, which seek to redirect flows of water from the wastewater/sewer network by mimicking more natural drainage regimes.
- **Traditional options**, which involve increasing the capacity of the drainage and wastewater network.
- **Combinations**, of the sustainable and traditional options**.**

1.3.14 The outputs of the optioneering have enabled the selection of the preferred programme of 160 interventions contained in the draft DWMP that has then been published for public consultation. Consultation responses will be analysed, and as necessary the DWMP will be revised. The DWMP will then be finalised and published to support business plans for the 2024 Price Review.

1.4 Strategic Environmental Assessment

Overview

1.4.1 SEA became a statutory requirement following the adoption[14] of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. In Wales, this was transposed into legislation on 12th July 2004 as Statutory Instrument 2004 No.1656 - The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004. These apply to plans and programmes whose effects are wholly within Wales; however, if plans or programmes could affect more than one country in the UK, then The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No.1633) would apply.

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

[14] 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 Scoping 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).

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 will be to:

- identify the potentially significant environmental effects of the draft plans in terms of the drainage and wastewater management proposals 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;
- 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 proposals to be taken forward into the final version of the plan.

Applying SEA to Drainage and Wastewater Management Plans

1.4.4 In relation to the part (c) of the SEA Regulation 2(1) definition, whilst the first cycle of DWMP's are exempt, all following cycles are now a statutory requirement[15] 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".

1.4.5 However, as these requirements do not formally apply to the first cycle of plans, and as noted in the Framework:[16]

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

1.4.6 Welsh Water's DWMP is also being undertaken to meet a performance requirement and so whilst not a statutory plan, there are regulatory and administrative reasons for its completion. In addition, it is possible that the DWMP could include schemes that could have likely significant effects, and SEA will enable the identification, description and evaluation of such effects, and in consequence, Welsh Water has undertaken a screening to consider the application of SEA further.

Screening

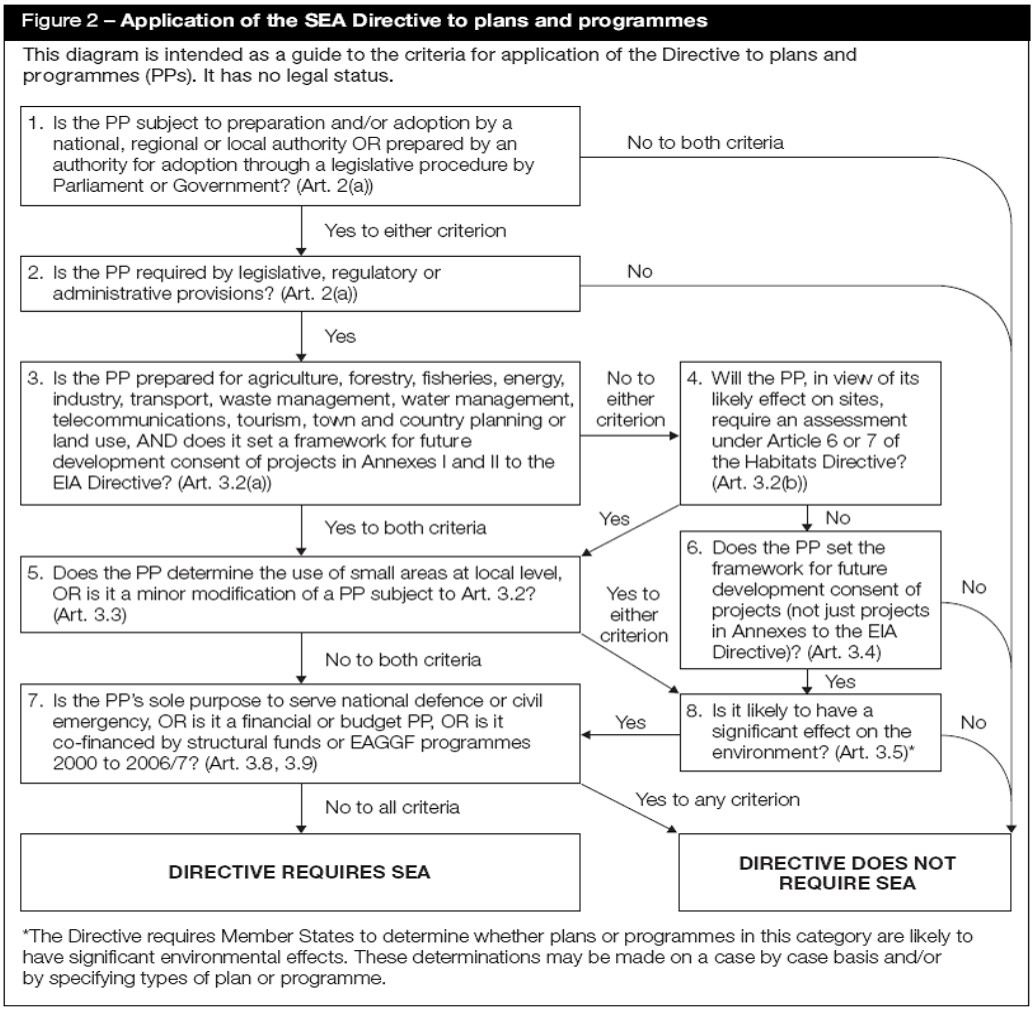
1.4.7 The flow diagram in the ODPM SEA Practical Guide[17] shown in **Figure 1.3** outlines the screening process used to determine whether SEA of the Welsh Water DWMP would be required.

[15] Welsh Government, Defra, Ofwat, EA 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]

[16] 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]

[17] Office of the Deputy Prime Minister (2005) *A Practical Guide to the Strategic Environmental Assessment Directive.* Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf [Accessed July 2021]

Figure 1.3 SEA Screening Process



1.4.8 During screening, the stages shown in **Figure 1.3** were converted into a proforma, that was then completed for the Welsh Water DWMP. In summary, considering the performance of the DWMP against the criteria in **Figure 1.3** in turn and the resultant Y/N response:

- **Criteria 1**: Yes, the DWMP is a plan being prepared for adoption by Welsh Water, which in the terms of the SEA Directive, and reflecting EC guidance and case law, has an equivalence to a public authority.
- **Criteria 2**: Yes, whilst the first cycle of DWMPs are not a statutory requirement[18] under Section 79(1) of the Environment Act 2021, Welsh Water has a performance requirement to complete a DWMP (and so this qualifies under the administrative provisions).
- **Criteria 3**: Yes, the Welsh Water DMWP is being completed for the purpose of water and waste management and could set the framework for future development consent of projects in Annex I and II of the EIA Directive, for example wastewater treatment plants, flood-relief works and water transfer schemes.

[18] Welsh Government, Defra, Ofwat, EA 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]

- **Criteria 4**: Yes, the DWMP is a plan subject to an assessment under Article 6 or 7 of the Habitats Directive.
- **Criteria 5**: No, the DWMP is not a plan for a small area at a local level (however, it is anticipated that it will contain catchment specific options, some of which will be locationally precise) and the DWMP is a new requirement and is not considered to be a minor modification to an existing plan (although it will build on elements of the SDP).
- **Criteria 6**: Yes, the Welsh Water DWMP could set the framework for future development consent of projects in Annex I and II of the EIA Directive.
- **Criteria 7**: No, it is not related to national defence or civil emergency, or is a financial or budget PP, or is it co-financed by structural funds or EAGGF programmes 2000 to 2006/7.
- **Criteria 8**: Yes (with uncertainty), the DWMP will contain drainage and wastewater options; the construction and operation of which could have a range of significant effects, including for example, effects on biodiversity, carbon, water quality, air quality, heritage and landscape

1.4.9 As a result, the screening confirmed that there is a requirement for Welsh Water to undertake an SEA. The screening also identified that it is possible that the DWMP could include options that could have likely significant effects, although such a conclusion remains uncertain, depending on the type, location, scale and design of any proposed schemes. Taking into account the nature of the catchments included in Welsh Water's DWMP and the associated challenges that the DWMP seeks to address, the screening concluded that the Welsh Water DWMP was screened in for assessment.

1.4.10 In consequence, Welsh Water is undertaking an SEA of the DWMP in order to support alignment with the SEA requirements, strengthen the plan development process and to help establish integrated assessment processes to support preparation over a number of plan cycles. This allows Welsh Water 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*."

1.4.11 As the DWMP includes parts of England (**Figure 1.1** illustrates those parts of Herefordshire, Cheshire and Shropshire that are covered), the SEA Regulations SI 2004 No.1633 will be applied.

Stages of Strategic Environmental Assessment

1.4.12 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.

1.4.13 **Stage A** of the SEA of the DWMP has led to the production of a Scoping Report[19]. 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 (this Scoping Report).

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 22nd October to 26th November 2021 (responses are summarised in **Appendix B**). Following consultation and amendment, the framework has been 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 are presented in this 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 plan and accompanying documents including this Environmental Report have then been published for consultation (**Stage D**). Following consultation, Welsh Water 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. Welsh Water 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.

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 site[20] or a European offshore marine site[21] (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

[19] Wood (2021) *Dŵr Cymru Welsh Water Drainage and Wastewater Management Plan Strategic Environmental Assessment Scoping Report Final* (October 2021)

[20] 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.

[21] '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.

"*…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 HRA[22]. An 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)[23] and, if so, whether there will be any 'adverse effects on site integrity'[24].

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 Welsh Water has chosen to complete the plan and its categorisation as a 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 in manner consistent with NRW's expectations and helps Welsh Water demonstrate that the plan delivers the best, sustainable outcomes for customers, stakeholders and the environment. In consequence, Welsh Water has undertaken a separate HRA, whose findings have been crossed referenced as appropriate through this assessment, notably when identifying effects on biodiversity.

1.6 Welsh legislation

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

1.6.1 The Well-being of Future Generations (Wales) Act (WFGA) 2015 places a duty on Welsh public bodies to carry out sustainable development. Welsh Water 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*".

1.6.2 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, Welsh Water 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;*

- the need to take an integrated approach, by considering how—

(i)the body's well-being objectives may impact upon each of the well-being goals;

(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;

[22] 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.
[23] Also referred to as the 'test of significance'.
[24] Also referred to as the 'integrity test'.

- 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—

(i)Wales (where the body exercises functions in relation to the whole of Wales), or

(ii)the part of Wales in relation to which the body exercises functions;

-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;

-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."

1.6.3 In consequence, and consistent with other water sector plans, Welsh Water has considered how the DWMP could contribute to the WFGA 2015.

The Environment (Wales) Act 2016

1.6.4 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:

"*-using natural resources in a way and at a rate that promotes achievement of the SMNR objective;*

-taking other action that promotes achievement of that objective; and

-not taking action that hinders achievement of that objective."

1.6.5 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—*

(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".

1.6.6 Section 6 of the Act places a duty on public authorities (including Welsh Water) 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*".

Requirement

1.6.7 In consequence, a high-level analysis of the impact that the Ddaft DWMP will have on the achievement of the well-being goals for Wales and the objective for SMNR has been completed and is presented in this report.

1.7 Environmental Report Structure

1.7.1 Reflecting the five scoping tasks set out in Section 1.5, the remainder of this Scoping 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 C**;

- **Section 3: Baseline Analysis** - Presents an overview of the baseline analysis of social, economic and environmental characteristics and identifies the key issues relevant to the draft plan and SEA;
- **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 preferred 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.

1.7.2 The report also contains the following appendices:

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

1.8 How to Comment on the Environment Report

1.8.1 This Environmental Report is being issued for consultation to the Welsh SEA bodies (Natural Resources Wales, Cadw and the Welsh Government) and the English SEA bodies (the Environment Agency, Historic England and Natural England). The consultation will run from **27th July to 7th October 2022**.

1.8.2 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 Midnight on 7th October 2022. You can e-mail your responses to DWMP@dwrcymru.com.

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 plan 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 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 Scoping Report.

2.2.2 Those that are relevant to the DWMP are listed in **Table 2.1**. These are summarised in **Appendix C**.

Table 2.1 Plans and Programmes Relevant to the SEA of 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
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European Commission (2010) Industrial Emissions Directive (integrated pollution prevention and control) 2010/75/EU
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European Commission (2012) Energy Efficiency Directive 2012/27/EU
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European Commission (2021) EU strategy on adaptation to climate change
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National

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HM Government (1990) Town and Country Planning Act 1990
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HM Government (2003) The Water Act 2003
HM Government (2003) The Water Environment (WFD) (England and Wales) Regulations 2003
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HM Government (2006) Climate Change and Sustainable Energy Act 2006
HM Government (2006) Natural Environment and Rural Communities Act 2006
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HM Government (2008) The Energy Act 2008
HM Government (2008) Planning Act 2008
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HM Government (2009) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI 3104
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HM Government (2011) Localism Act 2011
HM Government (2011) UK Marine Policy Statement
HM Government (2011) Water for Life: White Paper
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Welsh Government (2020) The Nature Recovery Action Plan for Wales 2020 – 21
Welsh Government (2020) Strategic Equality Plan 2020-2024
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Welsh Government (2021) Our Economic Resilience & Reconstruction Mission
Welsh Government (2021) Planning Policy Wales (Edition 11)
Regional
Water Company (various) Drought Plans
Water Company (various) Water Resources Management Plans
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Dŵr Cymru Welsh Water (2019) Final Water Resources Management Plan 2019
Dŵr Cymru Welsh Water (2020) Making time for nature 2020: Welsh Water's revised plan for maintaining and enhancing biodiversity
Dŵr Cymru Welsh Water (Undated) Our Plan PR19 Business Plan 2020-2025
Natural England (Various) Site Improvement Plans
Natural Resources Wales (2015) (Various) River Basin Management Plans
Natural Resources Wales (Various) Area Statements
Regional Transport Plans (Various)
Sub-Regional/Local

AONB Management Units (various) AONB Management Plans
Defra (Various) Eel Management Plans
Environment Agency (various) Catchment Flood Management Plans
Environment Agency/Natural Resources Wales (various) River Basin Management Plans
Environment Agency, Natural Resources Wales and Natural Scotland (2016) River Basin District Flood Risk Management Plans
Environment Agency (undated) Wye Waterway Plan 2017 -2022
Environment Agency and Natural Resources Wales (various) Salmon Action Plans
Local Biodiversity Action Plans (LBAPs), including Species and Habitats Action Plans (various)
Local Geodiversity action Plans (LGAPs) (Various)
Local Planning Authority (various) Land Use Plans
National Park Management Plans (various)
Natural Resources Wales (Various) Catchment Abstraction Management (Licencing) Strategies (CAMS)
Public Services Boards (PSBs) (Various) PSB Assessments and Local Well-being Plans
Shoreline Management Plans (various)
Torfaen County Borough Council (2011) Blaenavon Industrial Landscape World Heritage Site Management Plan
Welsh Government (2018) Castles and Town Walls of King Edward in Gwynedd World Heritage Site: World Heritage Site Management Plan 2018 -28
Wrexham County Borough Council British Waterways and the Royal Commission on the Ancient and Historical Monuments of Wales (2012) Pontcysyllte Aqueduct and Canal World Heritage Site – Management Plan

2.3 Policy Objectives Relevant to the Plan Assessments

2.3.1 The review of plans and programmes presented in **Appendix C** 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 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 for 2030; Marine Strategy Framework Directive; 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; Planning Policy Wales Edition 11; The State of Natural Resources Report (SoNaRR); Salmon and sea trout plan of action for Wales; 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); Site Improvement 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; Planning Policy Wales Edition 11; Soil: A Precious Resource; Local Planning Authority Local Plans (various); AONB Management Plans; National Park Management Plans (various).	Yes
Water (including flood risk)		
Protection and enhancement of all water supplies and resources	Bathing Waters Directives; Conservation of Habitats & Species Regulations; Drinking Water Directive; Habitats Directive; Nitrates Directive; Urban Waste Water Directive; Water Framework Directive; Environmental Quality Standards Directive; Wildlife & Countryside Act; 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; Planning Policy Wales Edition 11; 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 Abstraction; 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; Planning Policy Wales Edition 11; Water Strategy for Wales; 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 Strategy for Flood and Coastal Erosion Risk Management in Wales; Welsh National Marine Plan; Flood and Water Management Act; National	Yes

Key Objectives and Policy Messages	Key Sources	Relevant to the SEA of the DWMP?
	Planning Policy Framework; Planning Policy Wales Edition 11 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).	
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 Direct; Industrial Emissions Directive; Air Quality Strategy for England, Scotland, Wales and Northern Ireland; Air Quality Plan for Nitrogen Dioxide (NO2) in UK; National Planning Policy Framework; Planning Policy Wales Edition 11; 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; HM Government – Energy White Paper: Powering our Net Zero Future; UK Clean Growth Strategy: Leading the way to a low carbon future ; Energy Wales: A Low Carbon Transition; Climate Change Committee - The path to Net Zero and progress on reducing emissions in Wales; Local Planning Authority Local Plans (various).	Yes
Minimising the effects of climate change on natural resources, inhabitants and the economy	EU Strategy on Adaptation to Climate Change; UK Sustainable Development Strategy;; National Strategy for Flood and Coastal Erosion Risk Management in Wales; National Planning Policy Framework; Planning Policy Wales Edition 11; 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; The Future Generations Report 2020; Strategic Equality Plan 2020-2024; 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 2020; National Planning Policy Framework; Planning Policy Wales Edition 11; Creating a Healthier, Happier and Fairer Wales; Local Planning Authority Local Plans (various).	Yes
Providing high quality services, community facilities and social infrastructure that is accessible to all	National Planning Policy Framework; The National Plan 2040; Planning Policy Wales Edition 11; The Future Generations Report 2020; 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; Planning Policy Wales Edition 11; Prosperity for All: Economic Action Plan; Prosperity for All: National Strategy; Local Planning Authority Local Plans (various).	Yes
Improving and expanding the tourism economy	National Planning Policy Framework; Planning Policy Wales Edition 11; Prosperity for All: Economic Action Plan; Prosperity for All: National Strategy; Future Wales: The National Plan 2040; Welcome to Wales: Priorities for the visitor economy 2020 – 2025 Local Planning Authority Local Plans (various); AONB Management Plans (various); National Park Management Plans (various). Local Planning Authority Local Plans (various).	Yes

Key Objectives and Policy Messages	Key Sources	Relevant to the SEA of the DWMP?
Maximising job opportunities for all and enhancing the quality of employment opportunities	National Planning Policy Framework; Planning Policy Wales Edition 11; Prosperity for All: National Strategy; Our Economic Resilience & Reconstruction Mission; Local Planning Authority Local Plans (various).	Yes
Minimising noise pollution	Environment Noise Directive; 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; Planning Policy Wales Edition 11; The National Plan 2040; 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 Framework; Planning Policy Wales Edition 11; 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 Framework; Planning Policy Wales Edition 11; 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; Planning Policy Wales Edition 11; 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; Energy Wales; National Planning Policy Framework; Planning Policy Wales Edition 11; 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; Valuing the Welsh Historic Environment; Future Wales: The National Plan 2040; Planning Policy Wales Edition 11; Technical Advice Note 24 The historic Environment; Priorities for the Historic Environment of Wales; Historic Environment and Climate Change in Wales; Local Planning Authority Local Plans (various).	Yes
Landscape		
Protecting and enhancing the quality and distinctiveness of natural landscapes and environmental resources	European Landscape Convention; National Planning Policy Framework; Future Wales: The National Plan 2040; Planning Policy Wales Edition 11; Future Landscapes: Delivering for Wales; AONB Management Plans (various); Local Planning Authority Local Plans (various); National Park Management Plans (various).	Yes

3. Baseline Analysis

3.1 Introduction

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 This section of the report identifies and characterises current environmental baseline conditions, along with how these are likely to change in the future. The analysis is presented 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 C**). 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 Biodiversity, Flora and Fauna

Baseline Characteristics

3.2.1 Biodiversity is defined as the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. All ecological processes are the product of interactions between different groups of organisms and are dependent upon there being a range of these present. In this sense, biodiversity – the variety and variability of living organisms – ultimately underpins the functioning

of all ecosystems and thereby the delivery of all ecosystem services (which are critical in: providing clean air and water, food and raw materials; helping to regulate the climate; and providing space for recreation and amenity). Protected sites are key in the protection of semi-natural habitats and species and can act as excellent examples of natural resource management. The importance of preserving biodiversity is recognised from an international to a local level.

Protected sites

3.2.2 In the Welsh Water area, there are a large number of sites that are designated as internationally, nationally or locally important for biodiversity.

3.2.3 There are four categories of protected site:

- Protected areas that are established through International Agreements (including Ramsar Sites, which are wetlands of international importance designated under the Ramsar Convention and afforded the same degree of protection as European sites);
- Protected areas that are established under European Union Directives of other European Initiatives (including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) identified as making significant contribution to conserving designated habitats and species);
- Protected areas that are established under National Legislation (Sites of Special Scientific Interest (SSSIs) and National Nature Reserves)); and
- Marine Protected Areas.

3.2.4 Sites of European importance (SPAs and SACs) are designated to conserve natural habitats and wildlife which are rare, endangered or vulnerable in the European Community. In the UK, these form part of the 'Natura 2000' network of sites protected under the Habitats Directive (92/43/EEC). Interest features associated with European sites can be vulnerable (a function of sensitivity and exposure) to water resource permissions.

3.2.5 The importance of biodiversity in Wales is reflected by the number and variety of international, national and local nature conservation designations. More than 10 per cent of Wales' land cover is designated for nature conservation. Approximately 70 per cent of the Welsh coastline is designated as either SAC or SPA, with a range of habitats such as coastal saltmarsh, grazing marsh, mudflats, reedbeds, cliffs, dunes and shingle. Management of the coast including shoreline reinforcements, flood defence, drainage and land reclamation have threatened coastal habitats and create challenges for future management.

3.2.6 Important nature conservation sites (Ramsar sites, SPAs and potential SPAs, SACs and possible SACs, and SSSIs and NNR) across the Welsh Water operational area are shown in **Figures 3.1 to 3.4**. These figures are based on Geographical Information System (GIS) layers available in July 2021.

Figure 3.1 Ramsar Sites in the Welsh Water Operational Area

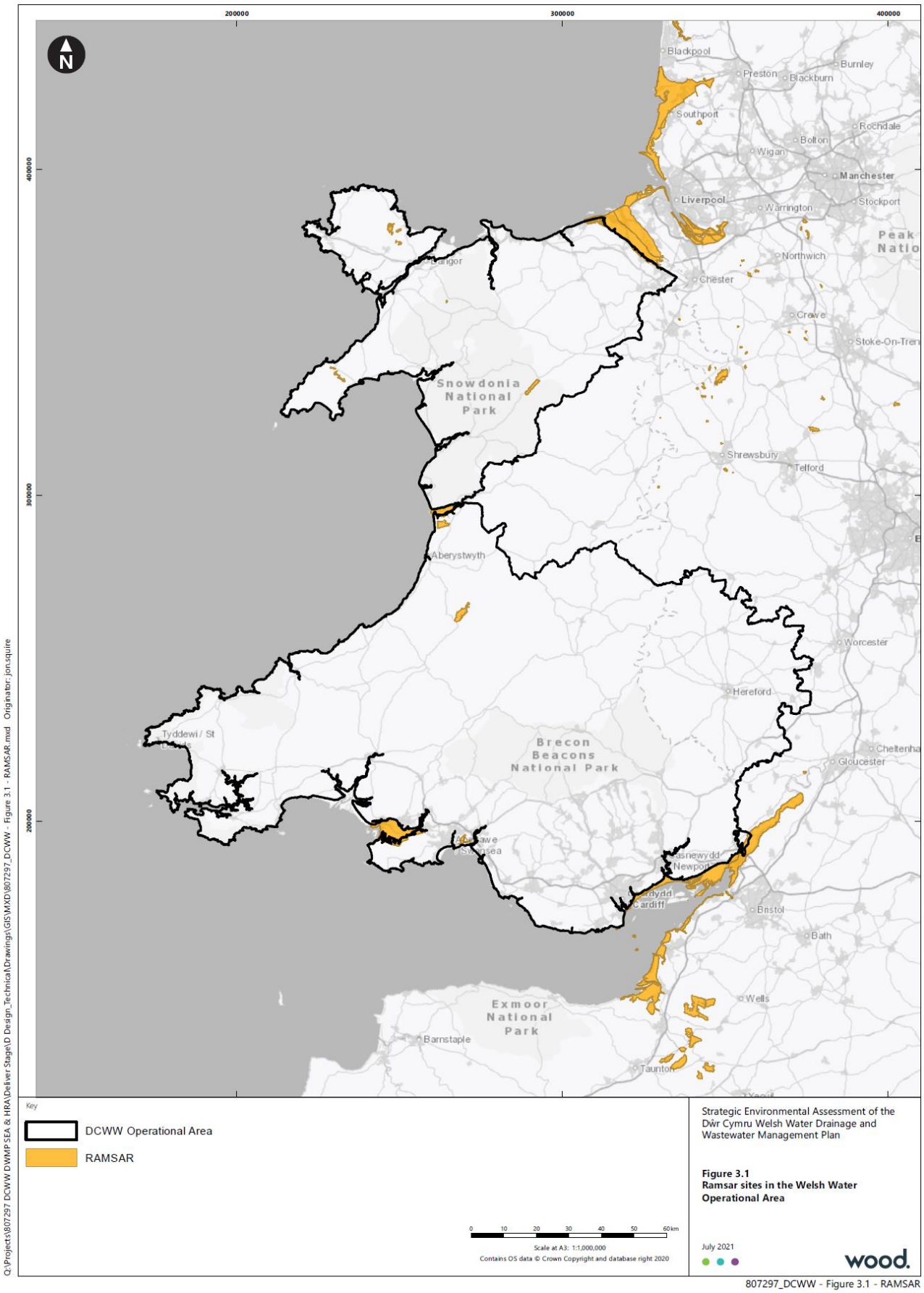


Figure 3.2 SPA and potential SPA sites in the Welsh Water Operational Area

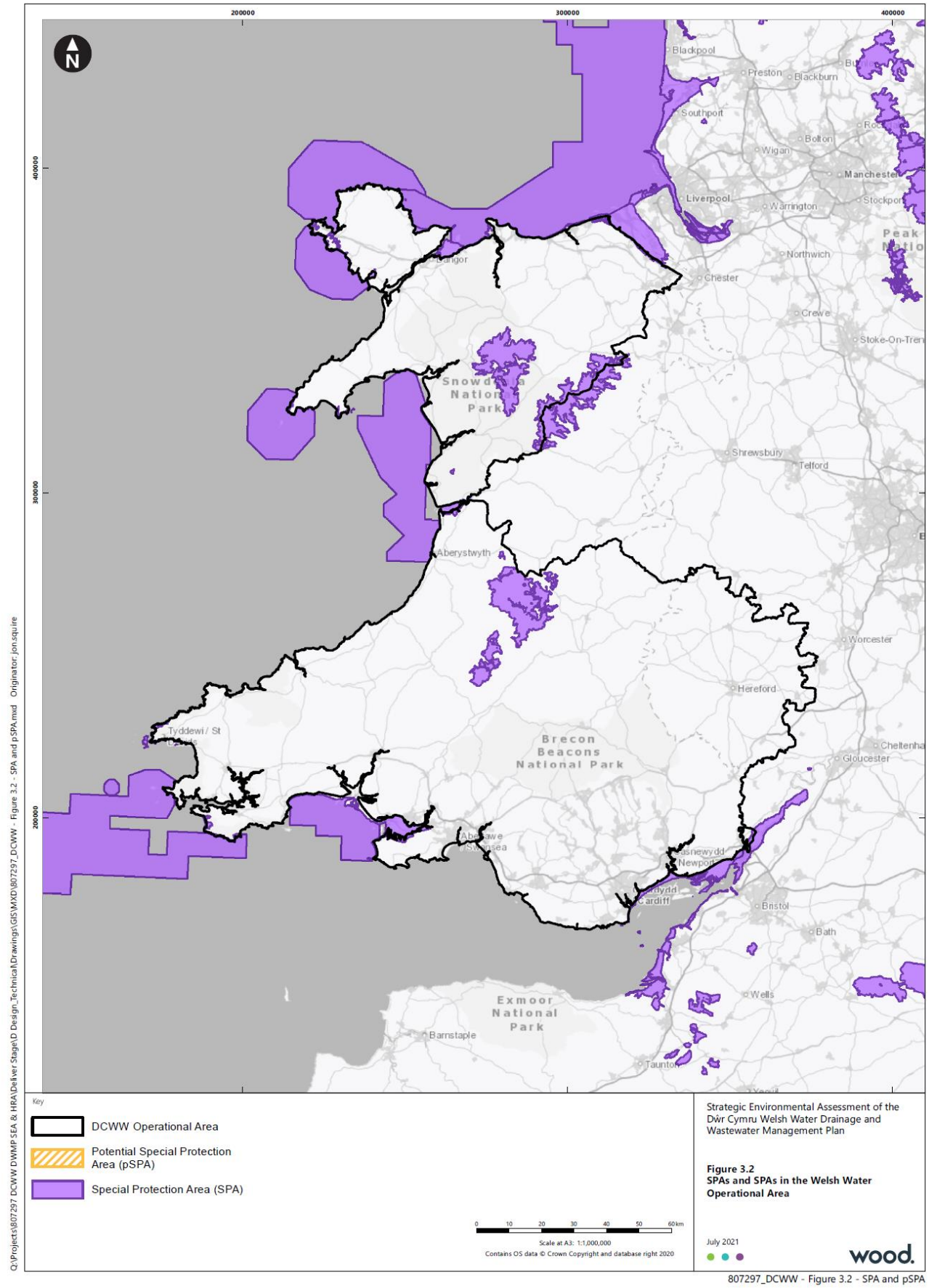
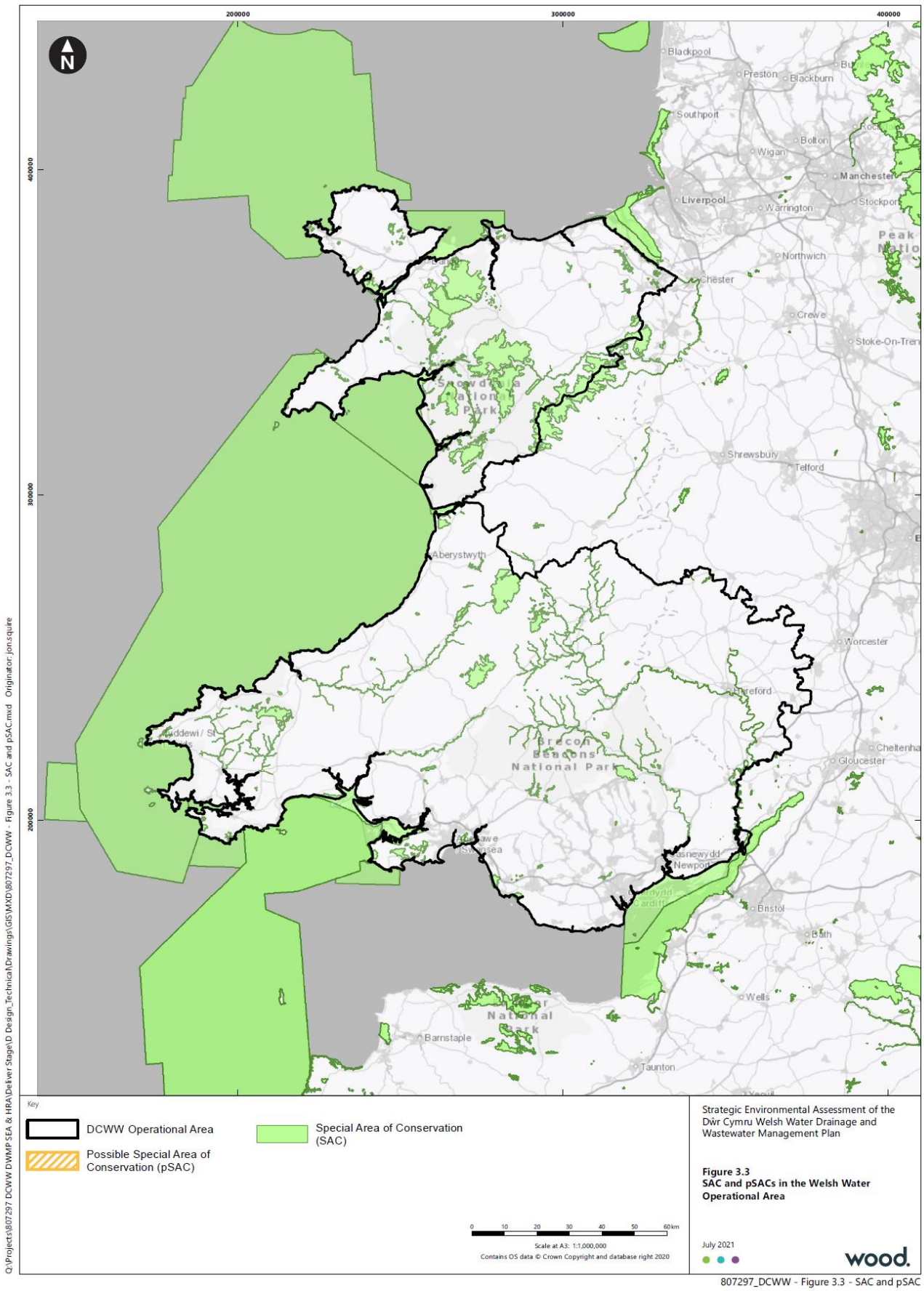
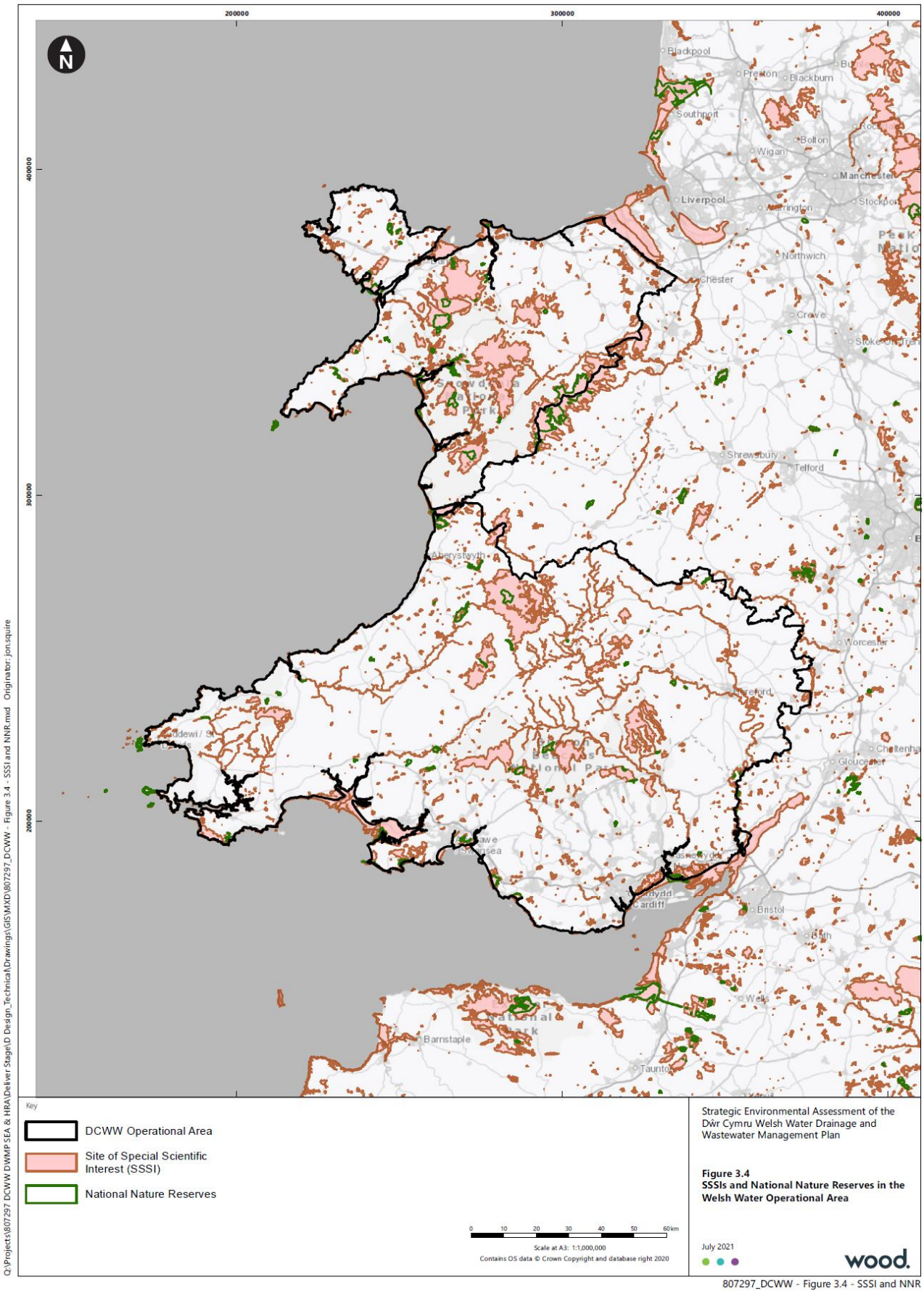


Figure 3.3 SACs and possible SAC sites in the Welsh Water Operational Area



807297_DCWW - Figure 3.3 - SAC and pSAC

Figure 3.4 SSSIs and National Nature Reserves in the Welsh Water Operational Area



3.2.7 As shown in **Table 3.1**, within the Welsh Water operational area there are 10 Ramsar sites, 95 SACs, and 19 SPAs. Other internationally important sites to consider include the Rhinog Biogenetic Reserve in North Wales (Blaenau Ffestiniog) and the UNESCO biosphere reserve at Cors Fochno in the Dyfi estuary near Borth in Ceredigion (West Wales)[25].

Table 3.1 Designations in Wales and the Welsh Water Operational Area

Designated Site Classification	Number of Sites within Welsh Water supply area (wholly or partially)	Total Area (hectares, ha) within Welsh Water supply area	Number of sites in Wales (including cross border sites with England)
Ramsar	10	7,051	10
Special Area of Conservation (SAC)	95	110,104	95
Special Protection Areas (SPA)	19	62,318	21
Site of Special Scientific Interest (SSSI)	1,089	197,126	1,078
National Nature Reserve	72	6,309	76
Local Nature Reserve	100	3,114	93

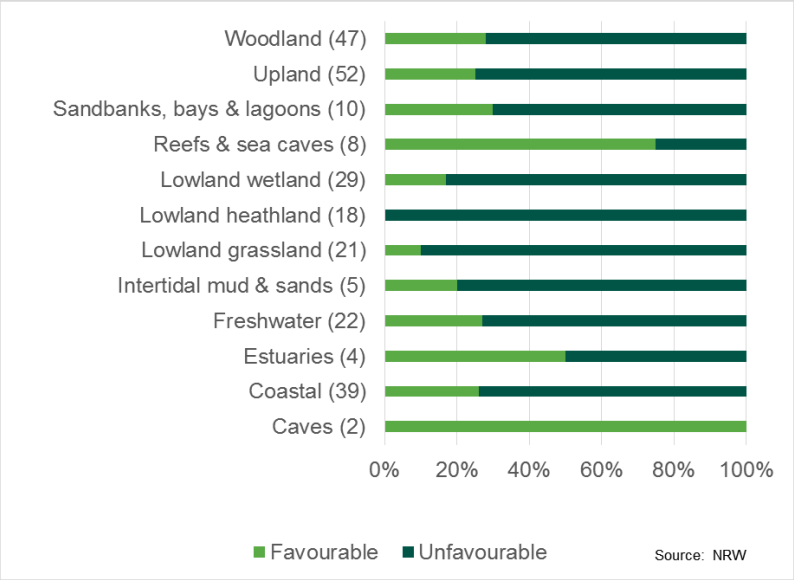
Source: JNC March 2021 GIS data[26] and SoNaRR 2020[27]

3.2.8 The majority of SAC and SPA habitats were reported to be in unfavourable condition (75 per cent) in 2016 with the exception of caves (100 per cent in favourable condition).

3.2.9 The condition of SAC and SPA species features on sites is mostly unfavourable (55 per cent), with the exception of birds and mammals of which 86 per cent and 68 per cent were in favourable condition, respectively in 2016.[28] The fourth Article 17 UK report (JNCC, 2019a), submitted to the EU in August 2019, found that 46 per cent of listed species were in favourable conservation status at the UK level. The figure is the same for species occurring in Wales. In Wales, 44 per cent of species are reported as stable, while 17 per cent are shown to be deteriorating.[29]

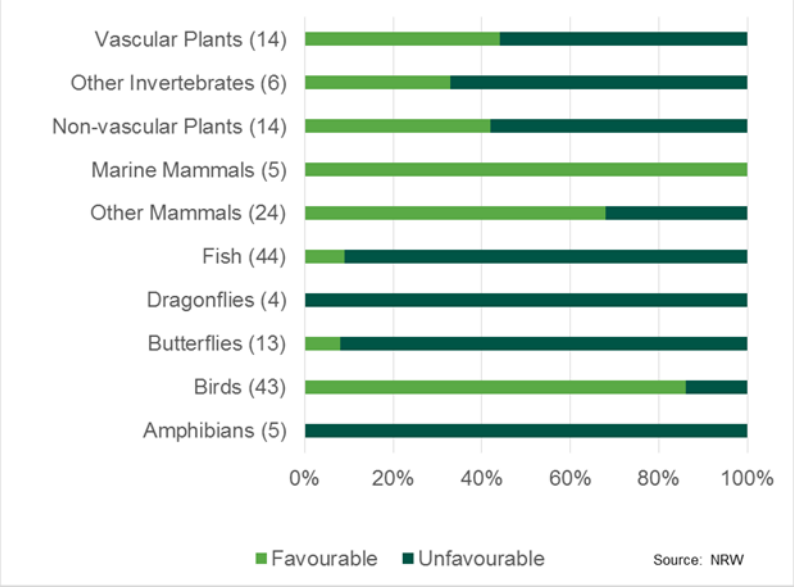
[25] The UNESCO Biosphere Reserve status is awarded in recognition of the way a local community lives sustainably in an area of special landscape quality with a rich wildlife. The designated area includes Aberystwyth, Llanbrynmair, Llanymawddwy, Corris Uchaf, and Aberdyfi.
[26] JNCC (2021 GIS data) *Protected Sites data.* Available online: www.jncc.gov.uk
[27] Natural Resources Wales (2020) *State of Natural Resources Report for Wales*. Available online: https://cdn.cyfoethnaturiol.cymru/media/693305/sonarr2020-theme-biodiversity.pdf [Accessed July 2021]
[28] Natural Resources Wales (2016) *State of Natural Resources Report for Wales 2016*
[29] Natural Resources Wales (2020) *The Second State of Natural Resources Report (SoNaRR2020): Assessment of Biodiversity*. Available online: https://cdn.cyfoethnaturiol.cymru/media/693305/sonarr2020-theme-biodiversity.pdf [Accessed July 2021]

Figure 3.5 Percentage of Special Area of Conservation (SAC) habitat features in favourable and unfavourable condition (Number of habitat features in assessment shown in brackets)



Source: SoNaRR2016[30]

Figure 3.6 Overview of condition of Habitat and Bird Directive species features on SACs and SPAs (Number of features in assessment shown in brackets)



Source: SoNaRR2016[31]

3.2.10 As of 2019, there were 1,078 SSSIs within Wales.[32] A 2006 Rapid Review recorded the condition of SSSIs reported in Wales. Approximately 47 per cent of SSSIs were assessed to high confidence levels and the results showed that 32 per cent of sites were in favourable condition and 68 per cent were in unfavourable condition. Of the individual features for which SSSIs were designated:

[30] NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources. Technical Report.*
[31] Ibid.
[32] NRW (2020) The Second State of Natural Resources Report (SoNaRR2020): Assessment of Biodiversity)

- 47 per cent of all features were in favourable condition;
- 72 per cent of geological features were judged to be in favourable condition;
- 53 per cent of species features (individual species and assemblages) were judged to be in favourable condition;
- 29 per cent of habitat features were judged to be in favourable condition.

Non-statutory protected sites and other biodiversity

3.2.11 Ancient woodlands are areas of woodland that have persisted since 1600 (see **Figure 3.7**). They are relatively undisturbed and include unique and complex communities of plants, fungi, insects and other microorganisms. The Ancient Woodland Inventory (AWI) (AWI 2011) indicates that there are around 95,000ha of ancient woodland (AW) in Wales, compared to the 62,000ha identified in the AWI 2004.[33] SoNaRR2020 identified a range of threats to woodland: changing weather patterns; air pollution; built development and infrastructure; competing land use; insufficient management; pests and diseases; and herbivore pressure.

3.2.12 Throughout Wales there are around 90 Local Nature Reserves (LNRs) identified for their local importance to biodiversity; there are 100 LNRs within Welsh Water's operational area. Local Nature Reserves are shown in **Figure 3.7**.

3.2.13 Wildlife Sites[34] and Sites of Interest for Nature Conservation (SINC) are sites recognised for their importance for wildlife, which fall outside the legal protection of the Sites of Special Scientific Interest (SSSI) system. Together with SSSI sites these form the core of a vital network of threatened habitats such as ancient woodlands, hay meadows, wetlands and neutral grasslands, providing space for many of the Wales' declining animal and plant species. In Wales there are over 4700 sites covering an area of about 800sq km (equivalent to almost 4% of Wales). Wildlife sites and SINC sites undergo the same robust selection criteria and are an integral part of national and local planning legislation. The intention is for these sites to be monitored for condition every few years and management recommendations made to support management practices that conserve and enhance the value of these sites for wildlife[35].

3.2.14 In Wales, 55 habitats and 557 species are identified under Section 7 of the Environment (Wales) Act 2016, as of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. The species comprise:

- 188 invertebrates;
- 67 lichens;
- 77 vascular plants;
- 51 birds;
- 55 marine species;
- 52 mosses and liverworts;
- 27 fungi;

[33] NRW Ancient Woodland Inventory. Available via: https://naturalresources.wales/evidence-and-data/research-and-reports/ancient-woodland-inventory/?lang=en [Accessed July 2021]

[34] where there is a correspondence with a landowner and agreed management plan for wildlife the sites are referred to as Wildlife sites. SINC sites generally do not have an agreed management plan as landowner contact has not commenced or is in the early stages.

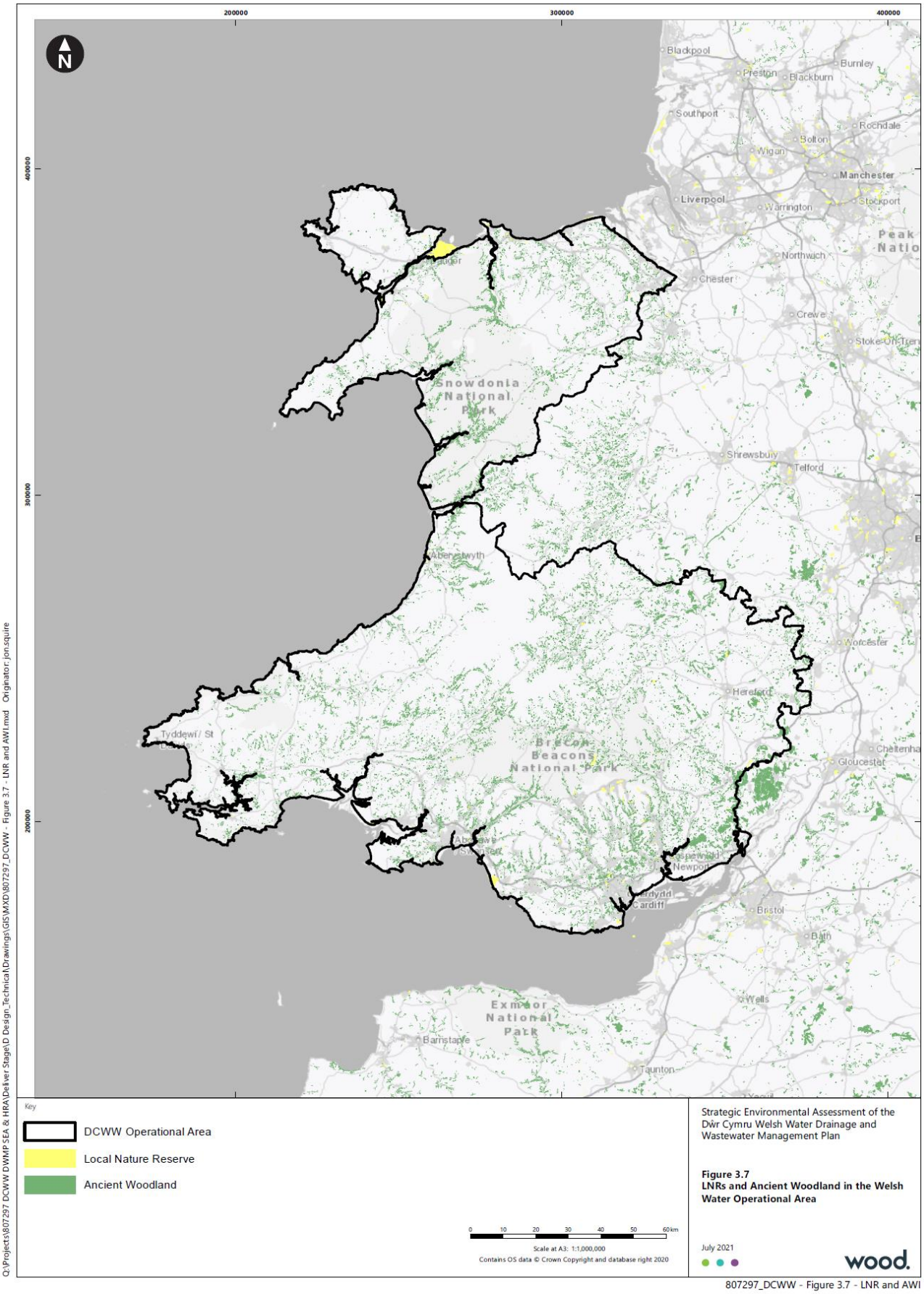
[35] Wales Biodiversity Partnership (2021) *Local Wildlife Sites.* Available via: https://www.biodiversitywales.org.uk/Local-Wildlife-Sites [Accessed July 2021].

- 5 stoneworts;
- 17 mammals;
- 10 fish; and
- 8 amphibians and reptiles.[36]

3.2.15 SoNaRR2020[37] states that mechanisms to provide future reporting of status will be developed. The 2016 Report noted that between 2002 and 2008, fewer than half of the species on the interim list were considered stable or increasing.

[36] Wales Biodiversity Partnership (2021) *Section 7 lists: Section 7 Priority species*. Available at: https://www.biodiversitywales.org.uk/Environment-Wales-Act [Accessed July 2021].
[37] Available via: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]

Figure 3.7 Local Nature Reserves and Ancient Woodland in the Welsh Water Operational Area



Ecosystem Resilience

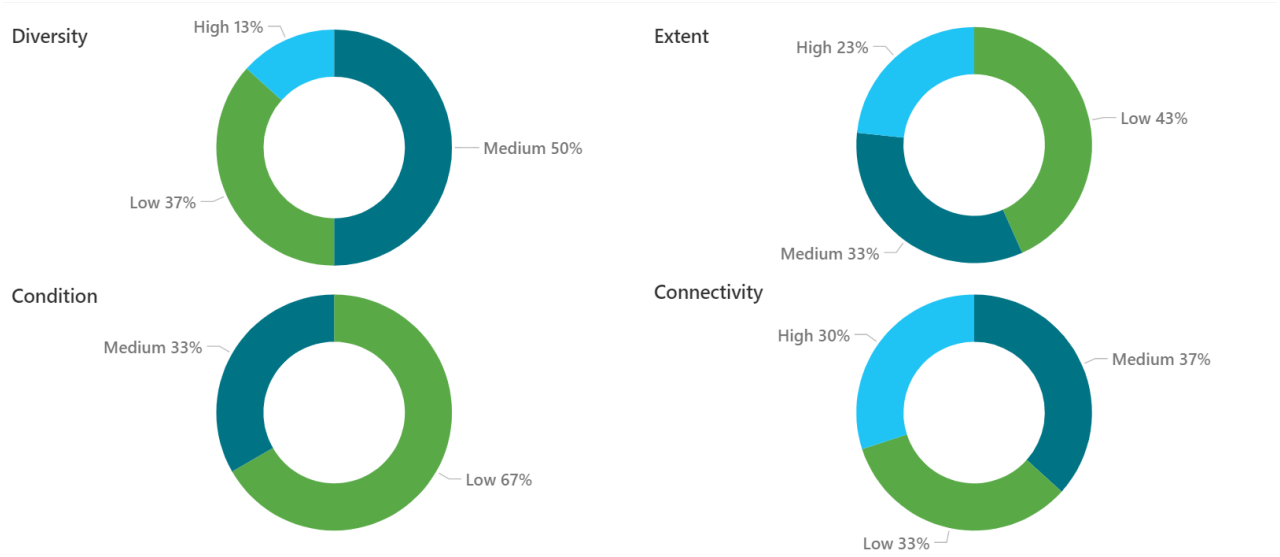
3.2.16 Natural Resources Wales describes a resilient ecosystem as being *"an environment that can respond to pressures by resisting, recovering or adapting to change; and is able to continue to provide natural resources and benefits to people."*[38]

3.2.17 In order to assess resilience in Wales, SoNaRR2020 uses ratings of high, medium or low for the following attributes of resilience:

- Diversity
- Extent
- Condition
- Connectivity

3.2.18 **Figure 3.8** shows the ratings of the four attributes of resilience across all ecosystem types (coastal margins; enclosed farmland; freshwater; marine; mountain, moorland and heath; semi natural grasslands; and, woodlands) in Wales.

Figure 3.8 Ecosystem Resilience Attribute Summary



Source: SoNaRR2020[39]

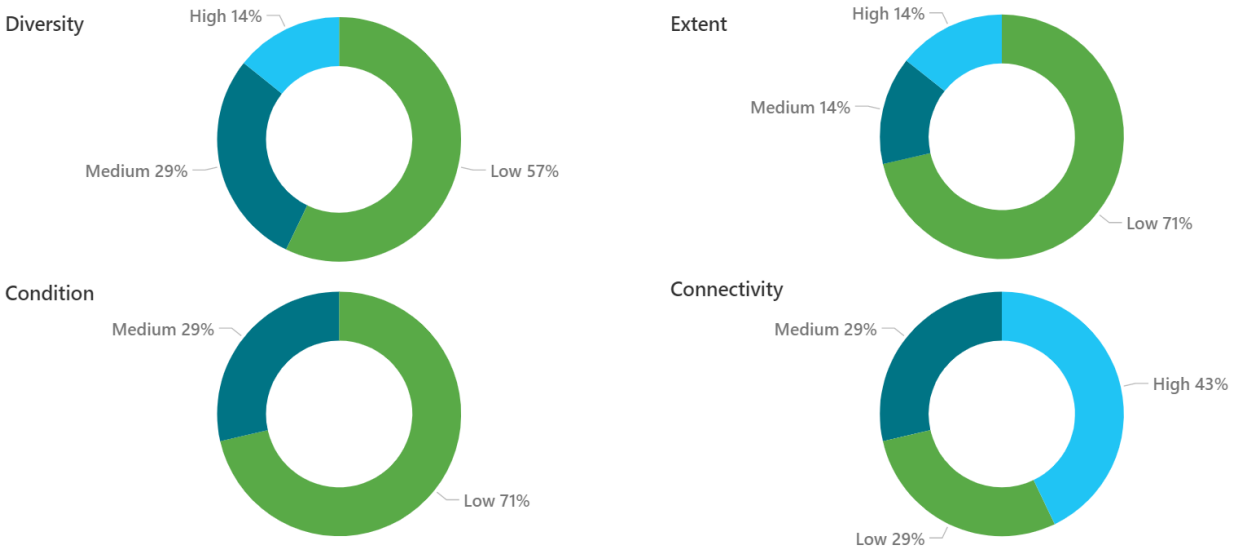
3.2.19 SoNaRR2020 states that in Wales, levels of ecosystem diversity are varied, but most habitat types have seen a reduction in diversity over the past 100 years and since the 1970s the rate of decline has been accelerating. In terms of extent, 31% of Wales is considered to be semi-natural habitat, however, at least 40% of Welsh habitats are spread out in very small patches, implying low resilience. There is a spatial pattern of semi-natural habitat loss, with less remaining in lowland areas than upland areas. Very few Welsh habitats are reported as being in good condition due to a number of pressures. For example, freshwater habitats are mainly affected by nutrient enrichment and physical modifications. The condition of terrestrial habitats is variable at a site level with some good quality areas. Connectivity is at its lowest in Wales' lowland habitats, where the landscape has been simplified by the loss of semi-natural habitats and intensively managed land dominates.

[38] Natural Resources Wales (2021) *SoNaRR2020: Ecosystems are resilient to expected and unforeseen change.* Available online at: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/sonarr2020-our-assessment/ecosystems-are-resilient-to-expected-and-unforeseen-change/?lang=en [Accessed August 2021]
39 Ibid

Connectivity between and within ecosystems has decreased with habitat damage and loss, which has affected both species and habitat distribution and functionality.[40]

3.2.20 **Figure 3.9** shows the resilience attribute summary for freshwater habitats in Wales.

Figure 3.9 Freshwater Ecosystems Resilience Attribute Summary



Source: SoNaRR2020[41]

3.2.21 SoNaRR 2020 notes that:

"*Freshwater ecosystems face multiple pressures, including climate change, rural and urban pollution, physical modifications, changes to flow, and invasive non-native species. The cumulative effects lead to low habitat quality, disrupted ecological processes, and poor water quality which reduces resilience; this is particularly evident in rivers and flood plain habitats. The majority of riverine Special Area of Conservation (SAC) features were unfavourable in the 2018 Article 17 Habitats Directive reporting round, and there were no river water bodies at high status in the Water Framework Directive 2018 interim classification. Across Wales, pressures are endangering once abundant species such as salmon, freshwater pearl mussel and water vole.*"[42]

Invasive Non-native Species

3.2.22 Invasive non-native species (INNS) are any non-native plants or animals that can spread and subsequently cause damage to the environment, the economy, public health or public ways of life.[43] Aquatic ecosystems are particularly susceptible to invasive non-native species (INNS) due to their degree of connectivity and the practical difficulties in containing and managing outbreaks in

[40] Natural Resources Wales (2021) The Second *State of Natural Resources Report (SoNaRR2020) Assessment of the Achievement of SMNR Aim 2: Ecosystems are Resilient to Expected and Unforeseen Change.* Available online at: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/sonarr2020-our-assessment/ecosystems-are-resilient-to-expected-and-unforeseen-change/?lang=en [Accessed August 2021]

[41] Natural Resources Wales (2021) *SoNaRR2020: Ecosystems are resilient to expected and unforeseen change.* Available online at: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/sonarr2020-our-assessment/ecosystems-are-resilient-to-expected-and-unforeseen-change/?lang=en [Accessed August 2021]

[42] Natural Resources Wales (2021), SoNaRR2020: Assessment of the achievement of sustainable management of natural resources: Freshwater. Available online at: https://cdn.cyfoethnaturiol.cymru/media/693312/sonarr2020-ecosystem-freshwater.pdf [Accessed August 2021]

[43] Natural Resources Wales (2021) *SoNaRR2020: Invasive non-native species (INNS).* Available online at: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/sonarr2020-our-assessment/cross-cutting-themes/invasive-non-native-species/?lang=en [Accessed August 2021].

the water environment. INNS can have serious negative impacts on native biodiversity, for example, due to competition for resources, predation and the introduction of disease. They can also cause structural instability in riverbanks, increase flood risk by blocking channels and interfere with navigation and water supply. Examples of INNS which have significant impacts in Wales include signal crayfish, Topmouth Gudgeon, Himalayan balsam (Impatiens glandulifera) and New Zealand Pigmyweed (Crassula helmsii).[44]

Likely Evolution of the Baseline without the DWMP

3.2.23 SoNaRR2020 states that the overall trend is one of serious decline in biodiversity, reflecting the global situation and internationally recognised nature emergency. Deterioration in habitat condition remains a significant concern with more than 50 per cent of Biodiversity Action Plan (BAP) habitats in decline in Wales. The trends identified take into account the presence of existing plans and programmes.

3.2.24 SoNaRR2020 identifies that semi-natural habitats and functioning ecosystems have reduced in extent, becoming more fragmented, and are often in poor ecological condition. This has been affected by the loss of more than 90% of semi-natural grassland habitats since the 1930s. SoNaRR2020 highlights that many species of wild pollinator such as bumble bees, solitary bees and hoverflies are under threat. The Report also notes that many coastal habitats and species are threatened by sea level rise and shoreline development and shoreline habitats are unable to migrate inland due to natural or man-made barriers. This could result in the loss of habitats, such as mudflats and saltmarshes, which are critical for wildfowl and wader species.

3.2.25 SoNaRR2020 and the 2019 *State of Natural Resources Interim Report*[45] identify that nature and climate emergencies are interlinked and highlight the following issues:

- climate change is driving species to move location;
- Arctic-alpine species within mountain habitats could disappear from Wales as their habitats are lost;
- where coastal plants and wildlife cannot move inland, sea-level rise and increased land erosion could lead to widespread loss;
- the ecosystem services these habitats provide - like flood defence and carbon dioxide removal - will also be lost; and
- the number and range of invasive non-native species is likely to increase with the changing climate.

3.2.26 The *Nature Recovery Action Plan for Wales 2020-21*[46] sets out a series of actions for addressing growing evidence about the scale of loss of biodiversity, the escalating ecological crisis and the need to respond to that alongside the response to the climate emergency.

3.2.27 Welsh Water proactively manages a number of sites, implementing biodiversity action plans to develop ongoing conservation work. This work is ongoing and has included providing or improving habitat for key species and monitoring of species and habitat; the company runs both a Biodiversity Fund and a Water Framework Directive fund for projects that meet both of these drivers and

[44] Natural Resources Wales (2021) *The Second State of Natural Resources Report (SoNaRR2020), Assessment of the achievement of sustainable management of natural resources: Freshwater*. Available online at: https://cdn.cyfoethnaturiol.cymru/media/693312/sonarr2020-ecosystem-freshwater.pdf [Accessed August 2021]
[45] Natural Resources Wales (2019) *State of Natural Resources Interim Report*. Available via https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-interim-report-2019/challenges/?lang=en [Accessed July 2021]
[46] Available via: https://gov.wales/sites/default/files/publications/2020-10/nature-recovery-action-plan-wales-2020-2021.pdf [Accessed July 2021]

support Welsh Water activities. Welsh Water has also implemented catchment management initiatives such as "Pest Smart" and "Weed Wiper" which have worked well in addressing the effects of excessive nutrient input. Welsh Water also work with others to maintain and enhance biodiversity, including:

- working with partners across 23 Safeguard Zones;
- working with NRW and the Brecon Beacons National Park Authority to deliver two peat restoration projects and leading on the Brecon Beacons "Mega catchment" project;
- supporting charitable organisations to develop and deliver actions at a local level, contributing to the wider national effort to ensure 'good ecological status' of watercourses under the Water Framework Directive.

3.2.28 Welsh Water has published a revised *Making Time for Nature* (2020)[47] strategy which sets out how, in the exercise of its functions, it proposes to comply with its duty to maintain and enhance biodiversity and in so doing promote the resilience of ecosystems.

Key Issues Relevant to the DWMP

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

- the need to maintain and enhance biodiversity and the resilience of ecosystems, including sites designated for their nature conservation value;
- the need to address the climate emergency and nature emergencies together;
- 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 protected species;
- the need to prevent pollution of freshwater habitats, from sources such as (*inter alia*) slurry, sewage and soil erosion;
- the need to prevent the spread/introduction of invasive non-native species;
- the need to maintain/enhance ecological connectivity;
- the need to maintain/enhance connectivity between rivers and their floodplains;
- the need to sustainably manage biodiversity assets, taking into account the effects of climate change;
- the need to recognise the key role that green infrastructure plays in supporting (*inter alia*) biodiversity, landscape, wellbeing and climate change resilience;
- the need to protect and enhance the green infrastructure network;
- the need to prevent/enhance physical modifications to freshwater ecosystems;
- the need to continue monitoring biodiversity and ecological indicators; and
- the need to work within environmental limits and capacities.

[47] Welsh Water (2020) *Making time for Nature. Welsh Water's revised plan for maintaining and enhancing biodiversity*. Available online: https://www.dwrcymru.com/-/media/Files/Environment/2017/Biodiversity-booklet---Final-English---Single-pages.pdf [Accessed July 2021]

3.3 Geology, Land Use and Soils

Baseline Characteristics

Geology

3.3.1 Wales has some of the most varied geology in the world representing all geological periods and spanning 1.4 billion years of the Earth's history. This diverse geology not only underpins biodiversity and landscape but also provides important mineral resources[48]. The bedrock geology of Wales is extremely varied and comprises sandstone, limestone and igneous rock. As a broad overview, the following rock types exist in a progression from North West to South East (predominant rock types): Ordovician; Silurian; and Devonian.

3.3.2 Coal and metal mining have been very important to Wales historically. The South Wales Coalfield stretches across a large part of South Wales and is still mined to some extent, although less than previously (and from opencast or drift mines rather than deep mines). Lead and silver were once produced from mines in mid-Wales, from a series of mines inland from Aberystwyth. Copper, meanwhile, was mined in Snowdonia and at Parys Mountain on Anglesey, whilst gold was exploited around Dolgellau and Pumpsaint. A number of other metals were produced including zinc, arsenic, antimony and manganese.

3.3.3 The geodiversity of Wales has led to the forming of landscapes and environmental settings that have strong cultural service value. For example, the mountains of Snowdonia attract tourists to Wales whilst coal mining has helped to define the cultural identity of the South Wales Valleys. Following a long history, metal mining has ceased and there is only localised coal mining and slate quarrying in Wales. The aggregates industry is now the main mineral extraction industry in Wales, including marine and terrestrially derived aggregates[49].

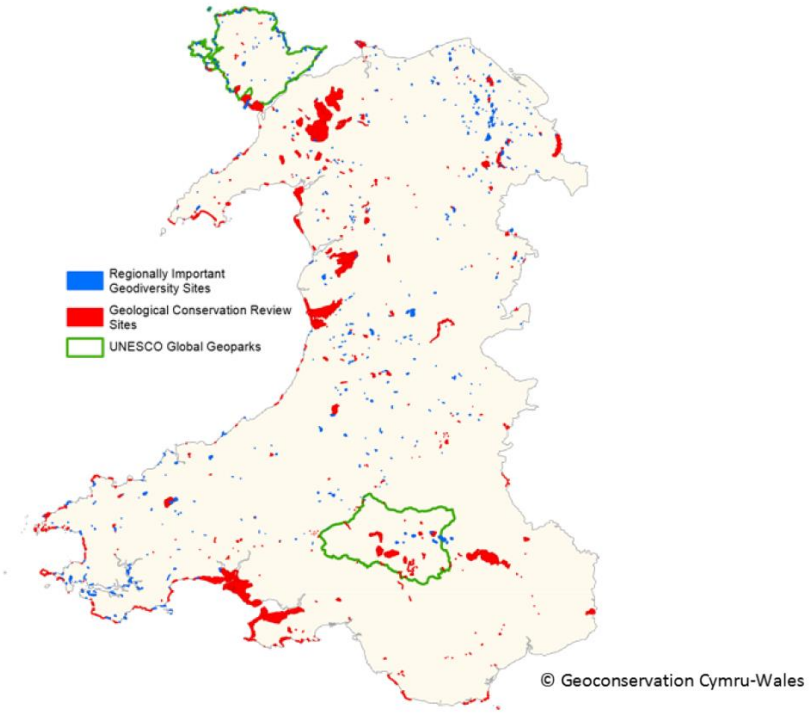
3.3.4 Within Wales, there are approximately 300 SSSIs designated for geology and earth science features covering 48,815 ha and containing some 500 geological features; 93 per cent of these features are in favourable condition. There are also 480 Geological Conservation Review (GCR) sites, 700 Regionally Important Geological / geomorphological Sites (RIGS), and two UNESCO Global Geoparks. The location of the geodiversity sites is shown on **Figure 3.10**. Fforest Fawr Global Geopark is within the Brecon Beacons National Park in South Wales and its geological heritage is of European significance. The GeoMôn Global Geopark is located on Anglesey, northwest Wales[50].

[48] NRW (2020) *The Second State of Natural Resources Report (SoNaRR2020).* Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]

[49] NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en [Accessed July 2021]

[50] NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en [Accessed July 2021]

Figure 3.10 Welsh Geodiversity Sites



Source: SoNaRR[51]

Land use and soil

3.3.5 Land use in Wales is dominated by agricultural land under pasture grassland and rough grazing with a small proportion under a crop type[52]. This is illustrated in the split of the land on agricultural holdings by usage, as shown in **Figure 3.11**. These characteristics reflect the climate, relief and soil type. Recent changes (2016-19) in land use area include an increase in tree cover on farms, woodland, permanent grassland, arable land and grass leys, and a decline in sole rights rough grazing and horticulture[53]. A total of 5.1 per cent of Wales is urban/suburban (compared to 7.2 per cent in the UK) whilst 15.6 per cent is woodland (compared to 12.5 per cent in the UK)[54].

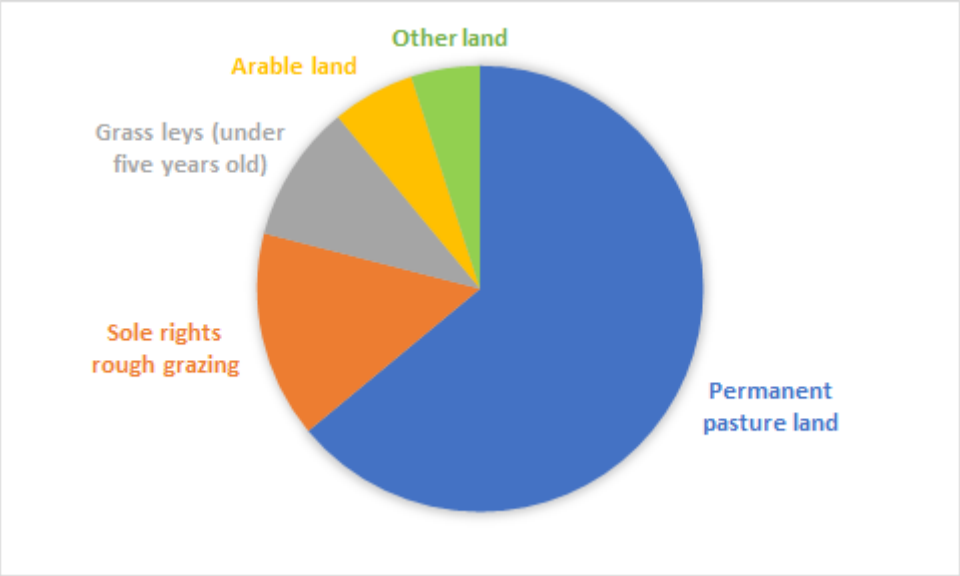
[51] NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en [Accessed July 2021]

[52] UK Centre for Ecology and Hydrology (2015) *Land Cover statistics derived from LCM2015* (Rowland, C.S.; Morton, R.D.; Carrasco, L.; McShane, G.; O'Neil, A.W.; Wood, C.M. (2017). Land Cover Map 2015 (25m raster, GB). NERC Environmental Information Data Centre. https://doi.org/10.5285/bb15e200-9349-403c-bda9-b430093807c7). Available online: https://www.ceh.ac.uk/land-cover-map-2015-statistics [Accessed July 2021]

[53] NRW (2020) *The Second State of Natural Resources Report (SoNaRR2020).* Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]

[54] UK Centre for Ecology and Hydrology (2015) *Land Cover statistics derived from LCM2015* (Rowland, C.S.; Morton, R.D.; Carrasco, L.; McShane, G.; O'Neil, A.W.; Wood, C.M. (2017). Land Cover Map 2015 (25m raster, GB). NERC Environmental Information Data Centre. https://doi.org/10.5285/bb15e200-9349-403c-bda9-b430093807c7). Available online: https://www.ceh.ac.uk/land-cover-map-2015-statistics [Accessed July 2021]

Figure 3.11 Split of Land on Agricultural Land in Wales (2019)



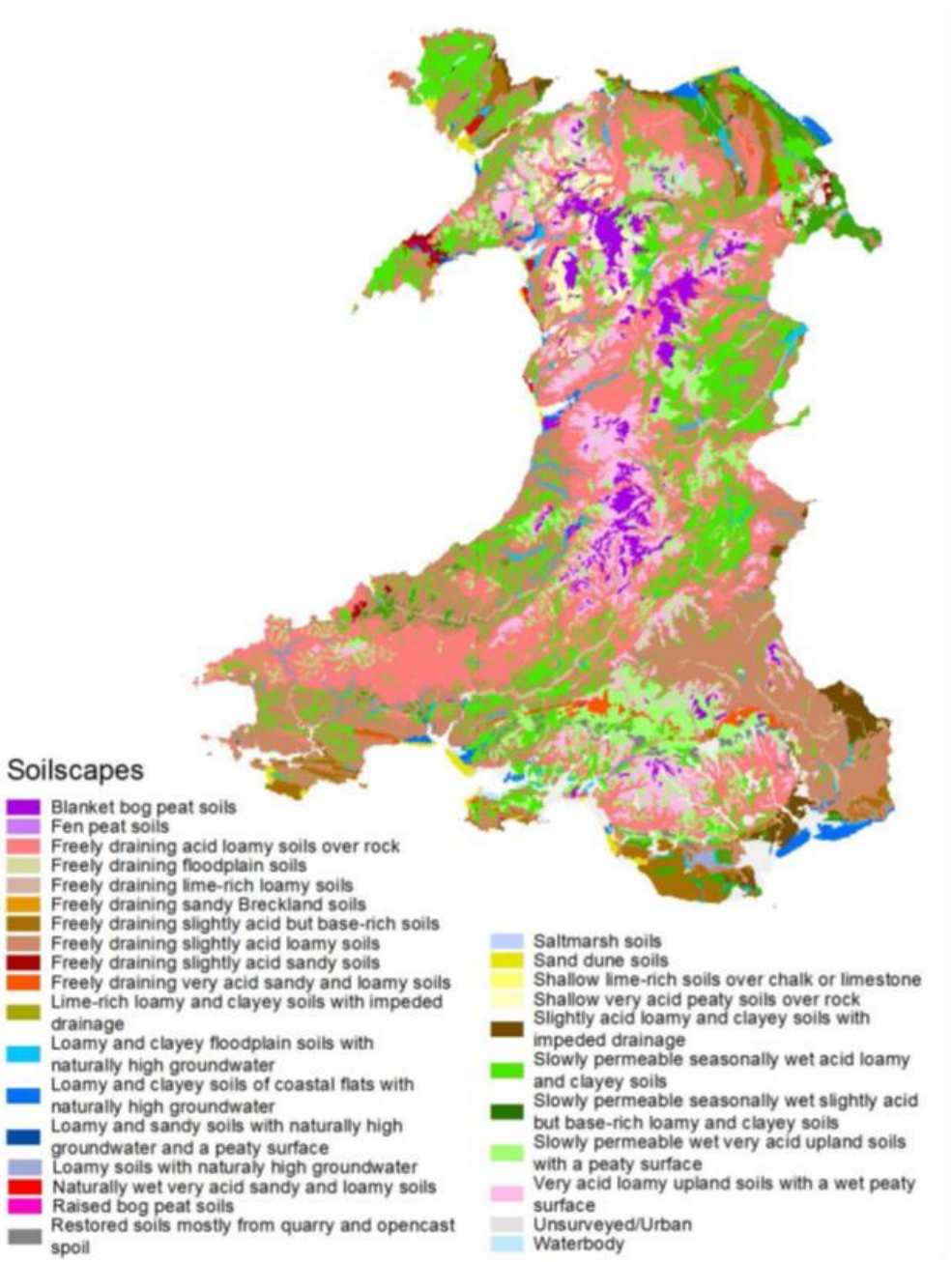
Source: SoNaRR2020[55]

3.3.6 There are over 400 different soil types in Wales (**Figure 3.12**) which are contributing to, reflecting, and supporting the geodiversity and biodiversity, landscapes and land uses in Wales. The soils of best quality and most productive agricultural land are a scarce and finite resource in Wales. Soil quality has deteriorated across all habitats apart from woodlands where there has been some improvement. Most of the peatland resource is in poor condition, reducing the ability to mitigate climate change and benefit from the many regulating services that peatlands in good condition can provide[56].

[55] NRW (2020) *The Second State of Natural Resources Report (SoNaRR2020).* Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]

[56] NRW (2020) *The Second State of Natural Resources Report (SoNaRR2020).* Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]

Figure 3.12 National Soil Map of Wales



Source: SoNaRR 2016 [57]

3.3.7 The Agricultural Land Classification (ALC) System developed by Defra provides a method for assessing the quality of farmland. There are five grades of agricultural land quality plus non-agricultural and urban categories. **Table 3.2** shows agricultural land quality in Wales and England by ALC grade.

3.3.8 Wales is characterised by significant areas of grades 4 and 5 agricultural land (poor to very poor quality) and at a much higher proportion than in England. Agricultural land quality is lower in the upland areas of Wales (See **Figure 3.13)**. The English areas of the Welsh Water supply area

[57] NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en [Accessed March 2021]

are generally of a higher agricultural quality. Poor soil quality combined with a hilly/mountainous landscape and wet climate means that the majority of agricultural land in Wales is restricted to the grazing of sheep and cattle[58].

Table 3.2 Agricultural Land Quality (as a percentage of land area)

Agricultural Land Grade	Wales	England
Grade 1 – Excellent	0.25	4.10
Grade 2 – Very Good	6.38	38.73
Grade 3 – Good / Moderate	33.13 (split 9.58 in 3a and 23.55 in 3b)	39.51
Grade 4 – Poor	19.78	12.37
Grade 5 – Very Poor	21.95	1.32
Non agricultural	14.48	2.76
Urban	4.03	1.21

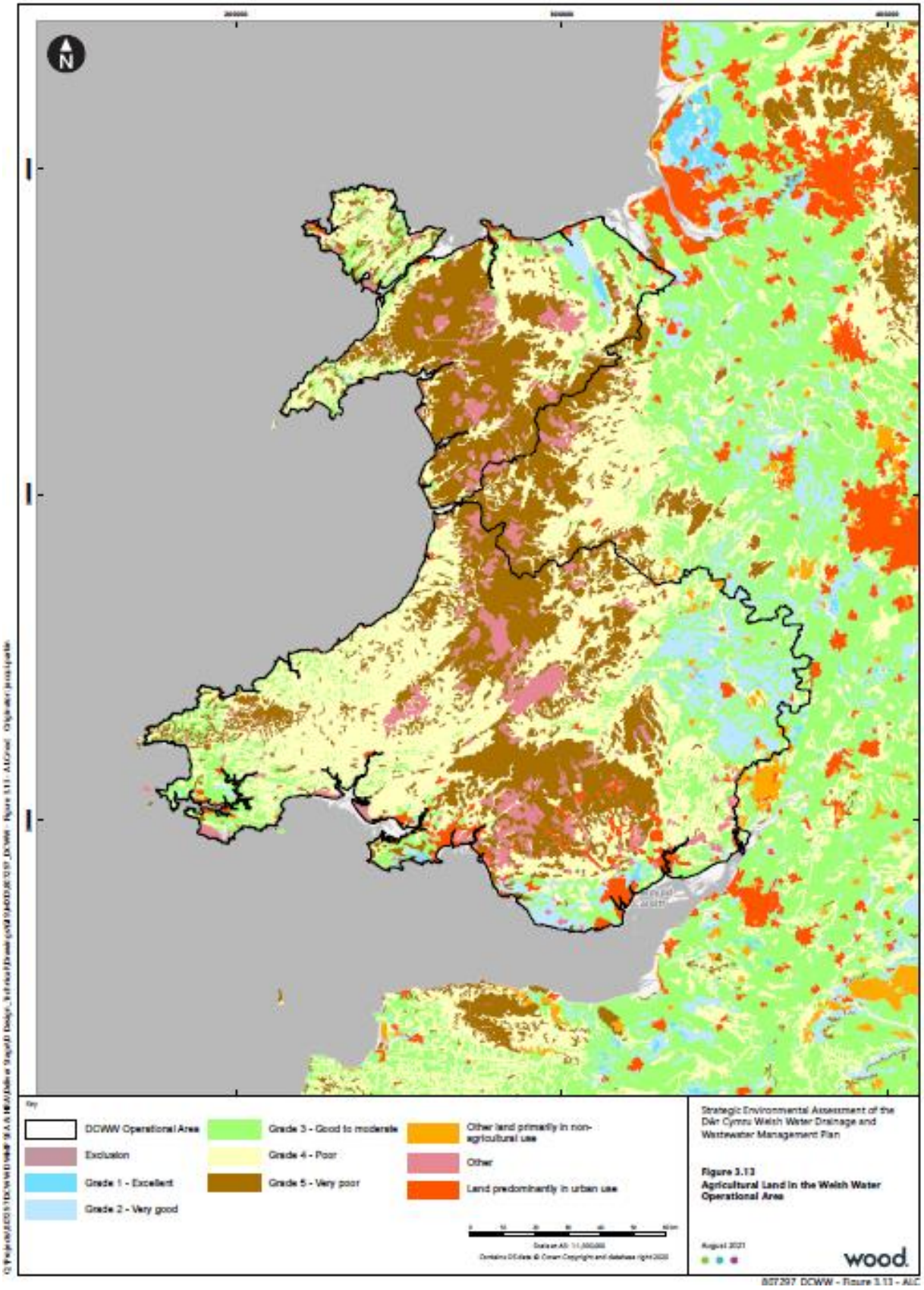
Source: Data.gov.uk[59] (England data) and DataMapWales[60] (Wales data)

3.3.9 Alongside their agricultural use, soils and particularly peats store a significant amount of carbon. Soils also provide storage for water, foundations for urbanisation and woodlands, provision of minerals and metals and for biodiversity acting as both a habitat and a foundation for a range of habitats. However, soil erosion and acidification are prominent pressures. Fertile topsoil develops at a rate of less than 1 cm/century. An estimated 2.2 million tonnes of topsoil is eroded on an annual basis in the UK. Some agricultural practices (e.g. harvesting in wet conditions, leaving fields bare after harvest) result in large volumes of productive topsoil being compacted and degraded as well as eroded and deposited in adjacent water courses. There are also many impacts on the water environment as a result of eroded soils entering waterways.[61]

3.3.10 Wales' peat habitats have been adversely affected by climate change, land management and atmospheric pollution and it is estimated that the extent of deep peat soils (≥0.5m) is now 90,995 ha.[62]

[58] NRW (2020) *The Second State of Natural Resources Report (SoNaRR2020).* Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]
[59] DATA.GOV.UK (2020) Provisional Agricultural Land Classification (ALC) Available online: https://data.gov.uk/dataset/provisional-agricultural-land-classification-alc2 [Accessed July 2021]
[60] DataMapWales (2019) *Predictive Agricultural Land Classification (ALC) Map 2.* Available online: https://datamap.gov.wales/layers/inspire-wg:wg_predictive_alc2 [Accessed July 2021]
[61] NRW (2015) *A Snapshot of the State of Wales' Natural Resources – June 2015.* Available online: http://naturalresources.wales/media/4798/snapshot-report.pdf [Accessed July 2021].
[62] Evans, C., Rawlins, B., Grebby, S., Scholefield, P. & Jones, P. (2015) *Glastir Monitoring & Evaluation Programme. Mapping the extent and condition of Welsh peat*. Welsh Government, NERC/Centre for Ecology & Hydrology.

Figure 3.13 Agricultural Land Classification in the Welsh Water Operational Area



Likely Evolution of the Baseline without the DWMP

3.3.11 Geological hazards may change as a response to climate change; for example, coastal erosion, landslides and pollution from former mine sites. Climate change is the biggest threat to soils. From 2050, predicted changes to the extent and distribution of the ALC grade and the best and most versatile (BMV) agricultural land will be largely driven by seasonal drought risk through changes in soil wetness and water availability.

3.3.12 Soil contamination is an additional threat posed by industry, urbanisation and mineral extraction which can affect biological processes of soil formation. Degradation in soil structure can also potentially be a factor in flooding whilst dissolved organic carbon (DOC) concentrations have increased in upland waters which suggests soil carbon stocks may be destabilising due to climate change. [63].[64]

3.3.13 Woodlands are a fundamental part of the environment in Wales and there are a number of pressures on them. Pests and diseases are some of the major pressures which have had a significant impact on Welsh woodlands in recent years. The rate of new planting increased between 2009 and 2014 but from 2014 to 2018 new planting has fallen[65], and many of the best examples of semi-natural woodland (on protected sites) are in poor condition[66].

3.3.14 The '*Natural Resources Policy*' identifies a number of aims of relevance to land use and soil, including:[67]

- better management of soil for carbon storage and sequestration;
- safeguarding the best and most versatile agricultural land to improve soil quality, productive capacity and its resilience to degradation;
- increasing green infrastructure in and around urban areas;
- increasing canopy cover and well located woodland; and
- peat bog management.

Key Issues Relevant to the DWMP

3.3.15 The key sustainability issues relevant to the DWMP arising from the analysis of the baseline for geology, land use and soils are:

- the need to protect, maintain and enhance geomorphological functions and services;
- the need to influence how land is managed, promoting sustainable patterns of land use;
- the need to conserve and enhance soil quality and function (including carbon sequestration);

[63] NRW (2020) *The Second State of Natural Resources Report (SoNaRR2020)*. Technical Report. Natural Resources Wales. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/state-of-natural-resources-report-sonarr-for-wales-2020/?lang=en [Accessed July 2021]
[64] NRW (2015) *A Snapshot of the State of Wales' Natural Resources – June 2015*. Available online: http://naturalresources.wales/media/4798/snapshot-report.pdf [Accessed July 2021].
[65] Welsh Government (2019) *Woodlands for Wales Indicators 2017-18*. Available online: https://gov.wales/woodlands-wales-indicators-april-2017-march-2018 [Accessed July 2021].
[66] UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment (NEA): Technical Report*. UNEP-WCMC, Cambridge. Chapter 20: Status and Changes in the UK's Ecosystems and their Services to Society: Wales. Pg 979-1044. Available at http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=StRD4fVq72c%3d&tabid=82 [Accessed July 2021]
[67] Welsh Government (2017) *Natural Resources Policy*. Available online: http://gov.wales/docs/desh/publications/170821-natural-resources-policy-en.PDF [Accessed July 2021]

- the need to protect and avoid damage to Wales' geodiversity and conserve and enhance sites designated for geological interest; and
- the need to manage impacts on soil resources, including control of pollution and remediation of contaminated land.

3.4 Water

Baseline Characteristics

3.4.1 The number and type of water bodies in Wales is summarised in **Table 3.3**. Water is abstracted from water bodies for many purposes, including public water supply, agriculture, industry and electricity generation. In Wales, most of the water licensed for abstraction is from surface water rather than groundwater, with electricity generation being the sector abstracting the most (82 per cent), followed by public water supply (13 per cent), other industry (0.03 per cent) and fish farming and amenity ponds (0.01 per cent). Spray irrigation, other agriculture and private water supplies account for a very low percentage of the total water abstracted[68].

Table 3.3 Number and Type of Water Bodies in Wales

Water body category	Natural	Artificial	Heavily modified	Total
River	631	5	91	727
Canal	n/a	7	n/a	7
Surface Water Transfer	n/a	1	n/a	1
Lake	33	2	89	124
Coastal	18	n/a	5	23
Transitional (Estuarine)	19	n/a	13	32
Groundwater	39	n/a	n/a	39
Total	740	15	198	953

Source: Water Watch Wales (NRW)[69]

3.4.2 Wales has relatively high rainfall compared to the rest of the UK, receiving on average 1,400 mm per year. There are, however, geographical differences across the Welsh Water supply area. Across Anglesey, the borders of Wales and Herefordshire, rainfall is around 700 mm per year, whilst the mountainous areas of the Brecon Beacons and Snowdonia receive substantially more rainfall, with the latter typically receiving more than 3,000mm of rainfall per year[70]. Rainfall patterns combined with sources of demand drive the nature of the water resource system operated by Welsh Water.

[68] Environment Agency (2011) *The Case for change – current and future water availability*. Available online: http://webarchive.nationalarchives.gov.uk/20140328084622/http:/www.environment-agency.gov.uk/research/planning/135501.aspx [Accessed March 2021].
[69] Water Watch Wales (NRW) (2017) *WFD Data Download.* Available online at: https://waterwatchwales.naturalresourceswales.gov.uk/en/ https://drive.google.com/file/d/0B2hsDbbdxz1tcUdGV1c5U0dXMkk/view?resourcekey=0-gAzLAdkmrhJ31gIvRhGTUQ [Accessed August 2021]
[70] Met Office (2016) *Wales: Climate*. Available online: http://www.metoffice.gov.uk/climate/uk/regional-climates/wl [Accessed July 2021].

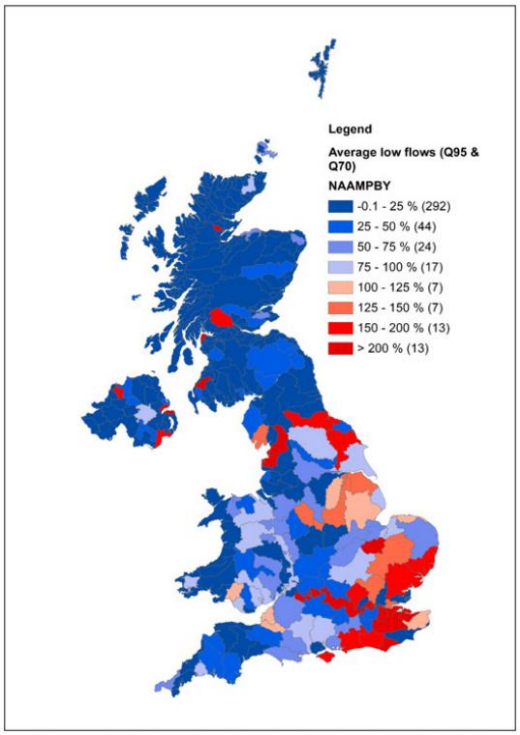
Only around 3 per cent of the rainfall in Wales is used for public water supply, which is very different to the rest of the UK where up to 50 per cent of rainfall is used for public water supply.

3.4.3 Welsh Water manages its water supplies and demands across 24 water resource zones (WRZs). Welsh Water provides water and sewerage services to some 3 million customers in much of Wales and small parts of Cheshire and Herefordshire in England. It also has over 100,000 business customers, and in total delivers more than 800 million litres of drinking water every day. This can increase by up to 20 per cent during a hot summer. Most of the water Welsh Water abstracts is supplied from impounding reservoirs although significant volumes are abstracted from lowland river sources such as those on the Rivers Wye and Usk in South East Wales, the River Towy in South West Wales and the River Dee in North Wales. Groundwater accounts for less than 5 per cent of water supplies by Welsh Water but at a local level, may be the whole supply[71]. River abstractions are the dominant supply in the Tywyn Aberdyfi, Llyswen, Hereford CUS, Whitbourne, Ross on Wye, and Monmouth zones. Reservoir supplies dominate the rest of Welsh Water's company area, with the remainder drawn from the ground through springs, wells and boreholes. There are groundwater sources in the Pilleth, Brecon, Clwyd Coastal, Pembrokeshire, Hereford and Vowchurch zones.

Water availability

3.4.4 The majority of UK catchments, including those in Wales, are not currently using 100 per cent of the available resource of water at average low flow conditions i.e., there is a surplus of water available for human uses (**Figure 3.14**). However, abstraction is more than the available resource in average low flow conditions in catchments mostly located in the east and south of the UK, although there are also a small number of catchments similarly affected in Scotland, Northern Ireland and the North West of England.

Figure 3.14 Present-day abstraction demand as a percentage of the available resource at average of low flow conditions (Q95 and Q70)



[71] Welsh Water (2019) *Final Water Resources Management Plan 2019. Technical Report. March 2019.* Available online: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed July 2021].

Source: HR Wallingford (2020)[72]

3.4.5 NRW has produced a series of Catchment Abstraction Management Strategies (CAMS) for the catchments within Wales and those that cross the England / Wales border. 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 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:

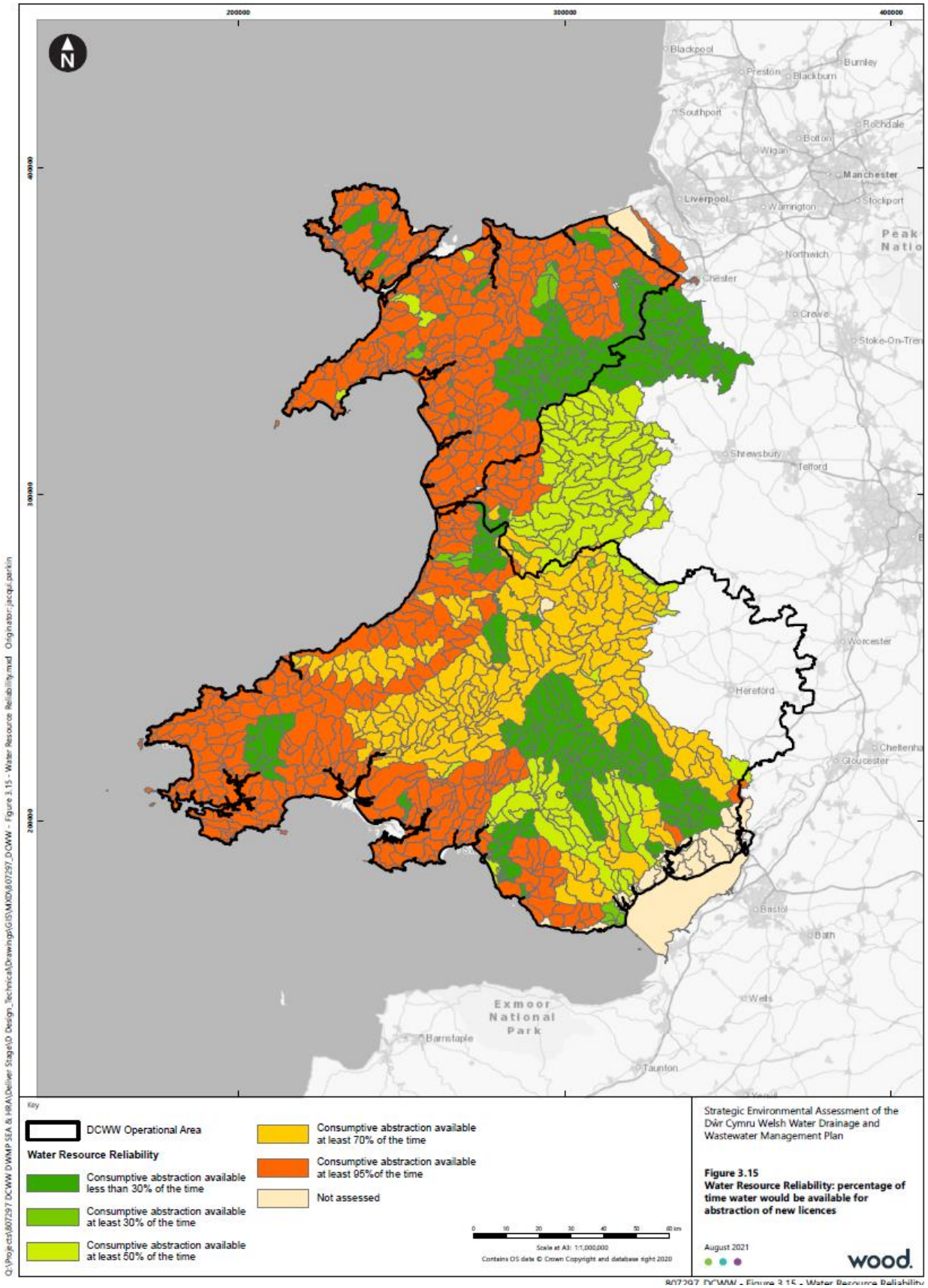
- **Water available for licensing**: There is more water than required to meet the needs of the environment. New licences can be considered depending on local and downstream impacts;
- **Restricted water available for licensing**: If all licensed water is abstracted there will not be enough water left 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.

3.4.6 **Figure 3.15** shows how reliable new surface water and groundwater licences are, using the CAMS assessment. About 60 per cent of water bodies in Wales can provide a reliable source of water for new abstractions for at least 95 per cent of the time. Approximately 10 per cent of water bodies in Wales can only provide water for new abstractions 30 per cent or less of the time (less than 100 days a year)[73].

[72] HR Wallingford (2020) *Updated projections of future water availability for the third UK Climate Change Risk Assessment* Available online: https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Updated-projections-of-future-water-availability_HRW.pdf [Accessed July 2021].

[73] Environment Agency & NRW (2013) *Current and future water availability – addendum: A refresh of the Case for Change analysis, December 2013.* Available online: http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/planning/135501.aspx [Accessed March 2021].

Figure 3.15 Water Resource Reliability: percentage of time water would be available for abstraction of new licences



Sustainability Reductions - Review of Consents

3.4.7 Under the Habitats Directive, NRW and the Environment Agency completed a review of all the consents (the RoC) that they regulate to ensure there were no detrimental impacts on the conservation interests in designated sites including SPAs and SACs. Discharge consents and water abstraction licences were included within this review.

3.4.8 The presence of a large number of SPAs and SACs in and adjacent to Welsh Water's operational area meant that a number of Welsh Water abstraction licences and discharge consents required modification in order to achieve the desired environmental outcomes for the primarily riverine European-designated sites (SACs) (for example, River Wye, River Usk, River Teifi, River Towy, Cleddau Rivers, Rhinog, Migneint-Arenig-Dduallt, Afon Gwyrfai and Llyn Cwellyn).

National Environment Programme (NEP) in Wales and the Water Industry National Environment Programme (WINEP) in England

3.4.9 The National Environment Programme (NEP) applies in Wales and represents a set of actions that NRW has requested of Welsh Water in order to contribute towards meeting their environmental obligations between 2020 and 2025. WINEP represents the equivalent set of actions required by the EA of all water companies operating in England (including Welsh Water's supply area in England). This will see up to £5 billion of investment by water companies in the natural environment through 2020 to 2025 (PR19). The investment comprises about 40% for meeting Water Framework Directive drivers, 40 per cent for meeting Urban Waste Water Treatment Directive drivers and 10% for meeting other drivers (including biodiversity). The investment aims to[74]:

- protect and improve at least 6,000 km of waters;
- protect and improve 24 Bathing Waters and 10 Shellfish sites;
- protect and improve 1,800 ha of protected nature conservation sites; and
- enhance nearly 900 km of river and 4,276 ha through wider biodiversity improvements.

3.4.10 NEP/WINEP will help tackle some of the biggest challenges facing the water environment, from the spread of invasive species, low flows and unsustainable abstraction to the effects of chemical and nutrient pollution. The measures in NEP/WINEP represent the actions required by water companies to meet their environmental obligations under their AMP7 investment plans. However, this also presents an opportunity for the industry to develop innovative approaches which will benefit customers, communities, the environment and natural capital.

3.4.11 Welsh Water's PR19 investment plan (September 2018) identifies an overall £2.3 billion capital investment programme. This includes £370 million of funding for the NEP that will:

- upgrade 25 wastewater treatment works;
- replace 7 wastewater treatment works in the Gwili Gwendraeth catchment; and
- improve 15 high risk catchments.

3.4.12 The NEP will improve the quality of 400km of river. This will be complemented through a combination of the Drainage and Wastewater Management Plan and increasingly a Sustainable Management of Natural Resources approach, which will be piloted in four catchments in Welsh Water's supply area during AMP7.

[74] Defra (2018) *£5 billion investment by water companies to benefit the natural environment.* Available online: https://www.gov.uk/government/news/5-billion-investment-by-water-companies-to-benefit-the-natural-environment [Accessed July 2021].

Supply and demand

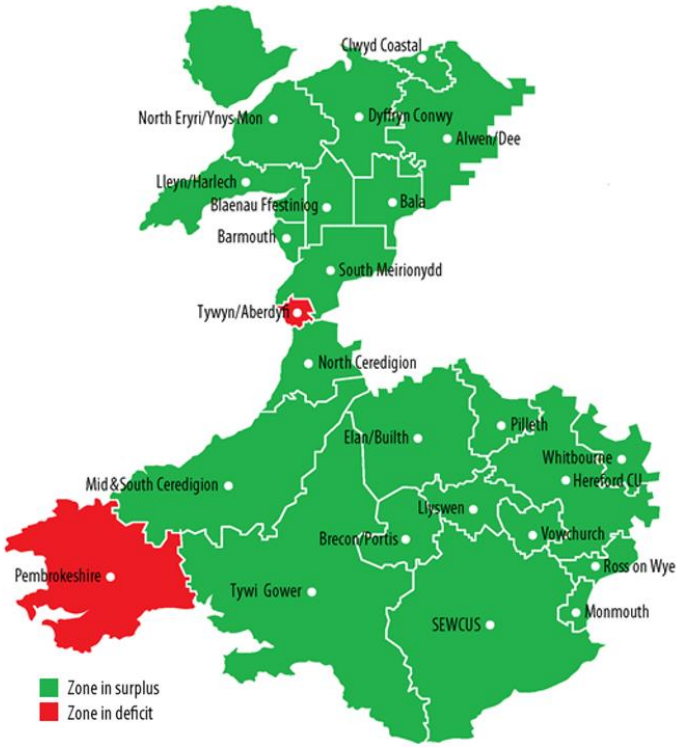
3.4.13 Welsh Water forecasts water supply and demand in all of the 24 water resource zones (WRZs) taking into account the RoC and the NEP or WINEP. To account for future uncertainties, an additional amount of water is included in the assessment of the supply demand balance called 'Target Headroom'. For the WRZ to have a 'surplus', the water available for supply must be equal to or greater than the sum of the total forecast demand plus the target headroom. Where a shortfall against demand plus target headroom occurs (i.e., the WRZ has a supply demand deficit) measures are required to address the shortfall. These could include measures to increase supply such as new abstractions or measures to reduce demand through additional leakage detection.

3.4.14 Welsh Water's Water Resources Management Plan 2019 presents the outcome of this assessment and identifies that two of the 24 WRZs are forecast to have a supply demand deficit over the planning period to 2050 unless management interventions such as demand management measures or new resources are implemented[75]. The two WRZs are Pembrokeshire and Tywyn/Aberdyfi and are shown in red on **Figure 3.16**. The Water Resources Management Plan 2019 ensures that a surplus of supply over demand is maintained in all WRZs.

3.4.15 Welsh Water forecasts the component of demand that is returned to the sewer in each of the 106 level 3 TPU's (see **Figure 1.1)**. This forecast is based on the same source information utilised to forecast Water supply. It is known that not all water supply demand is returned to the sewer as some activities such as washing cars, and watering gardens for example it is assumed that approximately 5% of per capital consumption is not returned to a sewer. During 2009 to 2015 an assessment of these micro components was undertaken to support the WRMP. During Dry weather the returned to sewer volume in the majority of cases is the largest component in the sewer however in a rainfall event over a combined sewer network system the largest contributor to the sewer becomes water that runs of roofs and roads.

[75] Welsh Water (2019) *Final Water Resources Management Plan, Technical Report*. Available online at: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed July 2021]

Figure 3.16 Welsh Water WRZs with supply demand deficit over the planning period to 2050



Source: Welsh Water (2019) Final Water Resources Management Plan [76]

Wastewater treatment

3.4.16 Welsh Water collects wastewater, including surface water from homes and businesses across the Welsh Water area. The wastewater is transported by the 30,000 km of sewer to one of the 829 wastewater treatment works (WwTWs) for treatment before being returned to the surface water system (rivers and the sea)[77].

3.4.17 WwTW discharge consent standards are set to maintain good water quality by the environmental regulators NRW and the EA. In 2019, Welsh Water's WwTWs achieved 98.2 per cent compliance with their environmental permit conditions. NRW gives water companies a star rating for their overall performance in protecting the environment (including during return of treated water to rivers and the sea). Welsh Water was awarded a three ('good') out of four-star Environmental Performance Assessment (EPA) rating in the latest assessment in 2019[78].

Combined Storm Overflows (CSOs)

3.4.18 Most of Welsh Water's sewers are 'combined sewers' meaning that they handle both rain water run-off from gutters, drains, roads etc. as well as sewage. During heavy rainstorms, more water can enter these sewers than they are designed to cope with. As such Welsh Water's combined sewers are designed to safely relieve this pressure and stop homes being flooded, through release points known as Combined Storm Overflows (CSOs), which are built into the sewer system. These release

[76] Welsh Water (2019) Final Water Resources Management Plan, Technical Report. Available online at: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed July 2021]
[77] Welsh Water (2021) *Dŵr Cymru Welsh Water: Key Facts*. Available online https://wsc.dwrcymru.com/en/Company-Information/Dwr-Cymru-Welsh-Water/Key-Facts.aspx [Accessed July 2021].
[78] DiscoverWater.co.uk (2019) *Environmental Performance Assessment*. Available online: http://www.discoverwater.co.uk/environmental-performance [Accessed July 2021]

additional water which enters the combined sewers during times of heavy rainfall, into watercourses. CSOs are designed to operate during heavy rain so that if they do operate then any sewage present is heavily diluted with rain and surface water. Without the release points, the sewerage system would back up causing sewage flooding to buildings, streets, highways and potentially even inside of properties.[79]

3.4.19 The operation of Welsh Water's CSOs are regulated and permitted and monitored by environmental regulators (Natural Resources Wales and the Environment Agency). Welsh Water has invested £8.1 million in improving the monitoring of its CSOs since 2015, and now have spill monitors on 96.7% of all of its CSOs. The monitors record the number and duration of spills and the data (EDM data) - is published on Welsh Water's website[80]. Welsh Water is currently investing £42m across Wales on its Storm Overflow Assessment Framework (SOAF). Over the five years between 2020-2025, the programme will use data from the EDM sites to prioritise wastewater assets for investigation, with the aim to reduce both the number and volume of storm water discharges to the environment, improving both watercourse amenity value and water quality overall[81].

Water quality

3.4.20 The quality of the water body that receives the output from the WwTW is important and the Water Framework Directive (2000/60/EC) provides a mechanism for management of the water environment to ensure sustainable use of water. The Water Framework Directive also seeks to protect and improve the quality, both ecological and chemical, of inland surface waters, ground waters and coastal waters. Under the Water Framework Directive, River Basin Management Plans (RBMP) were prepared for each River Basin District in 2009 (first cycle) and 2015 (second cycle). NRW issued the draft 2021 RBMPs (third cycle) for a 6 month consultation on 22nd December 2020. The RBMP for the Welsh part of the Severn River RBMP is due to be reviewed and updated by the EA by the end of 2021.

3.4.21 **Table 3.4** shows the overall status of the water bodies in each River Basin District within Wales in the three RBMP cycles (as a percentage of the total water bodies). In Wales, the most up to date classification is the 2018 interim classification for surface waters and 2015 classification for groundwater as the latter is updated every 6 years

Table 3.4 Overall status of water bodies in Wales as a percentage in 2009, 2015 and 2018

River Basin District	2009					2015						2018				
	Bad	Poor	Moderate	Good	High	Not Assessed	Bad	Poor	Moderate	Good	High	Bad	Poor	Moderate	Good	High
Dee	0	11	58	30	0	0	0	8	65	28	0	0	11	50	39	0

[79] Welsh Water (2021) *Combined storm overflows.* Available online at: https://www.dwrcymru.com/en/our-services/wastewater/combined-storm-overflows [Accessed July 2021].

[80] Ibid

81 Welsh Water (2021) *Combined storm overflows, South West Wales.* Available online at: https://www.dwrcymru.com/en/our-services/wastewater/combined-storm-overflows/south-west-wales [Accessed July 2021]

River Basin District	2009					2015						2018				
	Bad	Poor	Moderate	Good	High	Not Assessed	Bad	Poor	Moderate	Good	High	Bad	Poor	Moderate	Good	High
Western Wales	0	7	63	30	0	0	0	8	52	39	1	0	9	48	43	<1
Severn River*	1	12	50	37	0	1	1	8	47	43	0	-	-	-	-	-
Average	0.3	10	57	32	0	0.3	0.3	8	55	37	0.3	0	10	49	41	<0.3

Notes* Welsh part of Severn River Basin District
Source: Welsh Government and NRW[8283]

3.4.22 In 2009, 10 per cent of all water bodies were in poor condition, 57 per cent were in moderate condition and 32 per cent were in good condition. Since then, many improvements have been made both in monitoring and data collection and assessment. The percentage of water bodies achieving good or better status has increased to 37 per cent in 2015 and 41 per cent in 2018.

3.4.23 The main reasons for water body failure in Wales are pollution from abandoned mines and contaminated land, agricultural pollution, barriers to fish migration and impoundments. Sewage discharges, acidification, forestry, flood protection and land drainage, surface water drainage from urban and transport development, abstraction and industrial discharges are also factors[84].

3.4.24 The Marine Strategy Framework Directive (MSFD) aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive sets out 11 high level descriptors of GES and the status of these in Welsh waters is monitored for assessment of progress towards achieving GES. The Wales National Marine Plan will be a key tool for ensuring that the targets and measures to be determined by the UK for the MSFD can be implemented.

3.4.25 Bathing waters are very important for coastal communities, visitors and the economy in Wales. In 2020, all of the 105 designated Welsh bathing waters met the standards set by the Bathing Water Directive (2006/7/EC). Of the 105 bathing waters assessed in Wales, 84 were of an excellent standard, 14 achieved a good standard and 7 were classified as the minimum, sufficient, standard[85].

3.4.26 Across England and Wales, new drinking water standards came into force, *The Water Supply (Water Quality) Regulations 2018* (which revised earlier versions of the regulations). Welsh Water's performance against the water quality tests (known as Overall Mean Zonal Compliance) for 2019

[82] Welsh Government (2015) *River Basin Planning Progress Report for Wales 2009-2015. Updated December 2015*. Available online: http://naturalresources.wales/media/676155/progress-report-for-wales-2009-2015-english.pdf [Accessed July 2021]
[83] NRW (2020) *Consultation on updating the Western Wales River Basin Management Plan for the third cycle (2021-2027).* Available online: https://ymgynghori.cyfoethnaturiol.cymru/evidence-policy-and-permitting-tystiolaeth-polisi-a-thrwyddedu/western-wales-rbmp/user_uploads/draft-western-wales-urbmp-consultation-2020-1.pdf [Accessed July 2021] and NRW (2020) *Consultation on updating the Dee River Basin Management Plan for the third cycle (2021-2027).* Available online: https://ymgynghori.cyfoethnaturiol.cymru/evidence-policy-and-permitting-tystiolaeth-polisi-a-thrwyddedu/dee-river-rbmp/user_uploads/draft-dee-urbmp-consultation-2020.pdf [Accessed July 2021]
[84] Welsh Government (2015) *River Basin Planning Progress Report for Wales 2009-2015. Updated December 2015*. Available online: http://naturalresources.wales/media/676155/progress-report-for-wales-2009-2015-english.pdf [Accessed July 2021]
[85] NRW (2020) *Wales Bathing Water Report 2020*. Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/water-reports/wales-bathing-water-quality-report-2020/?lang=en [Accessed July 2021].

was 99.94 per cent, which is marginally lower than the average level for England and Wales (99.96 per cent)[86].

Nitrate Vulnerable Zones

3.4.27 Nitrate Vulnerable Zones (NVZs) are areas of land that drain into surface or ground water where nitrate levels are already high (greater than 50mg/l as NO_3), or may have high levels of nitrate in the future. It is important to manage nitrate concentrations in coastal waters, estuaries, rivers, lakes and groundwater as high nitrate concentrations can contaminate drinking water sources and can contribute to an overall deterioration in water quality leading to eutrophication.

3.4.28 Currently, NVZs account for some 2.4 per cent of land area in Wales. The Welsh Government consulted on NVZ's and Action Programme requirements from September to December 2016, seeking views on the current measures for reducing pollution caused by nitrates from agricultural sources. On 27th January 2021, the Welsh Government announced *The Water Resources Control of Agricultural Pollution Regulations 2021* covering the whole of Wales to protect water quality from agricultural pollution[87]. The Regulations introduce a NVZ across the whole of Wales and came into force on 1st April 2021 with transitional periods for some elements to allow farmers time to adapt and ensure compliance[88].

Flood risk

3.4.29 Flood risk in Wales is a significant issue with many urban settlements built alongside rivers and streams and on river and coastal floodplains. The areas at risk to flooding in the Welsh Water operational area are shown in **Figure 3.17**. The loss of natural coastal flood defences through coastal erosion, habitat loss and development pressure is also a key challenge. Climate change is likely to increase the frequency of extreme weather events resulting in more frequent and severe flooding. Coupled with rising sea levels, this is likely to affect Wales' natural resources, economy and communities.

3.4.30 The second National Strategy for Flood and Coastal Erosion Risk Management in Wales[89] was published by the Welsh Government in 2020. The National Strategy provides the framework for flood and coastal erosion risk management in Wales. Since the last National Strategy in 2011, over £600 million has been invested across Wales, reducing flood risk to communities.

3.4.31 Within the National Strategy, Flood Risk Management Plans (FRMPs) were prepared by NRW and the Environment Agency setting out what measures will be taken to help manage the risk of flooding to people, the environment and economic activity at a River Basin District level. The published FRMPs provide a comprehensive overview of flood risk to people, economic activity and the natural and historic environment for the period December 2015 to December 2021. The 2015 FRMPs are due to be reviewed and updated by the end of 2021.

3.4.32 Local Floor risk Management strategies (LFRMS) are also produced and are maintained by local authorities in their role as Lead local Flood Authorities (LLFA). The flood risk regulations 2009 followed by the flood and water management act 2010 gave additional responsibilities which include the preparation of these strategies. Policy guidance associated with flood risk and

[86] DiscoverWater.co.uk (2019) *Water quality results for all water companies*. Available online: https://www.discoverwater.co.uk/quality [Accessed July 2021]
[87]Welsh Government (2021) *Cabinet Statement: Written Statement: Control of Agricultural Pollution Regulations*. Available online: https://gov.wales/written-statement-control-agricultural-pollution-regulations. [Accessed July 2021]
[88] Legislation.gov.uk (2021) *The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021.* Available online: https://www.legislation.gov.uk/wsi/2021/77/contents/made [Accessed July 2021]
[89] Welsh Government (2020) *National Strategy for Flood and Coastal Erosion Risk Management in Wales.* Available online: https://gov.wales/sites/default/files/publications/2021-03/the-national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf [Accessed July 2021]

development is contained within Planning Policy Wales (PPW) and Technical Advice Note 13 (TAN15) Development and flood risk.

3.4.33 **Table 3.5** provides a summary of flood risk to people from rivers and the sea based on the information contained in the published FRMPs for the Western Wales[90], Severn River[91] and Dee River[92] River Basin Districts. Local Flood Risk Maps for Wales are available online from NRW[93], which incorporates the Welsh Government's Development Advice Map, in addition to separate local flood mapping for England[94].

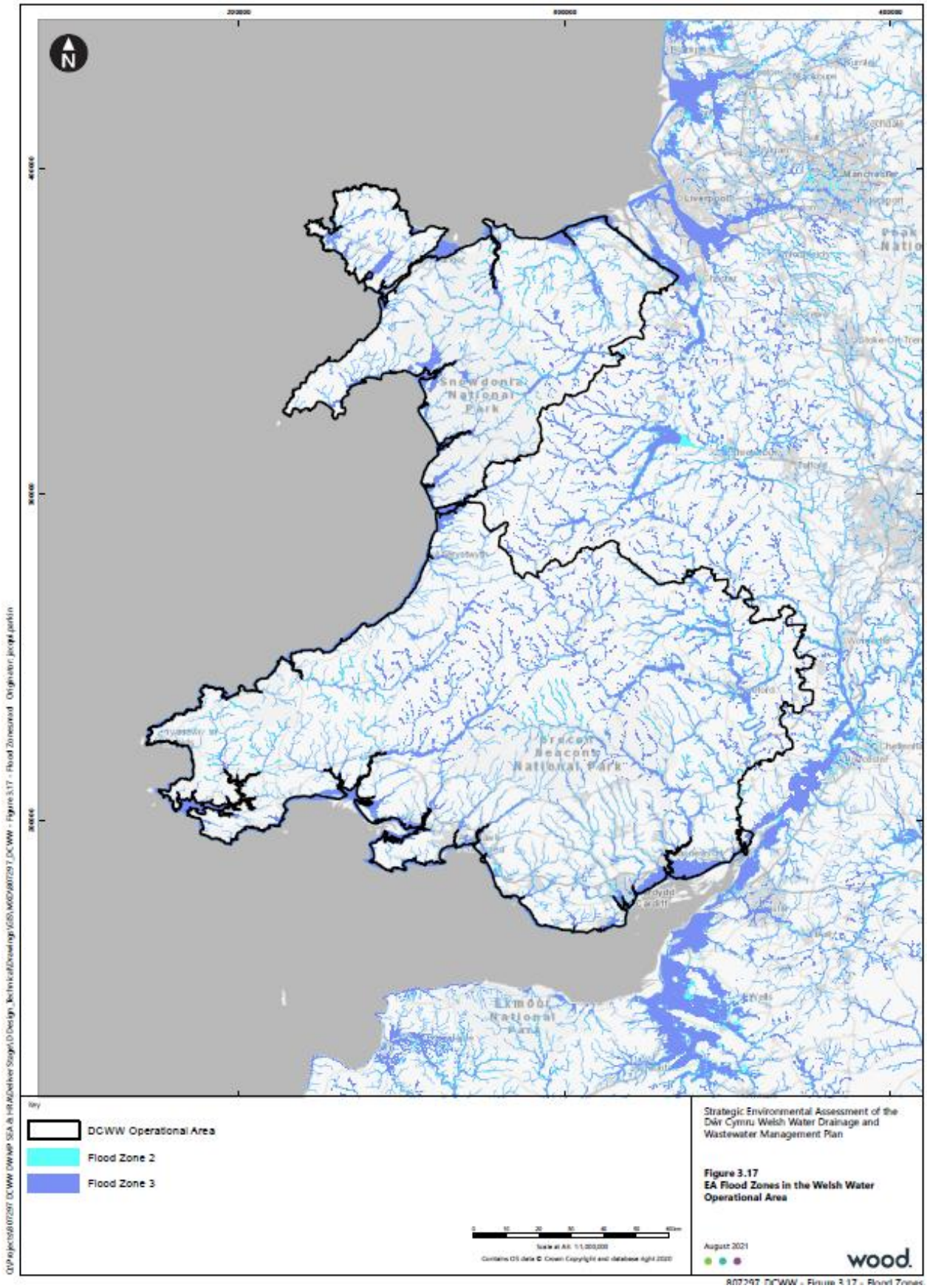
Table 3.5 People at risk from flooding from rivers and the sea in Wales

River Basin District	High Risk	Medium Risk	Low Risk	Very Low Risk
Western Wales	16,857	24,095	105,719	1,170
Severn	32,600	62,100	240,650	33,050
Dee	3,300	2,500	20,500	150
Total	52,757	88,695	366,869	34,370

Data from the FRMPs for each River Basin Districts (2016)

[90] NRW (2016) *Western Wales Flood Risk Management Plan*. Available online: https://naturalresources.wales/media/675146/final_frmp_-western-wales_pk26b82.pdf [Accessed July 2021]
[91] NRW and Environment Agency (2016). *Severn River Basin District Flood Risk Management Plan 2015-2021. Part A – Background and River basin District wide information*. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507832/LIT_10213_SEVERN_FRMP_PART_A.pdf [Accessed July 2021]
[92] NRW and Environment Agency (2016) *Dee River Basin District Flood Risk Management Plan 2015-2021*. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507153/LIT_10199_DEE_FRMP.pdf [Accessed July 2021
[93] NRW (2018) *Long term flood risk.* Available online: https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en [Accessed July 2021]
[94] GOV.UK (2018) *Learn more about flood risk*. Available online: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map [Accessed July 2021]

Figure 3.17 EA Flood Zones in the Welsh Water Operational Area



Likely Evolution of the Baseline without the DWMP

3.4.34 Wales records some of the highest rainfall levels in the UK and relies on this rainfall which is collected in the rivers, lakes and reservoirs as sources of water to dilute and disperse treated effluent from our Wastewater Treatment works. Wales records some of the highest rainfall levels in the UK and relies on this rainfall which is collected in the rivers, lakes and reservoirs as sources of water supply. However, in significant parts of Wales, there are no further reliable supplies of water available for new abstractions.

3.4.35 Whilst population increase estimates are lower for Wales than for many other parts of the UK, growth will place further pressure on water sources. Climate change is also expected to have significant effects on river flows in Wales, with most major watercourses predicted to see a 50-80 per cent decrease in summer flows. These predictions are generally more pronounced than in England, primarily due to the lack of groundwater storage capacity in Wales.

3.4.36 Under the Water Framework Directive, rivers in England and Wales 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. The second RBMPs cycle, 2015 – 2021 recognised the large degree of uncertainty about achieving such significant increases to achieve good status or better by 2021. NRW will reassess improvements and deterioration from the 2015 baseline in the third cycle RBMPs against the most recent classification data.

3.4.37 In 2015, 28 per cent and 40 per cent of water bodies in the Dee River Basin District and Western Wales River Basin District respectively achieved good or better overall status. NRW predicted that this would rise to 35 per cent in the Dee and 44 per cent in Western Wales districts by 2021. The most recent classification results (2018) indicate that 39 per cent in the Dee River Basin District and 43 per cent in Western Wales River Basin District of water bodies achieved good or better overall status. However, there are also 3 and 5 more water bodies at poor overall status than in 2015 in the Dee and Western Wales districts respectively[95].

3.4.38 Reducing the risk of flooding is a key challenge in the future. Increased soil sealing and compaction from farming practices and urban development resulting in loss of water storage capacity and more surface water run-off will increase flood risk. The loss of natural coastal flood defences is also considered to be an important issue. Climate change is likely to exacerbate coastal erosion and flooding as a result of sea level rise and increased intensity, severity and frequency of storms over the next 100 years. The most recent information for Wales from the UK Climate Impacts Programme (UKCP18) forecasts that by the 2070s, there will be an increase in winter precipitation of up to 19 per cent (under a low emission scenario) and 29 per cent (under a high emission scenario) whilst sea levels are forecast to increase by 27 to 69cm (low emission scenario) and 51 to 113cm (high emission scenario) compared to 1981-2000 levels.[96]

3.4.39 As the frequency and severity of extreme weather events increases as a result of climate change, it is likely that the frequency that some CSOs will have to be operated will also increase, as the sewerage system is not designed to deal with such events. However the receiving water's during these events will also be higher and predicted to be able to dilute and disperse efficiently as they do now.

[95] NRW (2020) *Consultation on updating the Western Wales River Basin Management Plan for the third cycle (2021-2027).* Available online: https://ymgynghori.cyfoethnaturiol.cymru/evidence-policy-and-permitting-tystiolaeth-polisi-a-thrwyddedu/western-wales-rbmp/user_uploads/draft-western-wales-urbmp-consultation-2020-1.pdf [Accessed July 2021] and NRW (2020) *Consultation on updating the Dee River Basin Management Plan for the third cycle (2021-2027).* Available online: https://ymgynghori.cyfoethnaturiol.cymru/evidence-policy-and-permitting-tystiolaeth-polisi-a-thrwyddedu/dee-river-rbmp/user_uploads/draft-dee-urbmp-consultation-2020.pdf [Accessed July 2021]

[96] Met Office (2018) *UK Climate Projections Headline findings*. Available at https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index [Accessed July 2021].

3.4.40 The resultant impact on the sewer network with the return to sewer volume being affected leading to an increased need to manage wastewater in more innovative methods such as reducing demand for water but for a wastewater perspective and returning to a more natural based approach to drainage.

Key Issues Relevant to the DWMP

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

- the need to maintain and improve water quality;
- the need to maintain seasonal flows in groundwater and surface water;
- the need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively;
- the potential effects of climate change and the need to build climate change resilience into the water environment and water management; and
- the need to prevent the deterioration of Water Framework Directive waterbodies, achieve protected area objectives and achieve water body status objectives.

3.5 Air Quality

Baseline Characteristics

3.5.1 Good air quality is essential to ensure people and ecosystems are healthy, productive and balanced. 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). Air quality within this context concerns the levels of pollutants emitted into the air and their significance, in terms of the risk of adverse effects on the environment and/or human health.

3.5.2 Emissions of gases into the air from transport, industry and agriculture can be transported significant distances by prevailing weather patterns and, via precipitation and deposition, eventually cause diffuse water pollution, the effects of which may be very long term. Pollutants may persist in groundwaters or sediments for decades or centuries and nutrient-enriched lakes and acidified waters may take many years to recover. All sectors will be required to make cuts in air emissions to meet the targets of the National Emissions Ceilings Directive and the Water Framework Directive.

3.5.3 The UK Government and Devolved Administrations are required to produce a national ambient air quality strategy, outlining objectives and standards for improving air quality. Local authorities must regularly assess air quality in their area against the standards and objectives of the National Air Quality Strategy[97]. Air Quality Management Areas (AQMAs) are declared by local authorities in specific locations where atmospheric concentrations of one or more pollutants (including pollutants such as nitrogen dioxide (NO_2), sulphur dioxide (SO_2) volatile organic compounds (VOCs) and fine particles (known as 'particulates') are either close to or exceeding statutory objectives set out within the National Air Quality Strategy.

[97] Defra (2007) *Air Quality Strategy for England, Scotland, Wales and Northern Ireland*. Available online at: www.defra.gov.uk/publications/2011/03/28/air-quality-strategy-vol2-pb12670/ [Accessed July 2021]

3.5.4 As of 2021, there are 44 AQMAs in Wales[98]. **Table 3.6** outlines the AQMAs in Wales by source and all but one AQMA is in place around roads. As shown in **Table 3.7**, Rhondda-Cynon-Taff Council has the most active AQMAs in place (16) of all local authorities in Wales, all for nitrogen dioxide and with half having been in place for more than seven years.

Table 3.6 Number of AQMAs in Wales by source

Source	Number of current AQMAs
County or Unitary Authority Road	20
Road transport unspecified	15
Mixture of road types	7
Highways Agency Road	1
Industrial Source	1

Source: Defra (2021) Summary AQMA data.[99]

Table 3.7 Number of AQMAs per local authority

Local Authority	Number of Active AQMA	Pollutant AQMA in place for
Bridgend County Borough Council	1	Nitrogen dioxide NO_2
Caerphilly County Borough Council	2	Nitrogen dioxide NO_2
Cardiff County Council	4	Nitrogen dioxide NO_2
Carmarthenshire County Council	3	Nitrogen dioxide NO_2
City and County of Swansea	1	Nitrogen dioxide NO_2
Merthyr Tydfil County Borough Council	1	Nitrogen dioxide NO2
Monmouthshire Council	2	Nitrogen dioxide NO_2
Neath Port Talbot County Borough Council	1	Particulate Matter PM_{10}
Newport City Council	11	Nitrogen dioxide NO_2
Pembrokeshire Council	2	Nitrogen dioxide NO_2
Rhondda-Cynon-Taff Council	16	Nitrogen dioxide NO_2
Total	44	

Source: Defra (2021) Summary AQMA data.[100]

3.5.5 Levels of individual pollutants are measured at National Automated Monitoring Network sites across Wales with concentrations of the pollutants analysed to determine the number of days at each site on which the pollution is moderate or higher i.e., when concentrations for at least one of

[98] Defra (2021) Summary AQMA data. Available online at: https://uk-air.defra.gov.uk/aqma/summary [Accessed July 2021]
[99] Available online at: https://uk-air.defra.gov.uk/aqma/summary [Accessed July 2021]
[100] Ibid.

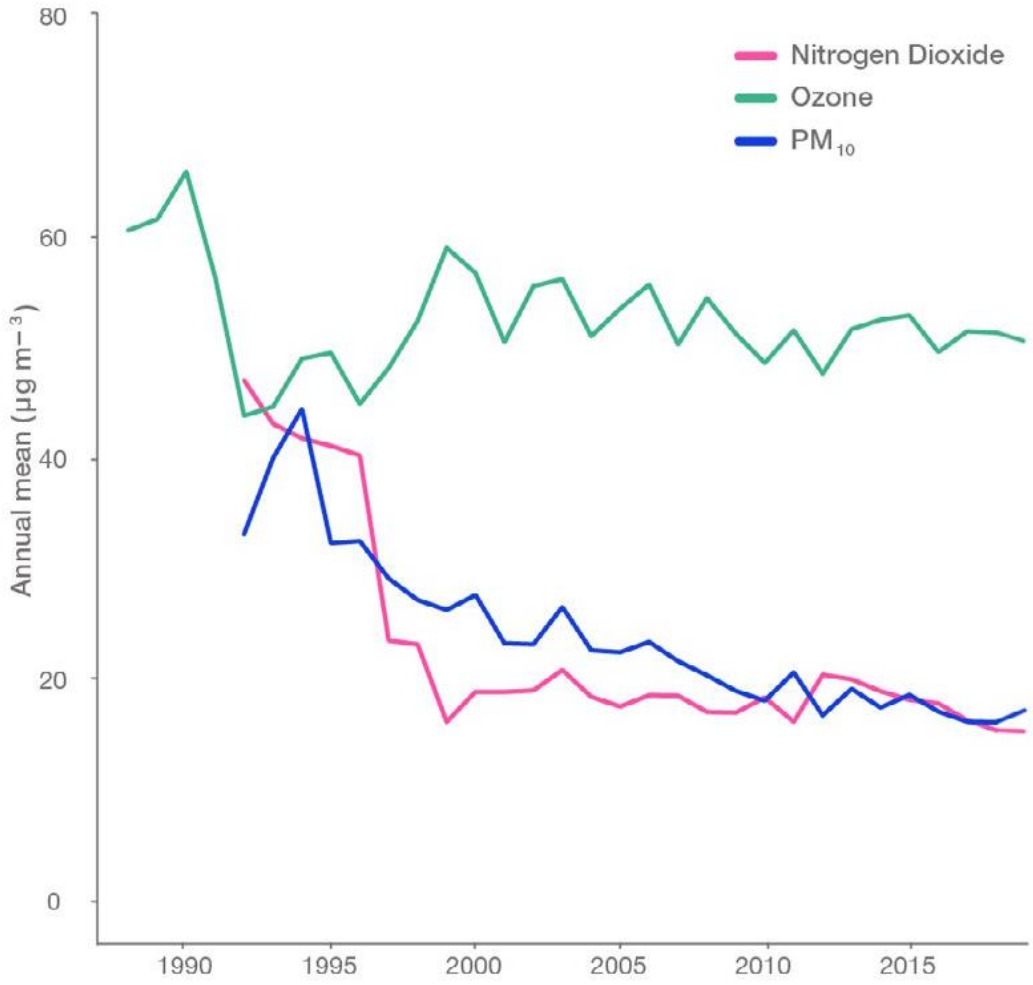
the pollutants exceeds the National Air Quality Standards (AQS). In 2019, the overall pollution levels for Wales were very high for 3 days, high for 11 days, moderate for 89 days and low for 262 days.[101]

3.5.6 As shown in **Figure 3.18**, the longer term trend is a reduction in nitrogen dioxide and particulate matter up to 10µm in size (PM_{10}) in Wales. This trend shows a steady improvement in air quality in Wales confirming that the local measures being put in place for in nitrogen dioxide and PM_{10} are having the desired result, all be it on a national scale. The Welsh Government Air Quality Report 2019[102] notes that ozone is a regional pollutant, transboundary in nature, making it more difficult to manage.

3.5.7 Urban air quality in Wales is generally worse than in rural areas. The main causes of pollution at urban sites are fine particles (PM_{10}) and ozone (O_3) whilst the main cause of pollution in rural areas is the variation in ozone levels, which is affected by the weather. The Welsh Government Air Quality Report identifies that no monitoring sites in Wales showed exceedance of Air Quality Strategy (AQS) Objectives for $PM10_{10,}$ carbon monoxide, sulphur dioxide, benzene or lead in 2019. Three monitoring sites (Rhondda Mountain Ash, Caerphilly Hafodyrynys, Newport M4 Junction 25) exceeded the annual mean objective of 40µg m^{-3} for nitrogen dioxide. Three sites (Aston Hill, Cwmbran and Swansea St. Thomas) exceeded the AQS objective for ozone on more than the permitted 10 occasions.

[101] Welsh Government (2019) *Air Pollution in Wales 2019*. Available online: https://airquality.gov.wales/sites/default/files/documents/2020-10/AQ-Wales-2019_English_Final.pdf [Accessed July 2021].
[102] Ibid.

Figure 3.18 Ambient Pollutant Trends in Wales 1990 – 2019



Source: Welsh Government (2019) Air Pollution in Wales[103]

3.5.8 Poor air quality is a significant public health issue. The Committee on the Medical Effects of Air Pollutants (COMEAP) estimated that the burden of long-term exposure air pollution (based on associations with PM2.5 and NO2)in the UK in 2013 was equivalent to 28,000 to 36,000 deaths at typical ages, associated with a loss of 328,000 – 416,000 life years.[104] Public Health Wales estimates that in Wales, the burden of long-term air pollution exposure is the equivalent of 1,000 to 1,400 deaths (at typical ages) each year (based on 2017 data).[105] It has been estimated that removing all fine particulate air pollution would have a bigger impact on life expectancy in England and Wales than eliminating passive smoking or road traffic accidents. The economic cost from the impacts of

[103] Available via: https://airquality.gov.wales/sites/default/files/documents/2020-10/AQ-Wales-2019_English_Final.pdf [Accessed July 2021]
[104] Committee on the Medical Effects of Air Pollutants (COMEAP) (2018) *Associations of long-term average concentrations of nitrogen dioxide with mortality* Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf [Accessed August 2021]
[105] Public Health Wales (2020) *Air pollution and health in Wales.* Available online at: https://phw.nhs.wales/services-and-teams/environmental-public-health/air-quality/air-pollution-and-health-fact-sheet/ [Accessed August 2021]

air pollution in the UK is estimated at £9-19 billion every year; this is comparable to the economic cost of obesity (over £10 billion) [106].

3.5.9 Some of the most widespread and significant effects on ecosystems are damage from air pollution such as exposure to ozone and acidification. For example, emissions to air of sulphur and nitrogen containing pollutants from heavy industry, power generation and transport have caused acidification of freshwaters across Wales. A 2015 NRW Water Framework Directive assessment estimated that 21 per cent of Welsh rivers and 36 per cent of Welsh lake water bodies were at risk of acidification.[107]

Likely Evolution of the Baseline without the DWMP

3.5.10 The majority of air pollutants have declined in Wales in recent decades; however, concentrations of ammonia and ozone are trending upwards[108]. In Wales (and the rest of the UK), nitrogen dioxide is the pollutant that most widely exceeds the AQS Objective. PM_{10} concentrations have generally decreased in recent years, at both urban background and urban traffic sites. Ozone concentrations, meanwhile, have tended to be highest at rural locations, although there are no clear trends as concentrations vary considerably from year to year because of variation in meteorological factors[109].

3.5.11 The Welsh Government supplemental plan to the UK plan for tackling roadside nitrogen dioxide concentrations (2017) set out actions the Welsh Government will take to reduce concentrations of nitrogen dioxide around roads where levels are above legal limits in Wales. These managed roads include:

- A494 at Deeside; (North Wales Zone);
- A483 near Wrexham; (North Wales Zone);
- M4 between junctions 41 and 42 (Port Talbot);(Swansea and South Wales Zone);
- M4 between junctions 25 and 26 (Newport); (South Wales Zone); and
- A470 between Upper Boat and Pontypridd. (South Wales Zone).

3.5.12 Implementation of measures such as enforcing a 50 miles per hour speed limit is predicted to reduce nitrogen dioxide emissions by up to 18%. Data for 2019 shows that the annual nitrogen dioxide concentrations have reduced at the five sites with the A494 at Deeside dropping below the 40µg/m^3 regulatory limit and A483 close to that[110].

[106] Defra (2015) Appendix 5: international, European and national standards for air quality in 2010 to 2015 Government policy: Environmental quality. Policy Paper. Available at: https://www.gov.uk/government/publications/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality [Accessed July 2021].
[107] NRW (2015) *A Snapshot of the State of Wales' Natural Resources – June 2015.* Available at http://naturalresources.wales/media/4797/snapshot-report.pdf [Accessed July 2021].
[108] NRW (2021) *State of Natural Resources Report (SoNaRR): Assessment of the achievement of sustainable management of natural resources. Air Quality*. Available online: https://cdn.cyfoethnaturiol.cymru/media/693285/sonarr2020-theme-air-quality.pdf [Accessed July 2021]
[109] Welsh Government (2019) *Air Pollution in Wales 2019*. Available online at: https://airquality.gov.wales/sites/default/files/documents/2020-10/AQ-Wales-2019_English_Final.pdf [Accessed March 2021].
[110] Welsh Government (2020) *Tackling roadside nitrogen dioxide concentrations in Wales. Annual Data.* Available online: https://gov.wales/sites/default/files/publications/2020-03/annual-data-on-no2-concentrations-for-the-motorway-and-trunk-road-2018-to-2019.pdf [Accessed July 2021]

3.5.13 Following the publication of Defra's 2019 Clean Air Strategy[111], the Welsh Government published The Clean Air Plan for Wales in 2020[112]. The Clean Air Plan for Wales seeks to improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and economy. The Plan includes a series of actions including:

- Development of evidence-based and effective air quality targets.
- Introduction of Local Air Quality Management (LAQM) policy changes by 2023 to ensure the regime is public health focused and proactively finding and tackling areas of pollution.
- Designation of Clean Air Zones/Low Emission Zones.

Key Issues Relevant to the DWMP

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

- the need to minimise emissions of pollutant gases and particulates and enhance air quality

3.6 Climatic Factors

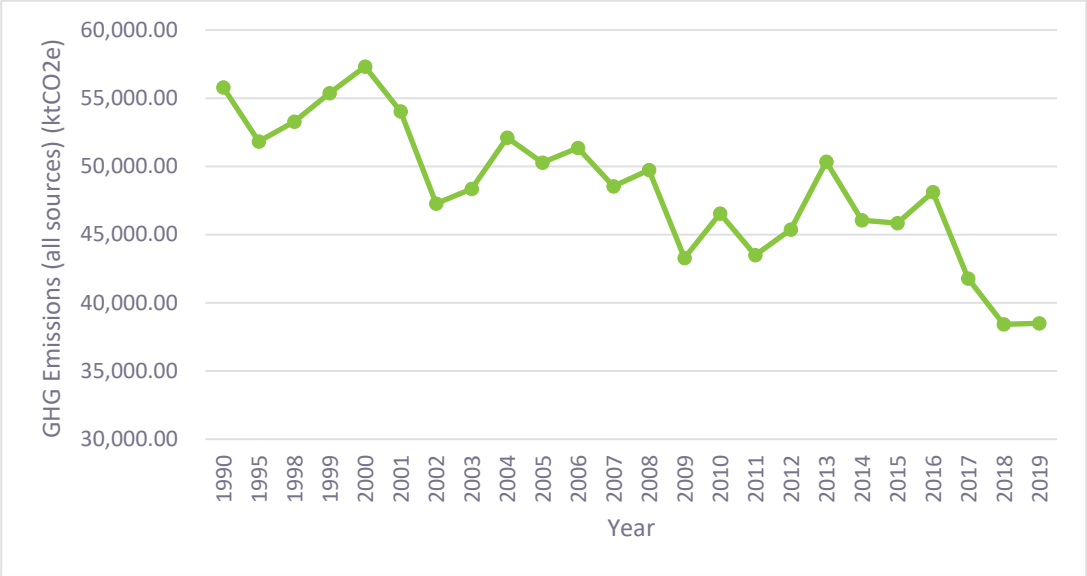
Baseline Characteristics

3.6.1 Greenhouse gas (GHG) emissions including carbon dioxide (CO_2) emitted from human actions are a major contributor to climate change. The Climate Change Act 2008 (as amended) commits the UK to bring all GHG emissions to net zero by 2050. The Environment (Wales) Act 2016 (as amended), meanwhile, places a duty on the Welsh Ministers to reduce GHG emissions in Wales by at least 100 per cent in 2050[113]. The target of net zero emissions (rather than 80% as originally stated in the Climate Change Act) reflected the and Welsh Government's acceptance of the independent Climate Change Committee's (CCC) recommendation[114] that Wales could achieve a net zero reduction in emissions.

3.6.2 Total GHG emissions in 2019 in Wales were 38,488 $ktCO_2e$[115]. Between 1990 and 2019 annual GHG emissions in Wales have reduced by 31%, although there have been fluctuations in annual emission reduction, as shown in Error! Reference source not found.**19**.

[111] Defra (2019) *Clean Air Strategy 2019*. Available online: https://www.gov.uk/government/publications/clean-air-strategy-2019 [Accessed July 2021].
[112] Welsh Government (2020) *The Clean Air Plan for Wales: Healthy Air, Healthy Wales*. Available online: https://gov.wales/clean-air-plan-wales-healthy-air-healthy-wales [Accessed July 2021]
[113] The Environment (Wales) Act 2016 (Amendment of 2050 Emissions Target) Regulations 2021 which change the statutory target within the Environment Act from 80% to 100% came into force on 19 March 2021.
[114] Climate Change Committee's (2020) The path to Net Zero and progress on reducing emissions in Wales. Available via: https://www.theccc.org.uk/publication/the-path-to-net-zero-and-progress-reducing-emissions-in-wales/
[115] National Atmospheric Emissions Inventory (2021), Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2019, [online], available at: https://naei.beis.gov.uk/reports/reports?report_id=1019[Accessed July 2021]

Figure 3.19 GHG Emissions from 1990 to 2019



Source: BEIS National Atmospheric Emissions Inventory (2021)

3.6.3 The amount of CO_2 emitted in Wales between 2014 and 2018 is shown in **Table 3.8** which highlights that emissions have reduced since 2014 from 28.5 million tonnes (Mt) CO_2 to 23.8 Mt CO_2 in 2019, principally because of declines in emissions from the industry and commercial and domestic sectors. Industry and commercial remained the largest source of CO_2 emissions in the region. Transport emissions have increased. Overall, since 2005, emissions in Wales have dropped by 28.6 per cent (which is slightly less than the UK average of 35.8 per cent).[116]

3.6.4 On a per capita basis, Wales emitted 7.6 tonnes (t) CO_2 per person in 2019. Across the UK as a whole, this averaged at 5.2 with figures ranging from 3.2 tCO_2 per person in London to 7.6 tCO_2 per person in Wales, which is the highest level of any region/country in the UK. This reflects the significant industrial base in Wales which resulted in a high contribution from industrial and commercial emissions.

Table 3.8 End User Estimates of Carbon Emissions (kt CO2), Wales 2014-2019

End User	2014	2015	2016	2017	2018	2019
Industry	13,691.3	12,644.0	11,482.4	11,621.9	10,799.1	11,042.7
Commercial	2,277.2	1,961.8	1,639.7	1,560.3	1,511.9	1,382.0
Public Sector	953.7	901.3	826.1	705.5	699.1	622.7
Domestic	5,721.5	5,489.3	5,229.5	4,942.7	4,946.7	4,839.5
Transport	6,098.7	6,254.5	6,426.6	6,403.0	6,396.3	6,256.3
LULUCF	-233.2	-246.0	-267.1	-291.5	-288.7	-335.4

[116] Department for Business, Energy & Industrial Strategy (BEIS) (2021) *UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019* Available online: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019 [Accessed July 2021]

Total	**28,509.4**	**27,004.8**	**25,337.2**	**24,942.0**	**24,064.5**	**23,807.8**
Per Capita Emissions (t)	*9.2*	*8.7*	*8.1*	*8.0*	*7.7*	*7.6*

Source: Department for Business, Energy & Industrial Strategy (2021)[117]

3.6.5 Increasing the amount of renewable energy generation is one response to the need to reduce CO_2 emissions, and Wales has shown a steady year-on-year increase in renewable electricity generation from 2003 to 2019. The most recent data from the Department for Business, Energy & Industrial Strategy (BEIS) shows that in 2019, Wales generated 7,631.4 GWh electricity from renewable sources, an increase of 328 per cent compared to 2010[118]. In 2019, Wales had a total renewable energy installed capacity of 3,515.5 MWe, equivalent to 7.5 per cent of the UK total (47,162.8 MWe).[119]

Likely Evolution of the Baseline without the DWMP

3.6.6 UKCP18 provides the following predictions on changes in climate in Wales for the period 2060 to 2079 (based on a high emissions scenario for a location in central Wales):

- winter temperature: a change in temperature of between 0.7 and 4.1ºC;
- summer temperature: a change in temperature of between 0.9 and 5.9ºC;
- winter precipitation: an increase of up to 29 per cent; and
- summer precipitation: 38 per cent drier to 3 per cent wetter.

3.6.7 Sea levels are also forecast to rise, with relative sea levels in Cardiff forecast to increase by up to 113 cm (by 2100, compared to the 1981 to 2000 period)[120]. The changes in climate are expected to result in an increase in the number of flash flooding events, increased pressure on the capacity of the sewerage system, increased frequency of summer water shortages and low flows in rivers which will result in the loss of habitats and species[121]. These risks are addressed in Welsh Government's *Prosperity for All: A Climate Conscious Wales* (2019)[122] which sets out how Wales will adapt to climate change from 2020–2025.

3.6.8 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;
- increased summer water shortages as summer rainfall decreases;

[117] Ibid
[118] BEIS (2020) *Regional Statistics 2003-2019: Generation.* Available online: https://www.gov.uk/government/statistics/regional-renewable-statistics [Accessed July 2021].
[119] BEIS (2020) Installed capacity of sites generating electricity from renewable sources, 2019. Available online: https://www.gov.uk/government/statistics/regional-renewable-statistics [Accessed July 2021].
[120] 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 July 2021].
[121] Welsh Government (2010) *Climate Change Strategy for Wales*. Available online: http://gov.wales/docs/desh/publications/101006ccstratfinalen.pdf [Accessed July 2021]
[122] Available via: https://gov.wales/sites/default/files/publications/2019-11/prosperity-for-all-a-climate-conscious-wales_0.pdf [Accessed July 2021]

- 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).

3.6.9 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;
- 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.

3.6.10 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 scenario[123]. Climate change is also identified as one of the potential key drivers associated with a significant and growing risk of severe drought.

3.6.11 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 GHG emissions development.

3.6.12 The UK Government 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. For Wales, the carbon budgets have been set for 37 per cent lower than the baseline over 2021-25 and an average of 58% lower than the baseline for 2026-30. For the UK, the Climate Change Committee has recommended that the sixth carbon budget[124] has a 78 per cent reduction in emissions between 1990 and 2030.

3.6.13 There is a degree of conflict between increasing the level of treatment of waste water required to meet stricter environmental quality standards and the energy use and associated emissions that result from the improved treatment processes.

3.6.14 Welsh Water has reduced its carbon emissions by 79 per cent since 2010. In 2019–20, Welsh Water's carbon footprint stood at 60.2 $ktCO_2e$, a slight reduction from 60.7 $ktCO_2e$ in 2018/19 and 62.9 $ktCO_2e$ in 2017/18[125]. This reflects Welsh Water's investment in energy efficiency and renewable generation and reduced grid imports.

[123] UK Climate Change Risk Assessment 2017 Evidence Report. Available online: https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/ [Accessed July 2021]
[124] Climate Change Committee (2020) *The Sixth Carbon Budget: The UK's path to Net Zero*. Available online https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf [Accessed July 2021]
[125] Welsh Water (2020) *Glas Cymru Report & Accounts 2019-2020*. Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed July 2021]

Key Issues Relevant to the DWMP

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

- the need to reduce travel and promote sustainable modes of transport;
- the need to reduce GHG 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.

3.7 Population and Human Health

Baseline Characteristics – Population

Demographics

3.7.1 The population of Wales at the time of the 2011 Census was 3,063,800 people. The 2020 mid-year population estimate indicates the population of Wales to be 3,170,000, an increase of 106,200 people from 2011[126]. The 2020 mid-year population estimates also indicate that population density in Wales had increased from 147.7 people per square kilometre in 2011 to 152.9 people per square kilometre in 2020[127]. There were 1,303,826 households in Wales in 2011, increasing to 1,368,708 in 2019[128], a 4.97 per cent increase.

3.7.2 Welsh Water provides water supply and sewerage services to approximately 3 million people in total with the majority within Wales. The change in Wales' population between 2001-2011 and 2011-2020 is shown in **Table 3.9**. The table includes all counties in Welsh Water's area, in both Wales[129] and England[130].

[126] ONS (2021) *Wales population mid-year estimate 2020*. Available online: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/timeseries/wapop/pop [Accessed July 2021]
[127] Stats Wales (2021) *Population density (persons per square kilometre) by local authority and year*. Available online: https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Density/populationdensity-by-localauthority-year [Accessed July 2021]
[128] Stats Wales (2020) *Households by Type and Year*. Available online: https://statswales.gov.wales/Catalogue/Housing/Households/Estimates/households-by-type-year [Accessed July 2021]
[129] Stats Wales (2021) *Components of population change, by local authority and component*. Available online: https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Components-of-Change/componentsofpopulationchange-by-localauthority-component [Accessed July 2021]
[130] ONS (2021) *All people population, County of Herefordshire, Cheshire West and Chester and Shropshire*. Available online: https://www.nomisweb.co.uk/reports/lmp/la/1946157169/subreports/pop_time_series/report.aspx Labour Market Profile - Nomis - Official Labour Market Statistics (nomisweb.co.uk) https://www.nomisweb.co.uk/reports/lmp/la/1946157170/subreports/pop_time_series/report.aspx? [Accessed September 2021]

Table 3.9 Population of Welsh Waters Area by County

County	2001 Population	2011 Population	Population change between 2001 and 2011 (%)	2020 Mid-year estimate Population	Population change between 2011 and 2020(%)
Isle of Anglesey	67,898	69,833	2.8	70,440	0.87
Gwynedd	116,699	121,155	3.8	125,171	3.31
Conwy	108,651	114,682	5.6	118,184	3.05
Denbighshire	92,525	94,152	1.8	96,664	2.67
Flintshire	147,930	152,080	2.8	156,847	3.13
Wrexham	127,653	134,009	5.0	136,055	1.53
Powys	126,134	132,878	5.3	133,030	0.11
Ceredigion	74,942	75,217	0.4	72,895	-3.09
Pembrokeshire	112,538	121,974	8.4	126,751	3.92
Carmarthenshire	172,874	183,004	5.9	190,073	3.86
Swansea	224,475	237,311	5.7	246,563	3.90
Neath Port Talbot	134,834	139,638	3.6	144,386	3.40
Bridgend	128,224	138,471	8.0	147,539	6.55
Vale of Glamorgan	119,276	126,435	6.0	135,295	7.01
Cardiff	311,443	341,402	9.6	369,202	8.14
Rhondda Cynon Taf	232,370	234,459	0.9	241,873	3.16
Merthyr Tydfil	56,218	58,493	4.0	60,424	3.30
Caerphilly	169,045	178,101	5.4	181,731	2.04

County	2001 Population	2011 Population	Population change between 2001 and 2011 (%)	2020 Mid-year estimate Population	Population change between 2011 and 2020(%)
Blaenau Gwent	70,537	69,798	-1.0	70,020	0.32
Torfaen	91,214	91,060	-0.2	94,832	4.14
Monmouthshire	84,458	91,016	7.8	95,164	4.56
Newport	136,932	144,803	5.7	156,447	8.04
WALES	2,906,870	3,049,971	4.9	3,169,586	3.92
Herefordshire	174,900	183,600	5.0	193,600	5.45
Cheshire West and Chester	322,200	329,500	2.3	343,800	4.34
Shropshire	283,300	307,100	8.4	325,400	5.96

3.7.3 **Table 3.10** provides information in relation to changes in population density between 2011 and 2020. Overall, densities have increased although there are two instances, Ceredigion where density decreased, and Powys where density stayed the same.

Table 3.10 Population Density per square Kilometre of land area by Welsh Authorities

	Population Density Mid-year 2011	Population Density Mid-year 2020	Change 2011-2020	% Change 2011-2020
Wales	147.7	152.9	5.2	3.52
Isle of Anglesey	98.2	98.9	0.7	0.71
Gwynedd	47.9	49.4	1.5	3.13
Conwy	102.4	105	2.6	2.54
Denbighshire	112.2	115.5	3.3	2.94
Flintshire	347.1	356.6	9.5	2.74
Wrexham	268.1	270.1	2	0.75
Powys	25.7	25.7	0	0.00

	Population Density Mid-year 2011	Population Density Mid-year 2020	Change 2011-2020	% Change 2011-2020
Ceredigion	42.2	40.8	-1.4	-3.32
Pembrokeshire	75.8	78.3	2.5	3.30
Carmarthenshire	77.6	80.2	2.6	3.35
Swansea	632.1	652.9	20.8	3.29
Neath Port Talbot	317	327.2	10.2	3.22
Bridgend	555.9	588.3	32.4	5.83
Vale of Glamorgan	382.5	408.6	26.1	6.82
Cardiff	2,451.40	2,620.00	168.6	6.88
Rhondda Cynon Taf	552.6	570.3	17.7	3.20
Merthyr Tydfil	528.1	542.2	14.1	2.67
Caerphilly	644.5	655.2	10.7	1.66
Blaenau Gwent	642.1	644	1.9	0.30
Torfaen	725.5	754.4	28.9	3.98
Monmouthshire	107.8	112.1	4.3	3.99
Newport	765.6	821.5	55.9	7.30

Source: StatsWales[131]

Economy and employment

3.7.4 Employment rates (seasonally adjusted) between February 2021 and April 2021 show that Wales had a slightly lower percentage of economically active people in employment (73.9 per cent) than the rest of the UK (75.2 per cent)[132]. Economically active in this context is defined by the ONS as those persons of working age who are employed or looking to be employed. This reflects historic trends where Wales has generally had a slightly lower percentage of people employed than the UK as a whole.

3.7.5 Unemployment rates amongst the economically active population have declined in Wales and the UK since 2012 but increased in the second half of 2020, however, decreased again in the first half of 2021. In between February 2021 and April 2021, Wales had a 4.3 per cent unemployment rate compared to the UK figure of 4.7 per cent[133]. The decline in the percentage in employment, and

[131] Stats Wales (2021) *Population Density (persons per square kilometre) by local authority and year.* Available online: https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Density/populationdensity-by-localauthority-year [Accessed July 2021]
[132] Nomisweb (2021) *Labour Market Profile*. Available online: https://www.nomisweb.co.uk/reports/lmp/gor/2013265930/report.aspx?town=Wales [Accessed July 2021]
[133] Ibid.

increase in rates of unemployment for both Wales and UK in the second half of 2020, largely reflects the impacts of the COVID-19 pandemic.

3.7.6 The breakdown of the workforce by industry sector as at March 2021 is shown in **Table 3.11**. The largest proportion of jobs in Wales are in human health and social work activities, and wholesale and retail trade; repair of vehicles, similar to UK trends. A total of 10,000 jobs (0.7 per cent) in Wales are within the water supply, sewerage and waste management sector, similar to the proportion of jobs in this sector for the UK as a whole (0.6 per cent). As of March 2021, Welsh Water directly employed just over 3,600 people[134].

Table 3.11 Workforce jobs by industry – seasonally adjusted (March 2021)

Industry Sector	Wales	Wales (%)	UK	UK (%)
A : Agriculture, Forestry And Fishing	39,000	2.7	379,000	1.1
B : Mining And Quarrying	2,000	0.1	57,000	0.2
C : Manufacturing	149,000	10.4	2,543,000	7.4
D : Electricity, Gas, Steam And Air Conditioning	7,000	0.5	147,000	0.4
E : Water Supply; Sewerage, Waste Management	10,000	0.7	206,000	0.6
F : Construction	97,000	6.7	2,225,000	6.4
G : Wholesale And Retail Trade; Repair Of Vehicles	209,000	14.5	4,860,000	14.1
H : Transportation And Storage	52,000	3.6	1,783,000	5.2
I : Accommodation And Food Service Activities	102,000	7.1	2,181,000	6.3
J : Information And Communication	35,000	2.4	1,452,000	4.2
K : Financial And Insurance Activities	35,000	2.4	1,140,000	3.3
L : Real Estate Activities	27,000	1.9	651,000	1.9
M : Professional, Scientific And Technical Activities	82,000	5.7	3,238,000	9.4
N : Administrative And Support Service Activities	85,000	5.9	2,862,000	8.3
O : Public Administration And Defence	97,000	6.7	1,612,000	4.7
P : Education	132,000	9.2	2,915,000	8.4
Q : Human Health And Social Work Activities	218,000	15.2	4,468,000	12.9
R : Arts, Entertainment And Recreation	31,000	2.2	884,000	2.6

[134] Glas Cymru (2021) *Annual Report & Accounts 2020-2021*Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts [Accessed July2021]

Industry Sector	Wales	Wales (%)	UK	UK (%)
S : Other Service Activities	23,000	1.6	913,000	2.6
T : Activities Of Households As Employers;...	4,000	0.3	49,000	0.1

Source: Nomisweb[135]

3.7.7 In 2019, there were 103,770 active business enterprises in Wales[136]. This compares to 90,435 active businesses in 2010, representing a 14.7 per cent increase. The percentage change varies across local authorities; Rhondda Cynon Taf has seen the largest percentage increase of 31.6 per cent whilst three areas have seen reductions in the number of businesses (Gwynedd -0.1 per cent; Ceredigion -5.2 per cent; Powys -3.7 per cent).

Transport and traffic

3.7.8 The total combined length of roads in Wales in 2018/19 was approximately 34,850 km. In 2018/19, 6.4 per cent of the motorway network and 2.8% of the trunk road network required close monitoring of structural condition. Powys contains the largest road network of all the Welsh local authorities. It also accounts for the highest proportion of all A Trunk roads (27.3 per cent), B and C roads (21.1 per cent) and minor surfaced roads (12.2 per cent).[137]

3.7.9 In 2019, the total volume of motorised traffic in Wales was 32.11 billion vehicle kilometres[138], the highest levels ever recorded. Within this total volume of traffic, cars accounted for 25.1 billion (78 per cent) of the total. Vehicles travelled mostly on the major roads, with 19.6 billion (65.7 per cent of motor traffic) in Wales either on motorways or A roads.[139]

3.7.10 Transport accounted for 26 per cent of energy used in 2017 (22.1 TWh) in Wales. This is similar to the 2005 total of 22.2 TWh but represents a higher percentage of total energy use compared to 20 per cent in 2005[140].

3.7.11 The number of rail passenger journeys has increased steadily in recent years and stood at 21.6 million in 2018 to 2019, however, dropped to 20.5 million in 2019 to 2020[141]. This is likely because of the impacts of the COVID-19 pandemic. However, private vehicles are expected to provide the dominant mode of transport over the short and medium term[142].

[135] Labour Market Profile – Wales. Available online: https://www.nomisweb.co.uk/reports/lmp/gor/2013265930/report.aspx [Accessed March 2021]
[136] StatsWales (2020) *Active Business Enterprises by area and year*. Available online: https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/Businesses/Business-Demography/activebusinessenterprises-by-area-year [Accessed July 2021]
[137] Welsh Government (2019) *Road lengths and conditions*. Available online: https://gov.wales/road-lengths-and-conditions-april-2018-march-2019 [Accessed July 2021]
[138] StatsWales (2020) *Volume of road traffic by road classification and year.* Available online: https://statswales.gov.wales/Catalogue/Transport/Roads/Road-Traffic/volumeofroadtraffic-by-roadclassification-year [Accessed July 2021]
[139] StatsWales (2020) *Volume of road traffic by type of vehicle and year*. Available online: https://statswales.gov.wales/Catalogue/Transport/Roads/Road-Traffic/volumeofroadtraffic-by-typeofvehicle-year [Accessed July 2021]
[140] Welsh Government, (2020), Energy Use in Wales 2018, Available online: https://gov.wales/sites/default/files/publications/2020-06/energy-use-in-wales-2018.pdf [accessed July 2021]
[141] StatsWales (2021) *Rail Passenger Journeys by Local Authority and Year* Available via: https://statswales.gov.wales/Catalogue/Transport/rail/rail-transport/railpassengerjourneys-by-localauthority-year [Accessed July 2021]
[142] Welsh Government (2017) *Future Trends Report* Available online: https://gov.wales/sites/default/files/statistics-and-research/2018-12/170505-future-trends-report-2017-en.pdf [Accessed July 2021]

Tourism and recreation

3.7.12 In Wales, 10.7 million domestic tourism trips were taken during 2019, which represents an increase of 6.8 per cent on the previous year. 5.7 million of the 9.0 million domestic tourism visits were holiday trips, which is an increase on the 5.6 million in 2016. The total spend attributed to domestic tourism trips in Wales in 2019 was £2 billion, an increase of 8.1 per cent from £1.85 billion spent in 2018[143].

3.7.13 With specific regard to wastewater services, large seasonal fluxes in tourist numbers create additional impact on the collection and transport of waste in summer months when demand is already at its highest. There may be an increasing (short term) trend in the near future in light of the expected increase in domestic holidays due to the current economic situation and potential for more 'staycations' following the COVID-19 pandemic.

3.7.14 Welsh Water manages 91 reservoirs and 40,000 hectares of land which includes four visitor centres, sporting recreational and leisure facilities that between them attract around one million visitors each year, making a valuable contribution to tourism and the local economy. [144]

Housing

3.7.15 **Table 3.12** shows that there has been a decline in household size in all areas of Wales between 2011 and 2019 except for Merthyr Tydfil which has remained the same. The largest change of -3.1 per cent was experienced within Ceredigion and Pembrokeshire.

Table 3.12 Change in household size (2011-2019)

	2011	2019	Change	% change
Wales	2.31	2.26	-0.03	-2.0
Isle of Anglesey	2.25	2.21	-0.03	-1.8
Gwynedd	2.24	2.20	-0.02	-1.8
Conwy	2.2	2.16	-0.03	-1.8
Denbighshire	2.28	2.26	-0.02	-0.9
Flintshire	2.38	2.33	-0.04	-2.1
Wrexham	2.34	2.28	-0.04	-2.6
Powys	2.24	2.18	-0.05	-2.7
Ceredigion	2.25	2.18	-0.05	-3.1
Pembrokeshire	2.27	2.20	-0.05	-3.1

[143] Welsh Government (2020) *Wales Tourism Performance Report January to December 2019*. Available online: https://gov.wales/sites/default/files/statistics-and-research/2020-06/wales-tourism-performance-january-to-december-2019-208.pdf [Accessed July 2021]

[144] Welsh Water (2020) *Welsh Water Report and Accounts 2019-20.* Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed July 2021]

	2011	2019	Change	% change
Carmarthenshire	2.3	2.26	-0.03	-1.7
Swansea	2.26	2.21	-0.03	-2.2
Neath Port Talbot	2.3	2.28	-0.02	-0.9
Bridgend	2.34	2.30	-0.03	-1.7
Vale of Glamorgan	2.32	2.26	-0.04	-2.6
Rhondda Cynon Taf	2.33	2.26	-0.06	-3.0
Merthyr Tydfil	2.4	2.40	0.00	0
Caerphilly	2.39	2.34	-0.04	-2.1
Blaenau Gwent	2.28	2.22	-0.05	-2.6
Torfaen	2.34	2.31	-0.03	-1.3
Monmouthshire	2.34	2.30	-0.03	-1.7
Newport	2.35	2.33	-0.02	-0.9
Cardiff	2.34	2.29	-0.03	-2.1

Source: StatsWales[145]

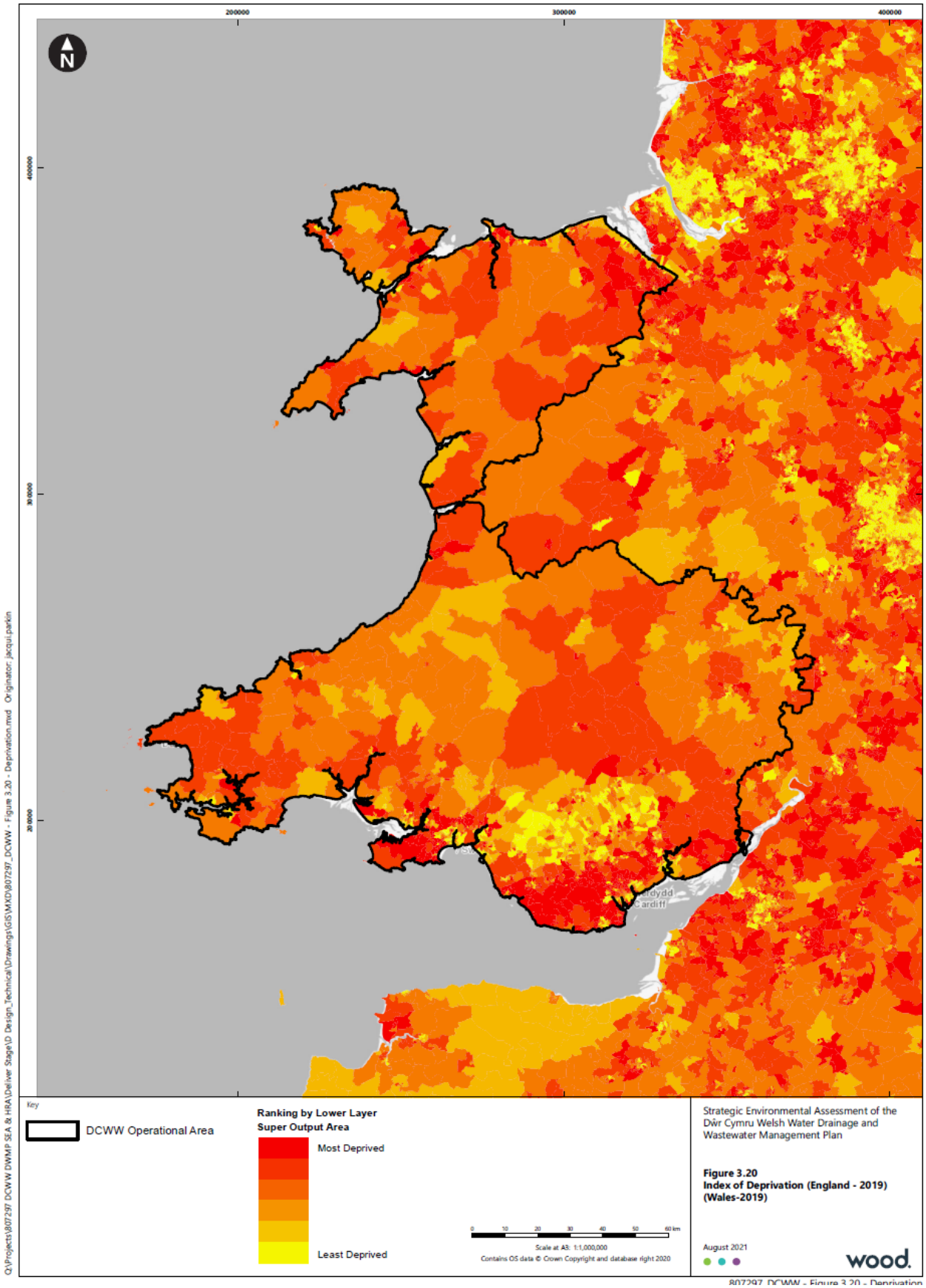
3.7.16 For the period 2015 – 2020, the Average household size (number of people) in the West Midlands region of England increased from 2.38 to 2.43.[146]

Deprivation

3.7.17 The *Welsh Index of Multiple Deprivation (WIMD)* (2019)[147] measured relative deprivation in all local authority Lower Super Output Areas (LSOA) areas (see **Figure 3.20)**. Figure 3.2 also shows the comparison with the bordering English counties.

[145] Available via: https://statswales.gov.wales/Catalogue/Housing/Households/Estimates/averagehouseholdsize-by-localauthority-year [Accessed July 2021]
[146] ONS (2021) *Households by household size, regions of England and UK constituent countries.* Available at https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/datasets/householdsbyhouseholdsizeregionsofenglandandukconstituentcountries [Accessed September 2021]
[147] Available via: https://gov.wales/welsh-index-multiple-deprivation-full-index-update-ranks-2019 [Accessed July 2021]

Figure 3.20 Index of Deprivation for LSOAs in the Welsh Water Operational Area



3.7.18 The WIMD 2019 identified pockets of high relative deprivation in the South Wales cities and valleys, and in some North Wales coastal and border towns. The local authority with the highest proportion of LSOAs in the most deprived 10 per cent in Wales was Newport (24.2 per cent). Blaenau Gwent had the highest percentage of areas in the most deprived 50 per cent in Wales (85.1 per cent). Analysis shows that 26 LSOAs across ten local authority areas are in deep rooted deprivation due to being in the top 50 most deprived areas over the last 15 years.

3.7.19 The percentage of individuals living in relative income poverty for the period 2017-2018 to 2019-2020stood at 23 per cent. This was higher than all of the other UK countries and the UK average of 22 per cent. However, this percentage has been stable since 2000-01 and is lower than the two previous reporting periods where it was 24 per cent.[148]

3.7.20 Levels of deprivation, particularly income deprivation, affect the ability of customers to pay for water and may also impact on total water usage. In 2019/20, Welsh Water helped approximately 130,000 customers who were struggling to pay their bills and £8 million was used to help lowest-earning customers to pay their bills.[149]

3.7.21 The English Index of Deprivation[150] measures relative levels of deprivation in small areas of England called Lower Layer Super Output Areas (LSOA). 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. Baseline Characteristics – Health

3.7.22 Life expectancy is used as a broad measure of the health of an area and where a person is born largely influences how long they will live. In Wales, the average life expectancy at birth for the period 2017-19 was 78.51 for men and 82.33 for women, compared to 79.4 and 83.1 years respectively for the UK. Life expectancy at birth increased for males by around 0.2 years but stayed the same for females in Wales.[151] In England over the same period, life expectancy increased by 0.3 years for males and 0.4 years for females.[152]

3.7.23 The National Survey for Wales 2019-20[153] reported that 71 per cent of people were in good or very good health which was similar to 2018-19 (72 per cent). 33 per cent of people reported having a life limiting illness, disability or infirmity which was slightly higher than the previous year (29 per cent). 27 per cent reported having any arthritis condition.

3.7.24 The survey identified that 18 per cent of adults' smoke, with 7 per cent using e-cigarettes. A total of 19 per cent of adults drank alcohol over the weekly guidelines and 25 per cent ate five or more portions of fruit and vegetables a day. Just over half of the people surveyed, 53 per cent, were active for 150 minutes or more the previous week. With regards to obesity, 61 per cent of people

[148] DWP Household Below Average Income (HBAI) via StatsWales. Available via: https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Poverty/householdbelowaverageincome-by-year [Accessed July 2021]
[149] Glas Cymru (2020) *Annual Report and Accounts 2019-2020*. Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed July 2021]
[150] MHCLG (2019) *The English Indices of Deprivation 2019 (IoD2019)*. Available online https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019 [Accessed July 2021]
[151] ONS (2020) *Statistical bulletin: National life tables, UK: 2017 to 2019*. Available online: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/nationallifetablesunitedkingdom/2017to2019 [Accessed July 2021]
[152] ONS (2020) *Life expectancy at birth and selected older ages*. Available online: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/lifeexpectancyatbirthandselectedolderages [Accessed September 2021]
[153] Welsh Government (2020) *National Survey for Wales 2019-20*. Available at: https://gov.wales/national-survey-wales-april-2019-march-2020 [Accessed July2021]

were found to be overweight or obese. Taking into account all of these indicators of health, 25 per cent of people were found to have four or five healthy behaviours (not smoking, health weight, eat five fruit or veg, not drinking above guidelines, active).

3.7.25 The survey also identified:

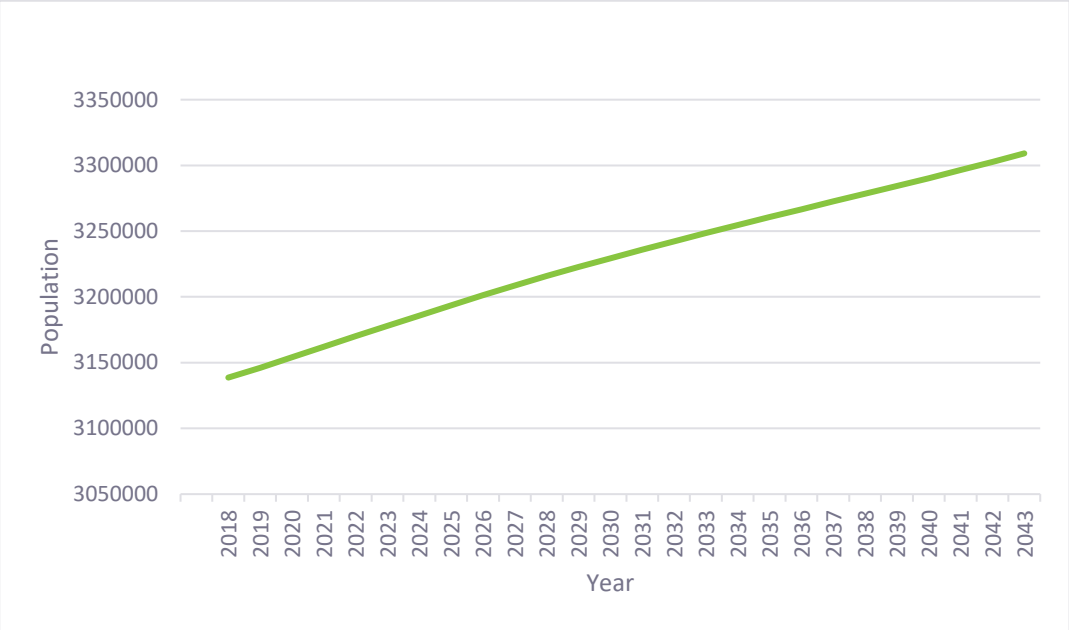
- Healthcare providers:
  - 77 per cent of people had visited a dentist for two dental checks in the last 12 months;
  - 73 per cent visited an optician at least once every two years; and
  - 8 per cent had seen an out of hours GP or GP nurse.
- Medicines:
  - 54 per cent of people had purchased conventional medicines in the latest reporting data (2017-18); and
  - 65 per cent received prescription medicine in the last 12 months.
- Drug support services:
  - Overall 81 per cent of adults felt they were well-informed about drugs the effect of drugs in the latest reporting data (2017-18); and
  - People were most likely to seek advice on drugs from parents, friends or their GP. They were less likely to use online services.

Likely Evolution of the Baseline without the DWMP

3.7.26 The latest 2018 based population projections show that the population of Wales is projected to rise to 3,309,154 by 2043 (the latest projection data).[154] **Figure 3.21** shows the projected steady population increase up to 2043.

[154] StatsWales (2021) Population projections by local authority and year. Available online: https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/Local-Authority/2018-based/populationprojections-by-localauthority-year [Accessed August 2021]

Figure 3.21 Population projection to 2043



3.7.27 The population is projected to increase in 18 of the 22 local authorities in Wales with the largest percentage increases in the population projected to be in Newport (up 7.2 per cent), the Vale of Glamorgan (up 6.0 per cent) and Bridgend (up 4.6 per cent) by 2028. The population is projected to decrease in four local authorities: Ceredigion (by 3.3 per cent), Wrexham (by 1.5 per cent), Blaenau Gwent (by 0.7 per cent) and the Isle of Anglesey (by 0.4 per cent) by 2028[155]. For 2043, the same authorities are expected to experience increased/decreased populations but there is greater uncertainty about the figures.[156]

3.7.28 The 2018-based household projections show that, by 2043, the number of households in Wales is projected to increase by 9.4 per cent to 1,486,248. By 2028, all local authority areas (with the exception of Ceredigion) are expected to increase in the number of households with the largest percentage increases in the number of households projected to be in the Vale of Glamorgan (up 8.6 per cent), Newport (up 8.6 per cent) and Bridgend (up 6.3 per cent). By 2043, all local authorities are expected to see growth in households with the exception of Ceredigion which is expected to decrease.[157] There is greater uncertainty for the figures for 2043.

3.7.29 The number of households is projected to grow in every region in England by 2028. The number of households in the South West is projected to increase by 9.0% between 2018 and 2028, closely followed by the East Midlands, where growth is projected to be 8.7%. Household growth in the north of England is projected to take place at a slower rate than the rest of the country. At local authority level, numbers of households are projected to grow in all but five of the 326 local authorities in the 10 years to 2028.[158]

[155] Ibid
[156] Welsh Government (2020) *Subnational population projections (local authority): 2018 to 2043*. Available online: https://gov.wales/sites/default/files/statistics-and-research/2020-08/subnational-population-projections-2018-based-280.pdf [Accessed July 2021]
[157] StatsWales (2021) *Household projections by local authority and year*. Available online at: https://statswales.gov.wales/Catalogue/Housing/Households/Projections/Local-Authority/2018-based/householdprojections-by-localauthority-year [Accessed August 2021].
[158] ONS (2020) *Household projections for England: 2018-based*. Available online: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/householdprojectionsforengland/2018based [Accessed September 2021]

3.7.30 The 2018-based projections for England show that:

- Cheshire West and Chester is projected to increase from 340,502 to 389,402 (14.4% change)
- Herefordshire is projected to increase from 192,107 to 219,891 (14.5% change
- Shropshire is projected to increase from 320,274 to 381,514 (19.1% change

3.7.31 In addition to population growth driving household demand, economic growth is likely to increase water use by businesses and consequential demand for water treatment.

3.7.32 The Welsh Government's Future Trends Report[159] outlines some key trends:

- the number of older people will rise significantly;
- life expectancy is expected to continue to increase;
- the number of children is projected to rise in the medium term, before falling slightly in the longer term;
- the number of households is growing faster than the population, and there is a long term trend to smaller households (with a large increase in the number of single person households);
- rates of house building are not keeping pace with growth in the number of households, and on current trends this gap will widen, contributing to further house price inflation in the long term;
- all other things remaining unchanged, the projected increase in population and ageing demographic profile means the number being treated for illnesses such as dementia will increase whilst levels of obesity is also expected to increase; and
- health inequalities within Wales are widening.

Key Issues Relevant to the DWMP

3.7.33 The key sustainability issues relevant to the DWMP arising from the analysis of the population and human health baseline are:

- the need to ensure that water services requirements of people and visitors can be met at all times, in a sustainable way;
- the need to ensure that water services remain affordable;
- the need to ensure that measures to manage drainage and wastewater do not adversely affect the health and well-being of any member of the community;
- the need to ensure that vulnerable people are not affected by implementation of measures to manage drainage and wastewater;
- the need to ensure that measures undertaken to manage drainage and wastewater do not have an adverse economic impact;
- the need to avoid disruption through effects on the transport network; and
- the need to ensure resilience of wastewater treatment and sewerage infrastructure and drainage infrastructure against climate change effects.

[159] Welsh Government (2017) Future Trends Report https://gov.wales/sites/default/files/statistics-and-research/2018-12/170505-future-trends-report-2017-en.pdf [Accessed July 2021]

3.8 Material Assets and Resource Use

Baseline Characteristics

Assets

3.8.1 Welsh Water supplies water to 1.4 million homes and businesses and to a population of over 3 million people across most of Wales, Herefordshire and parts of Deeside[160]. To facilitate this, Welsh Water operates a large network of infrastructure assets including[161,162,163] :

- over 40,000 ha of land, much of which has high nature conservation and recreational value.
- over 800 sewage treatment works;
- over 30,000km of sewers;
- 91 reservoirs;
- 62 Water treatment works;
- over 27,700 km of water mains;
- 447 service reservoirs and seven water towers; and
- 700 water pumping stations;

3.8.2 In 2011, as a requirement of the *Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011*, approximately 17,000km of private sewers and lateral drains transferred to Welsh Water, almost doubling Welsh Waters' sewer network. In 2013, Welsh Water commenced a process of adopting the 800 or more private pumping stations in its operating area by 2016. In total, 115 private sewer pumping stations were adopted in 2014, many in a poor state of repair.

3.8.3 Between 2010 and 2015, Welsh Water:

- replaced or upgraded 40 wastewater treatment works (investing £29 million);
- rebuilt, refurbished or upgraded 12 water treatment works (investing £120 million);
- built a new watersports and visitor centre at Llandegfedd Reservoir (investing £2.5 million);
- provided two new laboratories in Glaslyn, Newport and Bretton, North Wales (investing £11 million);
- implemented 'RainScape' urban drainage project at Llanelli and Gowerton (investing £15 million).

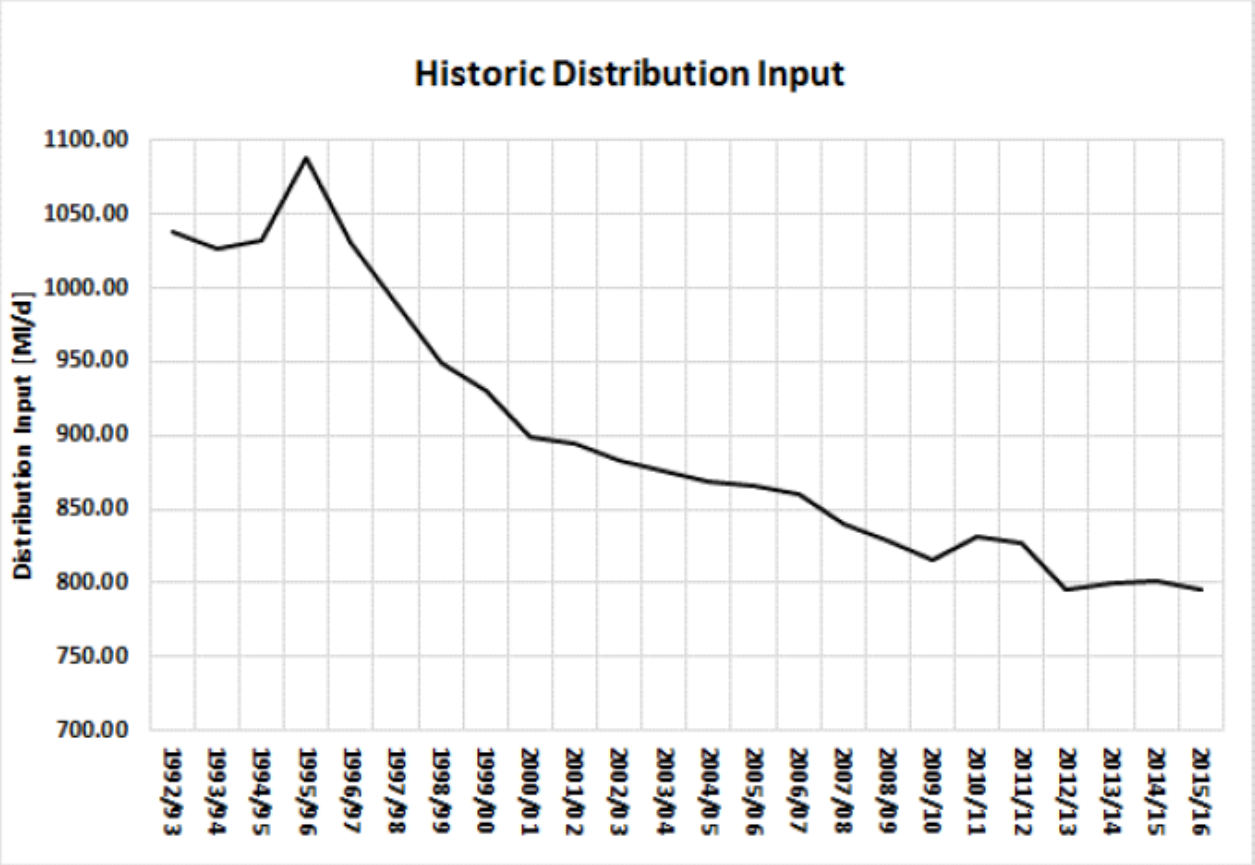
[160] Welsh Water (2019) *Final Water Resources Management Plan, Technical Report.* Available online at: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed July 2021]
[161] Welsh Water ((2019) *Our Plan: PR19 Business Plan 2020 – 2025.* Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2020 [Accessed July 2021]
[162] Welsh Water (2020) *Annual Performance Report 2019-20 Part 4 – Additional regulatory information* Available online at: https://corporate.dwrcymru.com/en/library/annual-performance-reports [Accessed August 2021]
[163] Welsh Water (2021) *Annual Performance Report 2020-2021* Available online at: https://corporate.dwrcymru.com/en/library/annual-performance-reports [Accessed August 2021]

Water demand and Return to Sewer

3.8.4 Welsh Water[164] currently abstracts around 800 Ml/d from the environment for public water supply. This increases by 15-20 per cent during the summer. During extreme conditions, demands on the Welsh Water supply system can increase by over 25 per cent, and in some localised areas by more than this. The geographical variation within the Welsh Water area results in regional impact on the sewer system due to this variation in demand and resultant return to sewer.

3.8.5 There has been a long-term steady decline in water demand in the Welsh Water area (**Figure 3.22**) and this trend continues and the same trend is seen in the dry weather flow received at our WWTW's

Figure 3.22 Welsh Water long term water demand



Source: Welsh Water WMRP 2019

3.8.6 During the 2019/20 period, the average daily water usage in the Welsh Water area was 160 litres per person per day (l/p/d)[165], which is above the average for England and Wales for the same period (142 l/p/d). As shown in **Table 3.13**, the average daily water usage for Welsh Water is above the average for England and Wales over the past three years.

[164] Welsh Water (2019) Final Water Resources Management Plan, Technical Report. Available online at: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed March 2021]
[165] Discover Water. The amount we use. Available online at: http://www.discoverwater.co.uk/amount-we-use [Accessed July 2021]

Table 3.13 Average daily water usage (litres per person)

	2017-18	2018-19	2019-20
England and Wales Average (l/p/d)	141	143	142
Welsh Water (l/p/d)	151	157	160

Source: *Discover Water. The amount we use.*

3.8.7 There is a difference between usage for metered and non-metered customers. For metered customers, the average use for Welsh Water for 2019/20 was 131 l/p/d compared to non-metered customers where the average use for Welsh Water was 176 l/p/d.[166]

3.8.8 Leakage levels[167] are affected by a number of factors including the length, age and condition of the water mains network as well as weather conditions. The change in climate to hotter, drier summers, combined with a growing population means water resources need to be manged more efficiently. In 2019/20, Welsh Water had reduced leakage to 168 million litres per day (Ml/day), from 260 Ml/day in 2001 and 180 Ml/day in 2015[168].

Table 3.14 Number of pipe bursts in company pipe network (per 1,000 kilometre of pipe)

	2017-18	2018-19	2019-20
England and Wales Average (l/p/d)	159	172	137
Welsh Water (l/p/d)	152	154	139

Source: Discover Water. Number of pipe (mains) bursts

3.8.9 Sewer flooding is unpleasant and distressing and the worst situation is where properties become flooded. For Welsh Water, the number of incidents of internal sewer flooding fell from 370 (in 2012-13) to 297 (in 2017-18) [169] and 221 in 2018-19. In 2019-20, there were 216 incidents of internal sewer flooding[170]. The target for 2020-25 is for no more than 273 incidents of sewer flooding and has therefore been met in the last two reporting years.[171]

3.8.10 Variations are likely in the number of incidents each year as there are a number of causes, with blockages becoming a more frequent cause. Also, changes in climate resulting in heavier, more intense rainfall can overwhelm the sewer and drainage system. Whilst newer systems keep drainage separate from sewer systems, in locations such as cities these systems are often combined. Pressure on the sewerage/drainage system also poses a risk of more frequent localised flooding as a result of exceeding network capacity.

Water efficiency

3.8.11 Welsh Water's water efficiency initiatives save a combined 1.5 million litres of water per day. Welsh Water currently supplies 17,500 domestic customers a water efficiency 'Welcome Pack' when they

[166] Ibid.
[167] Leakage - The water lost between the treatment works and the customer.
[168] Welsh Water (2020) *Glas Cymru Report & Accounts 2019-2020*. Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed July 2021]
[169] Welsh Water (2020) *Our Plan: PR19 Business Plan 2020-2025*. Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2020 [Accessed July 2021]
[170] Welsh Water (2020) *Glas Cymru Report & Accounts 2019-2020*. Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed July 2021]
[171] Welsh Water (2018) *Our Plan: PR19 Business Plan 2020-2025*. Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2020 [Accessed July 2021]

opt for a water meter, or where a new property is connected the network. Around 40% of customers are on a metered supply[172].

3.8.12 To reduce leakages across the network, Welsh Water aims to develop methods to regularly survey 10,000 km of trunk mains using new technology, and to progress the 'Toilet and tap' initiative to get a better understanding of leakages beyond the customer boundary. Welsh Water will undertake free repairs or replacements on a targeted proportion of customer supply pipe leaks. Overall, Welsh Water intends to meet Ofwat's target of a 15% reduction in total leakage by the end of AMP7 invest in water efficiency messaging and education..[173]

Energy use

3.8.13 Wales is a net exporter of electricity. In 2019, Wales generated approximately 27.9 TWh yet consumed approximately 14.7 TWh of electricity (~53 per cent of energy generated in Wales is exported). Since 2005, electricity consumption has fallen by 16 per cent[174]. Energy generation is from fossil fuel (including gas and diesel) and renewable sources (including onshore wind, offshore winds, solar PV and others). Renewable sources contribute approximately 27 per cent of electricity generation[175] which is lower than the UK average of 37 per cent[176].

3.8.14 Since 2005, renewable electricity generation has increased by over 500 per cent in Wales. This is predominantly due to large-scale onshore and offshore wind. The three sectors with the greatest energy use are industry (32.3 per cent), buildings (29.6 per cent) and transport (22.1 per cent) in 2017. There has been steady decline in energy use in all these sectors since 2005. Nearly two thirds of the energy used provides heat to homes, businesses and industry (~61 per cent).[177]

3.8.15 To supply drinking water and remove and treat wastewater requires energy. Topography and volumes can increase or decrease this energy demand further. The topography and size of the Welsh Water area means water and wastewater have to be pumped over large areas, and Welsh Water is one of the largest energy users in Wales. In 2019/20, Welsh Water used 580 GWh of energy in total to pump and treat wastewater. This was a slight increase on 545 GWh in 2017/18 and 566GWh in 2018/19[178]. In 2019-20, Welsh Water achieved a total of 122 GWh of renewable generation (water and wastewater) in comparison to renewable generation of 85GWh in 2018-19[179].

Material use and waste generation

3.8.16 Municipal waste volumes in Wales have been steadily decreasing from a peak of 1.93 million tonnes in 2004/05 to 1.51 million tonnes in 2019/20 (see **Table 3.15**). The percentage of local authority

[172] Welsh Water (2019) Final Water Resources Management Plan, Technical Report. Available online at: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed July 2021]
[173] Welsh Water (2018) *Welsh Water 2050*. Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2050 [Accessed July 2021]
[174] Welsh Government, (2020) *Energy Generation in Wales: 2019*Available online at: https://gov.wales/sites/default/files/publications/2021-01/energy-generation-in-wales-2019.pdf [Accessed July 2021]
[175] Ibid.
[176] BEIS, (2020), Energy Trends: December 2020, special feature article - Electricity generation and supply in Scotland, Wales, Northern Ireland and England, 2016 to 2019, Available online at: https://www.gov.uk/government/statistics/energy-trends-december-2020-special-feature-article-electricity-generation-and-supply-in-scotland-wales-northern-ireland-and-england-2016-to-20 [Accessed July 2021].
[177] Welsh Government, (2020), Energy Use in Wales 2018, Available online: https://gov.wales/sites/default/files/publications/2020-06/energy-use-in-wales-2018.pdf [accessed March 2021]
[178] Welsh Water (2020) *Glas Cymru Report & Accounts 2019-2020.* Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed March 2021]
[179] Welsh Water (2020) Annual performance Report 2019/20. Available online: https://corporate.dwrcymru.com/en/library/annual-performance-reports [Accessed July 2021]

municipal waste that was prepared for reuse, recycled or composted in Wales has continued to increase from around 5 per cent in 1998/99 to 65.14 per cent in 2019/20.

Table 3.15 Annual management of municipal waste by management method (tonnes)

Method	2015-16	2016-17	2017-18	2018-19	2019-20
Total Municipal Waste Collected/Generated	1,592,177.68	1,589,794.99	1,549,683.62	1,542,486.99	1,512,100.84
Total Waste Reused/Recycled/Composted (Statutory Target)	958,258.84	1,014,454.76	971,112.03	968,512.86	984,935.01
Waste sent for other recovery	3,937.44	1,010.14	1,934.95	6,647.99	7,660.58
Waste Incinerated with Energy Recovery	301,905.74	389,599.30	374,457.53	385,764.13	387,469.39
Waste Incinerated without Energy Recovery	655.93	495.59	677.00	743.32	1,249.53
Waste Landfilled	288,820.05	150,984.28	170,509.75	155,198.48	114,101.45
Percentage of Waste Reused/Recycled/Composted (Statutory Target)	60.19	63.81	62.67	62.79	65.14

Source: StatsWales[180]

3.8.17 Welsh industrial and commercial sectors, meanwhile, generated an estimated 2.9 million tonnes of waste in 2018 split equally between the sectors. Around 1.3 million tonnes or 45 per cent was recycled, 413 thousand tonnes or 14 per cent was prepared for re-use and 218 thousand tonnes or 8 per cent was composted. 306 thousand tonnes or 11 per cent was disposed of via landfill.[181]

3.8.18 Operationally, Welsh Water requires materials in the water treatment processes including a wide range of chemicals for both water and wastewater treatment. Welsh Water are exploring chemical free treatment processes, for example, through catalysis.[182]

Likely Evolution of the Baseline without the DWMP

Water efficiency

3.8.19 Welsh Water is investing £2.2 billion between 2020 and 2025 to maintain and improve the extensive network of its assets.[183] The quantity of water supplied in the Welsh Water area in a normal year reduced from around 1,000 Ml/day to 800 Ml/day in the last 25 years. This is down to a reduction in leakage, reduction in demand from heavy industry, reduced use by customers.[184]

[180] StatsWales (2020) *Annual management of waste by management method (tonnes)*. Available online: https://statswales.gov.wales/Catalogue/Environment-and-Countryside/Waste-Management/Local-Authority-Municipal-Waste/annualwastemanagement-by-management-year [Accessed July2021]
[181] Natural Resources Wales (2019) *Industrial and Commercial Waste Survey 2018.* Available online: https://naturalresources.wales/evidence-and-data/research-and-reports/waste-reports/industrial-commercial-waste-survey/?lang=en [Accessed March 2021]
[182] Welsh Water (2020) *Glas Cymru Report & Accounts 2019-2020.* Available online: https://corporate.dwrcymru.com/en/library/group-annual-report-and-accounts/glas-cymru-cyfyngedig [Accessed March 2021]
[183] Welsh Water (2018) *Our Plan: PR19 Business Plan 2020-2025*. Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2020 [AccessedJuly 2021]
[184] Welsh Water (2019) *Final Water Resources Management Plan, Technical Report.* Available on line at: https://www.dwrcymru.com/en/our-services/water/water-resources/final-water-resources-management-plan-2019 [Accessed July 2021]

3.8.20 In its Final WRMP19, Welsh Water predict that two WRZs will fall into a potential supply deficit over this period. The WRMP19 contains measures to address these forecast deficits. **Table 3.16** outlines the WRZ and the likely deficit.

Table 3.16 Welsh Water WRMP deficit zones (taken from WRMP19)

Water Resource Zone	Max. deficit over planning period (Ml/d)	First year of deficit	Reasons for deficit	Measures in WRMP19 to address forecast deficit in WRZ
Pembrokeshire	14	2022	• Review of Consents driven licence changes • Climate Change impact on Target Headroom and DO • Revised demand forecast and base year position	Welsh Water is proposing asset upgrades at Canaston Bridge raw water pumping station which would allow finer control of abstraction volumes from the Afon Cleddau, and hence reduce unnecessary over-release of compensation flows from Llys y Fran reservoir.
Tywyn Aberdyfi	1.52	2020	• Climate Change impact on Target Headroom and DO • Revised demand forecast and base year position • Single source zone	Welsh Water is proposing a new abstraction from Afon Dysynni at Pont y Garth, with transfer to Pen y Bont Water Treatment Works (WTW) via a new raw water transfer main. A new pumping station would also be required. This will operate within the maximum WTW capacity.

3.8.21 Welsh Water manages leakage control through the establishment of District Metering Areas (DMA). DMAs have been used to target planned interventions to detect leakage, monitoring over 5,000 data signals on a 30 minute basis. Through the Asset Management Policy (AMP) 6 period, Welsh Water embarked on a project to coordinate water efficiency and customer side leakage on an area by area basis (Project Cartref). Welsh Water seeks to make a 15 per cent reduction in leakage over the course AMP7 period[185].

Energy use

3.8.22 Wales' energy consumption has declined since 2005 and this trend is expected to continue due to energy efficiency improvements. There is also expected to be an increase in energy use from renewables and in this context, the UK and the Welsh Government has a legally binding target for net zero emissions in 2050.

3.8.23 Welsh Water plans to significantly increase its renewable energy generation, and become an energy neutral business by 2050.[186]

Materials and waste

3.8.24 In 2010, the Welsh Government launched the 'Towards Zero Waste' (TZW) initiative, which set out the aim to be recycling 70 per cent of waste in Wales by 2025 and to be a zero waste nation by

[185] Welsh Water (2018) *Welsh Water 2050*. Available online: https://corporate.dwrcymru.com/en/about-us/our-plans/water-2050 [Accessed July 2021]
[186] Ibid

2050[187]. This has been refreshed by *Beyond Recycling: A strategy to make the circular economy in Wales a reality* (2021). The July 2015 Towards Zero Waste progress report[188] stated that total waste arisings per annum had decreased from 14.5 million tonnes in 2007 to 8.4 million tonnes in 2012. This is an 8.4 per cent reduction per year, against a target of a 1.4 per cent reduction per year. In 2012, the 50 per cent of commercial waste and 68 per cent of industrial waste was sent to recycling.

3.8.25 *Beyond Recycling*[189] sets the target of a 26 per cent reduction in waste and zero waste to landfill by 2025, a 33 per cent reduction in waste by 2030 and 62% reduction in waste by 2050.

Key Issues Relevant to the DWMP

3.8.26 The key sustainability issues relevant to the DWMP arising from the analysis of the material assets and resource use baseline are:

- the need to promote water efficiency measures;
- the need to ensure that infiltration is managed;
- the need to maintain the balance between wastewater capacity, use and constraints;
- the need to reduce energy consumption and support low carbon and renewable energy production;
- 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.

3.9 Cultural Heritage

Baseline Characteristics

3.9.1 The historic environment of Wales is both unique and irreplaceable, contributes greatly to the Welsh sense of identity and culture and is an important economic and social asset. In Wales, there are three UNESCO World Heritage Sites recognised for their universal value:

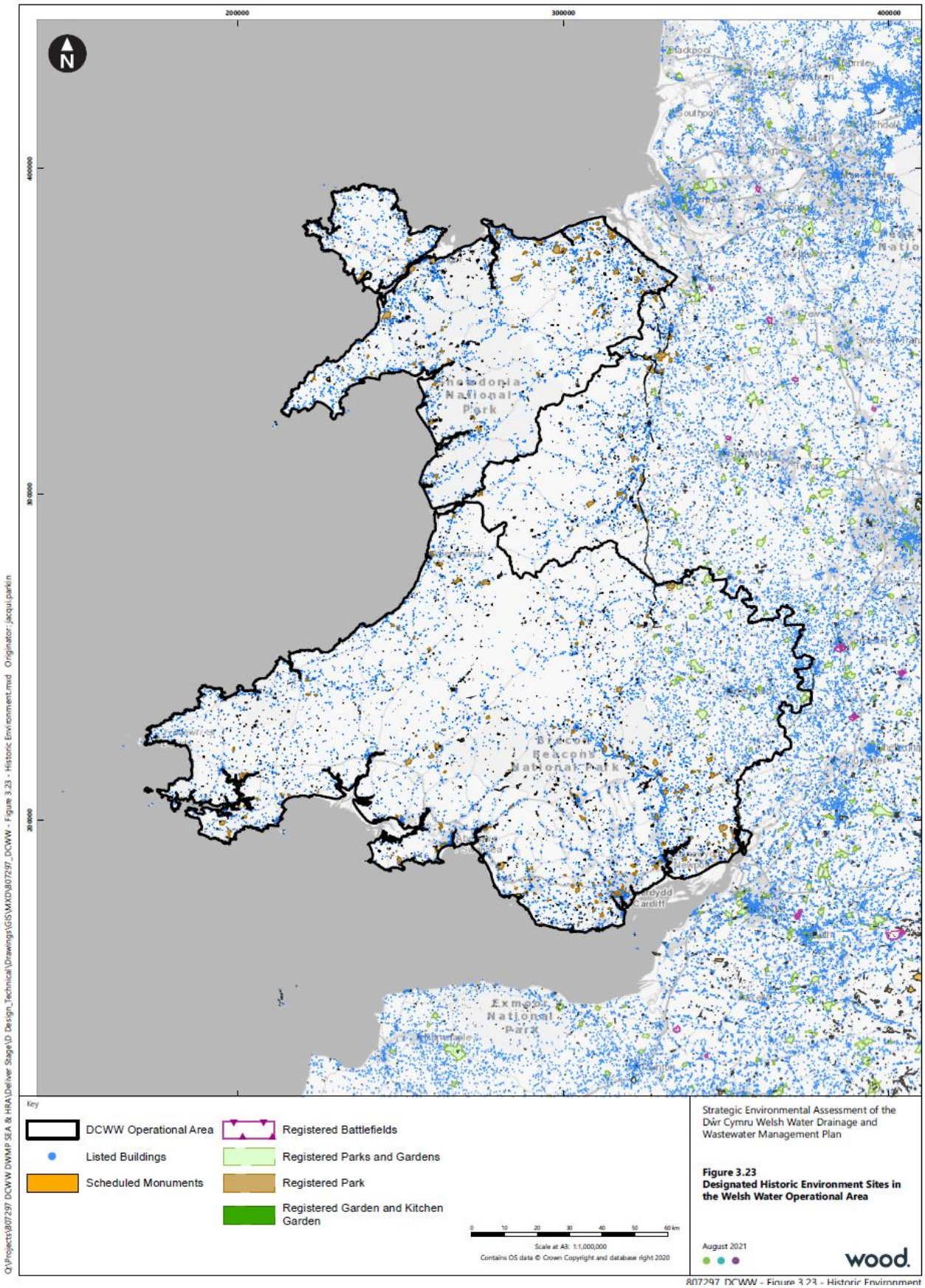
- Pontcysyllte Aqueduct and Canal;
- Blaenavon Industrial Landscape; and
- The Castles and Town Walls of King Edward in Gwynedd.

3.9.2 There are over 4,000 scheduled monuments[190], 30,000 listed buildings, 700 battlefields, 500 conservation areas and around 350 historic parks and gardens of national importance within Wales. There are also a large number of undesignated heritage assets (including archaeological remains) and locally listed buildings identified by local authorities that contribute to the character of local areas.

[187] Welsh Government (2010) Towards Zero Waste. One Wales: One Planet. June 2010. Available online at: https://gov.wales/sites/default/files/publications/2019-05/towards-zero-waste-our-waste-strategy.pdf [Accessed July 2021]
[188] Welsh Government (2015) *Towards Zero Waste 2010-2050. Progress report. July 2015*. Available online at: https://gov.wales/sites/default/files/publications/2019-05/towards-zero-waste-progress-report-july-2015.pdf [Accessed March 2021]
[189] Welsh Government (2021) *Beyond Recycling. A strategy to make the circular economy in Wales a reality.* Available online at: https://gov.wales/sites/default/files/publications/2021-03/beyond-recycling-strategy-document.pdf [Accessed July 2021]
[190] Cadw records can be searched via: https://cadw.gov.wales/advice-support/cof-cymru/search-cadw-records [Accessed July 2021]

3.9.3 **Figure 3.23** shows the designated heritage assets within the Welsh Water operational area.

Figure 3.23 Historic environment designations in the Welsh Water Operational Area



3.9.4 The Historic Landscapes Register for Wales has identified some 58 landscapes which are regarded as representing the best examples of the variety of historic landscapes in Wales[191]. The Register has been issued in two parts, covering 36 'outstanding' and 22 'special' historic landscape areas. All landscape areas identified on the Register are of national importance in the Welsh context. **Section 3.10** provides more detail on the extent of 'outstanding' and 'special' landscape areas.

3.9.5 Cadw maintains a record of designated heritage assets and are working towards identifying all those that are at risk from decay, neglect or development pressure. The latest data from 2015[192] suggests that some 8.54 per cent of listed buildings are at risk which is a slight decrease from 8.92 per cent identified in 2013. Those classed as 'vulnerable' fell slightly from 13.81 per cent to 12.20 per cent over the same period and those classed as 'not at risk' increased slightly from 77.27 per cent to 79.26 per cent. The percentage of listed buildings in 'Very bad' condition increased slightly from 1.81 to 2.02 per cent over the period whilst those in 'Good' condition increased from 53.02 per cent to 55.27 per cent. Buildings in 'Poor' or 'Fair' condition decreased from 2013 to 2015 (8.41 to 7.6 percent).

Likely Evolution of the Baseline without the DWMP

3.9.6 Wales' cultural heritage assets are vulnerable to disturbance from development, land management and the effects of climate change, which can present physical, economic and/or cultural challenges for the historic environment[193]. However, (as a broad indicator) the percentage of listed buildings classified as 'At risk' or 'Vulnerable' by Cadw fell between 2013 and 2015 (as outlined above).

3.9.7 Managing drainage and wastewater can impact on, or enhance, the historic components of the Welsh landscapes and built assets including historic woodlands, field systems and hedgerows, traditional buildings and ancient monuments and archaeological sites. The protection, preservation and settings of cultural heritage assets needs to be considered when locating any new development including drainage and wastewater treatment and management infrastructure.

Key Issues Relevant to the DWMP

3.9.8 The key sustainability issues relevant to the DWMP 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;
- the need to promote access to Wales' cultural heritage sites within Welsh Water's ownership where possible and safe to do so; and
- the need to avoid damage to important wetland areas with potential for paleoenvironmental deposits.

[191] Cadw (2007) *Caring for Historic Landscape*. Available online: https://cadw.gov.wales/sites/default/files/2019-05/Caring_for_Historic_Landscapes_EN_CY.pdf [Accessed July 2021]
[192] Cadw (2015) *The Condition and Use Survey of Listed Buildings in Wales 2015 Update.* Available online: https://cadw.gov.wales/advice-support/historic-assets/listed-buildings/listed-buildings-risk#section-the-condition-of-listed-buildings-in-wales- [AccessedJuly 2021]
[193] Historic Environment Group (HEG) (2020) *Historic Environment and Climate Change in Wales*. Available via: https://cadw.gov.wales/advice-support/climate-change/adapting-to-climate-change [Accessed July2021]

3.10 Landscape

Baseline Characteristics

3.10.1 Landscape is defined by The European Landscape Convention as *"an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"*. This definition is stated as covering natural, rural, urban and peri-urban (i.e., the urban-rural fringe) and includes land, inland water and marine areas.

3.10.2 Wales is characterised by a beautiful and rugged landscape, which ranges from the mountains and lakes of Snowdonia and the estuaries of the mid-Wales coast, to the beaches and cliffs of Pembrokeshire, and the industrial heritage of the South Wales Valleys. Wales is generally a predominantly pastoral landscape with agriculturally improved grassland being the single most extensive habitat type, followed by semi-improved grassland.

3.10.3 There are three National Parks covering 20 per cent (287,830 ha) of Wales (Brecon Beacons, Snowdonia and Pembrokeshire Coast National Parks) and five Areas of Outstanding Natural Beauty (AONBs) (Anglesey, Gower, Llŷn, the Clwydian Range and Dee Valley and Wye Valley, which straddles England and Wales), covering 65,926 ha (**see Figure 3.24**). Collectively, these are referred to as 'designated landscapes', which have specific Special Qualities that should be protected and enhanced. In total, 25 per cent of Wales is designated as either a National Park or an AONB.

3.10.4 Other areas designated for their landscape quality include 495 km of Heritage Coast and 58 landscapes of outstanding/special historic interest (see **Figure 3.24**).[194] In total, over 52 per cent of Wales is nationally or internationally valued for its scenic quality and character, often recognised as iconic landscapes providing a clear sense of place and identity.[195]

3.10.5 The National Landscape Character Area map of Wales[196] recognises 48 sub-regional Landscape Character Areas across Wales, as shown in **Figure 3.25**. Each Area has a distinctive sense of place that enables it to be recognised as a single area (for example, a range of hills or a major urban area). Local detail is recorded in LANDMAP, an all-Wales landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated. It includes nationally consistent, quality assured spatial datasets covering geological landscape, landscape habitats, visual and sensory, historic landscape and cultural landscape, evaluating their importance from a national to local scale.

3.10.6 The large area of designated landscapes throughout Wales demonstrates their value to people as a cultural service. Many people find beauty, tranquillity or aesthetic value in the landscapes and seascapes of Wales and which in-turn promotes social and mental wellbeing as well as the physical benefits of recreational ways of appreciating such landscapes (such as walking, climbing and cycling). Additionally, the landscape is an important aspect of the tourism offer in Wales.[197]

3.10.7 Cadw and other stakeholders produced the Register of Landscapes of Historic Interest in Wales[198] as a means of identifying, and to provide information on, the most important and best-surviving

[194] Cadw (2007) *Caring for Historic Landscape*. Available online: https://cadw.gov.wales/sites/default/files/2019-05/Caring_for_Historic_Landscapes_EN_CY.pdf [Accessed July 2021]
[195] NRW (2017) *Updated All Wales LANDMAP Statistics 2017: Visual and Sensory Aspect*. Available online: https://cdn.cyfoethnaturiol.cymru/media/684055/landmap-visual-and-sensory-all-wales-stats-2017.pdf?mode=pad&rnd=131625599140000000 [Accessed July 2021]
[196] Natural Resources Wales (2021) *Wales environmental information portal.* Available at https://naturalresources.wales/evidence-and-data/accessing-our-data/beta-environmental-data/?lang=en [Accessed July 2021]]
[197] Welsh Government (2020) *Welcome to Wales: Priorities for the Visitor Economy 2020-2025*. Available online: https://gov.wales/sites/default/files/publications/2020-02/welcome-to-wales-priorities-for-the-visitor-economy-2020-2025.pdf [Accessed July 2021]
[198] Cadw, Welsh Government and Countryside Council for Wales *(2007) Historic Landscapes.* Available online at: https://cadw.gov.wales/sites/default/files/2019-05/Caring_for_Historic_Landscapes_EN_CY.pdf [Accessed July 2021]

historic landscapes in Wales. The Register has been issued in two parts, covering 36 'outstanding' and 22 'special' historic landscape areas. All landscape areas identified on the Register are of national importance in the Welsh context[199]. **Figure 3.26** shows the extent of the areas.

3.10.8 In 2009, over 11,5600 km^2 of Wales (55 per cent of the total area) was identified as 'tranquil', as defined by the Countryside Council for Wales (now NRW) Wales Tranquil Areas Map. The 2009 Tranquil Areas Map is shown in **Figure 3.27**. Factors that contribute to how tranquil a place feels include the presence of nature, feeling safe, low noise, visually pleasing surroundings and a relaxing atmosphere[200]. The two largest tranquil areas in Wales are both over 1,000 km^2. These areas are part of the Berwyn Mountains, bordered by the towns of Dolgellau, Bala, Llangollen and Welshpool, and the southern part of the Cambrian Mountains, bordered by Llangurig, Rhayader, Llandovery, Lampeter and Tregaron. Between 1997 and 2009, there was a loss of tranquil areas of nearly 1,500km^2 of land. This is over 6 per cent of the total land area of Wales and is greater than the area of the Brecon Beacons National Park[201].

[199] Cadw (et al) (2007) *Guide to Good Practice on using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process.* Available online at: https://cadw.gov.wales/sites/default/files/2019-05/LandscapesRegisterGoodPractice_EN_0.pdf [Accessed July 2021]

[200] NRW (2017) *Tranquil Areas Wales 2009*. Available online at: https://data.gov.uk/dataset/35a4cb9e-0dcc-4e25-93b0-6a0a04305940/tranquil-areas-wales-2009 [Accessed July 2021]

[201] Landscape Institute Technical Information Note (2017) Tranquillity – An Overview. Available online: https://www.landscapeinstitute.org/technical-resource/tranquillity/ [Accessed July 2021]

Figure 3.24 Landscape designations in Wales

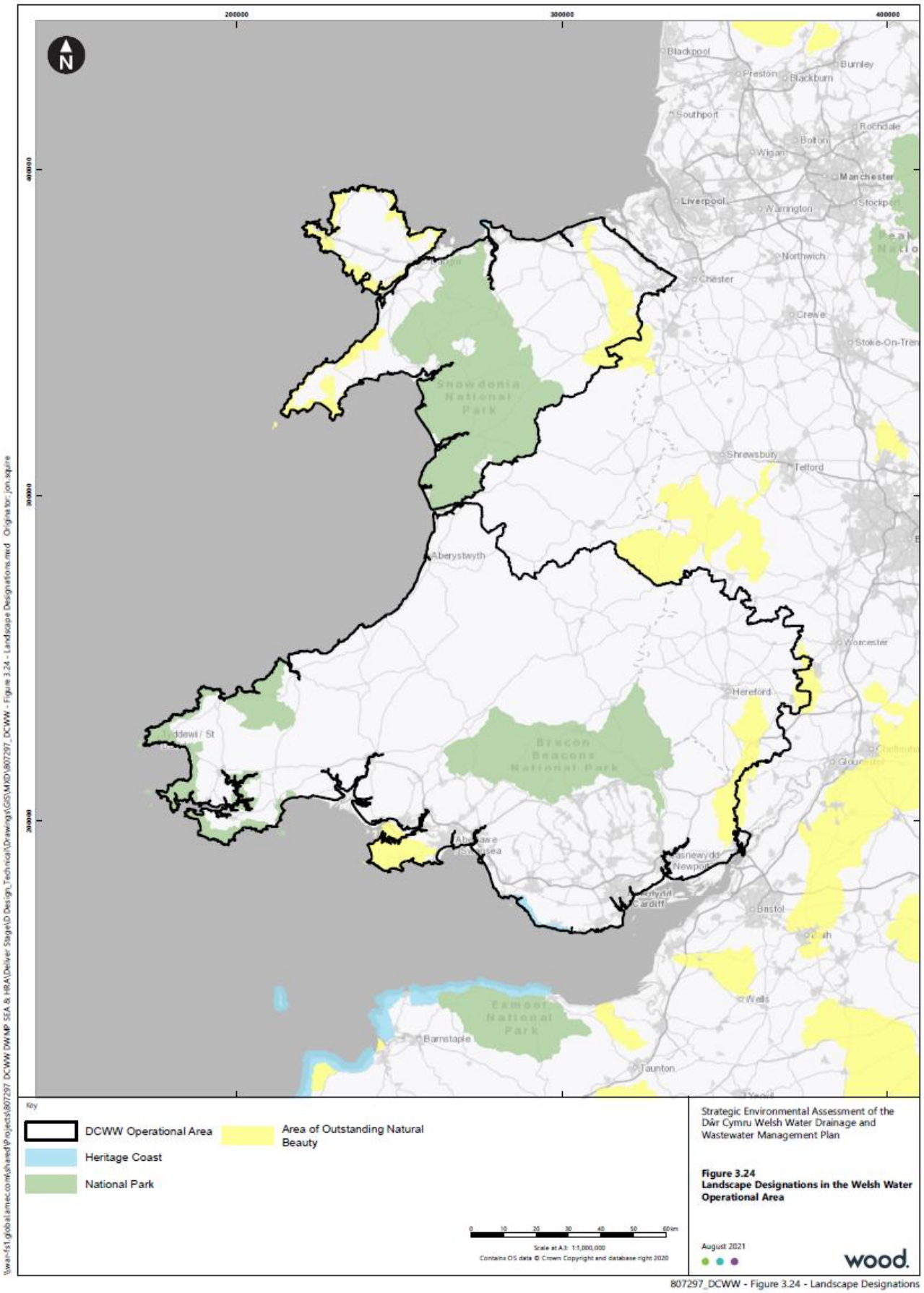
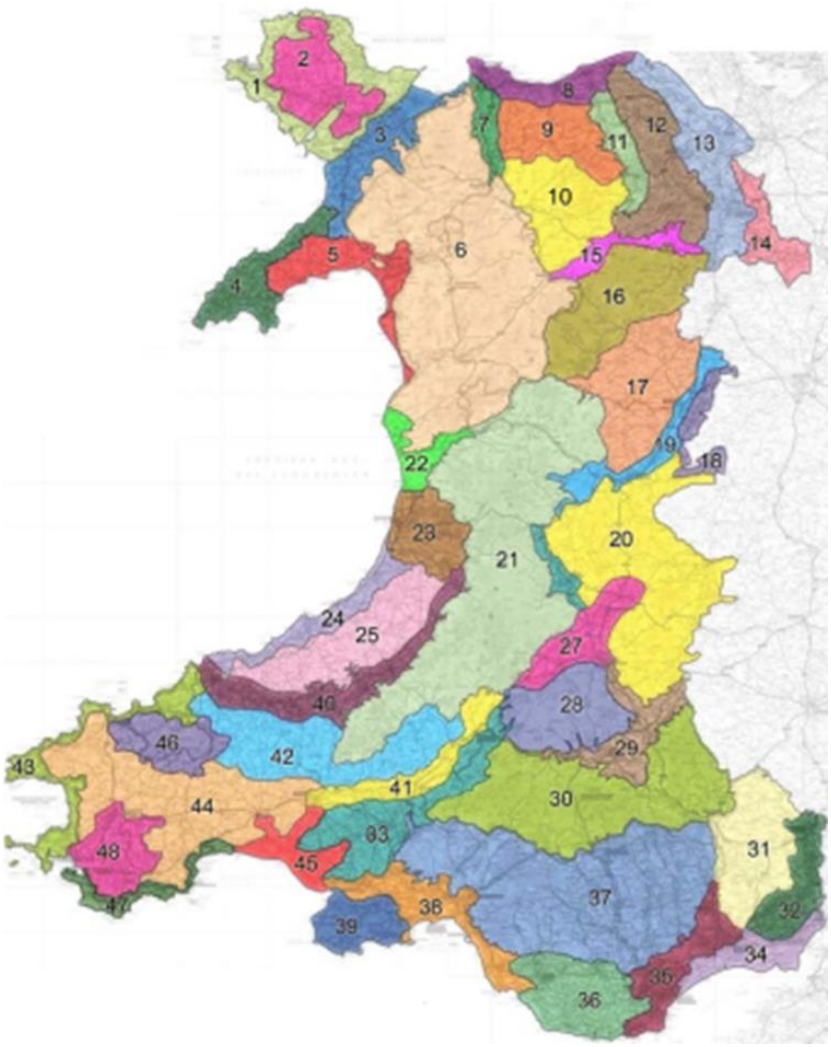


Figure 3.25 National Landscape Character Areas of Wales



1 Anglesey Coast	25 Ceredigion
2 Central Anglesey	26 Upper Wye Valley
3 Arfon	27 The Spas and Wells of Central Wales
4 Llyn	28 Eppynt Plateau and Valleys
5 Tremadoc Bay	29 Wye and Usk Vales
6 Eryri	30 Brecon Beacons and Black Mountains
7 Conwy Valley	31 Central Monmouthshire
8 Colwyn and Northern Coastline	32 Wye Valley and Wentwood
9 Y Rhos	33 Gwendraeth Vales
10 Denbigh Moors	34 Gwent Levels
11 Vale of Clwyd	35 Cardiff and Newport
12 Clwydian Range	36 Vale of Glamorgan
13 Deeside and Wrexham	37 South Wales Valleys
14 Maelor	38 Swansea Bay
15 Vale of Llangollen and Dee Valley	39 Gower
16 Y Berwyn	40 Teifi Valley
17 Montgomeryshire Hills and Vales	41 Tywi Valley
18 Shropshire Hills (part)	42 Pembroke and Carmarthen Foothills
19 Severn Valley	43 West and North Pembrokeshire Coast
20 Radnorshire Hills	44 Taf and Cleddau Vales
21 Cambrian Mountains	45 Taf, Tywi and Gwendraeth Estuaries
22 Aberdyfi Coast	46 Preseli Hills
23 Rheidol and Ystwyth Hills and Valleys	47 South Pembrokeshire Coast
24 Ceredigion Coast	48 Milford Haven

Source: Natural Resources Wales. National Landscape Character Areas (NLCA)

Figure 3.26 Landscape of Historic Interest in Wales

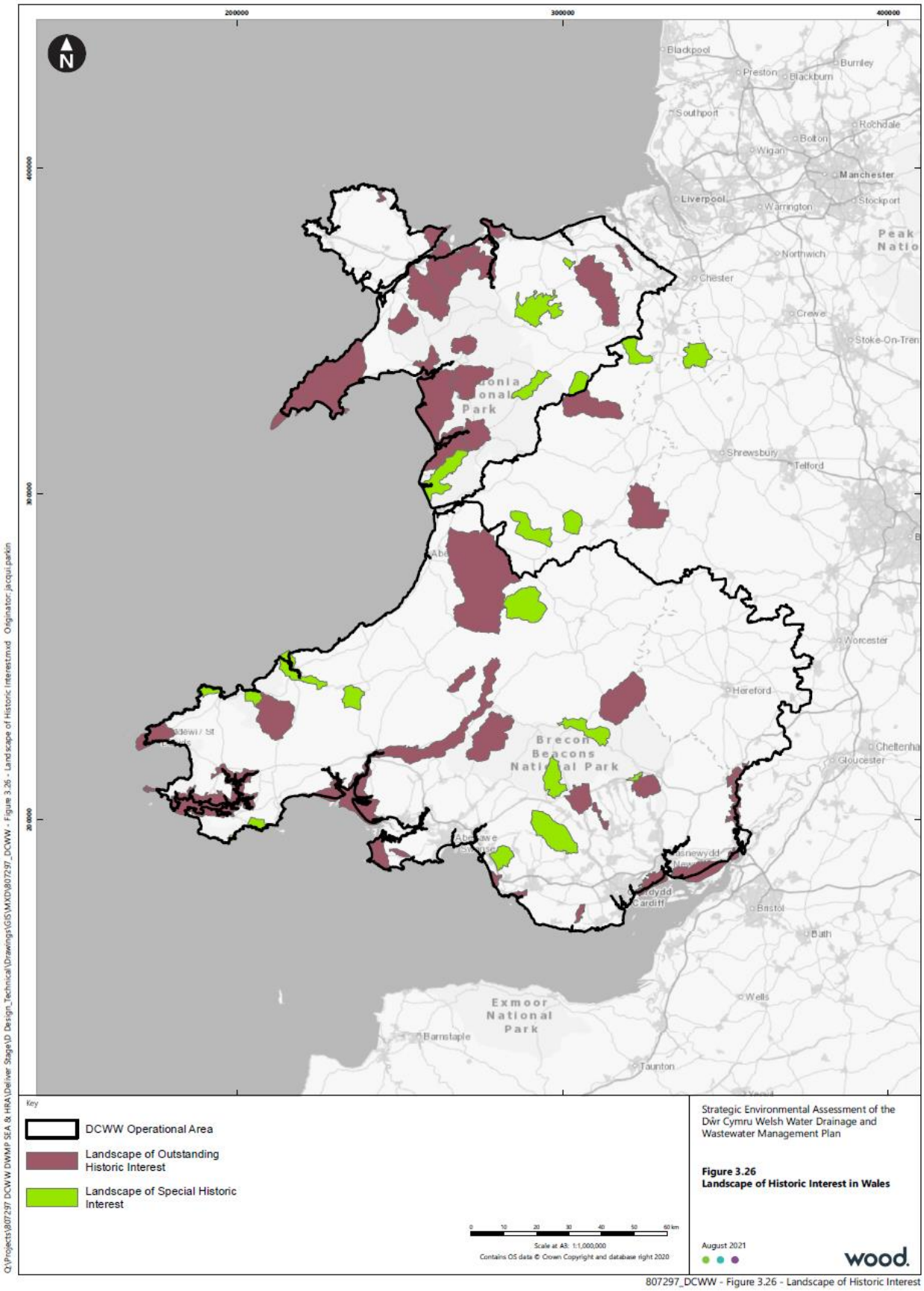
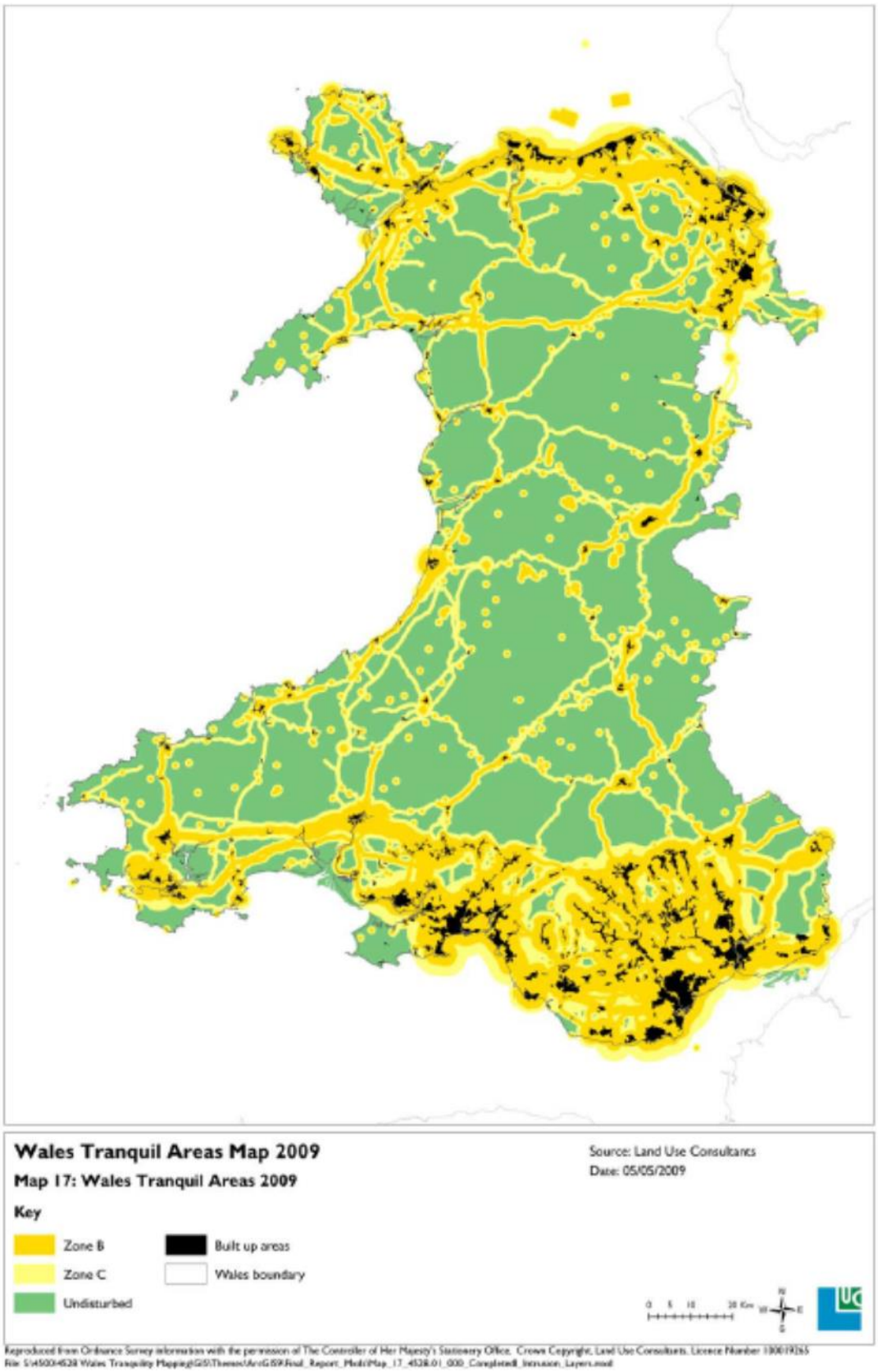


Figure 3.27 2009 Wales Tranquil Areas Map



Source: Countryside Council for Wales (2009) Wales Tranquil Areas Map 2009.

Likely Evolution of the Baseline without the DWMP

3.10.9 Recent key factors determining landscape change in Wales are, in particular, the expansion of settlements, commercial and industrial development, road improvements, onshore windfarms and turbines and recreational related developments. Key changes in the natural environment affecting landscape character include the felling of conifers and replanting with broadleaves, woodland expansion, changing bracken cover, reduced habitat diversity in places and reduced bog.

3.10.10 Climate change over time is likely to have significant impacts on landscape character, local distinctiveness and quality in Wales. This is likely to be directly through changing land cover (migrating habitat and species ranges) and indirectly by influencing land use decisions. There may also be landscape changes resulting from mitigation measures, such as renewable energy generation, water resource management and adaptation through the planned expansion of woodland. There are also risks to landscapes from pests, pathogens and invasive species and from changes in frequency and/or magnitude of extreme weather and wildfire events. Hotter drier summers are also likely to have significant effects on tree cover and vegetation through increasing stress, and lead to reductions in visibility and availability of surface water, especially in upland areas. Wetter winters and more intense storms, meanwhile, are likely to create issues including soil waterlogging, increased run-off and higher potential for flooding, affecting lowland and coastal edge areas in particular[202].

Key Issues Relevant to the DWMP

3.10.11 The key sustainability issues relevant to the DWMP arising from the analysis of the landscape baseline are:

- the need to protect, conserve and enhance landscape character, taking into account the effects of climate change;
- the need to ensure the special qualities of designated landscapes are protected; and
- the need to minimise any adverse impacts upon landscape that may result from measures in the DWMP.

3.11 Summary of Key Sustainability Issues

3.11.1 From the analysis of the baseline presented in the preceding sections, a number of key sustainability issues have been identified as being relevant to the DWMP. These issues are summarised in **Table 3.17**.

Table 3.17 Key Issues Relevant to the DWMP

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
Biodiversity, Flora and Fauna	• The need to maintain and enhance biodiversity and the resilience of ecosystems, including sites designated for their nature conservation value. • The need to address the climate emergency and nature emergencies together. • 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 protected species. • The need to prevent pollution of freshwater habitats, from sources such as (inter alia) slurry, sewage and soil erosion • The need to prevent the spread/introduction of invasive non-native species.

[202] NRW (2019) *LANDMAP, Landscape and a Changing Climate*. Available online: https://cdn.naturalresources.wales/media/688626/eng-landmap-landscape-and-a-changing-climate.pdf?mode=pad&rnd=131989289330000000 [Accessed July 2021]

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
	• The need to maintain/enhance ecological connectivity. • The need to maintain/enhance connectivity between rivers and their floodplains. • The need to sustainably manage biodiversity assets, taking into account the effects of climate change. • The need to recognise the key role that green infrastructure plays in supporting (inter alia) biodiversity, landscape, wellbeing and climate change resilience. • The need to protect and enhance the green infrastructure network. • The need to prevent/enhance physical modifications to freshwater ecosystems. • The need to continue monitoring biodiversity and ecological indicators. • The need to work within environmental limits and capacities.
Geology Land Use and Soils	• The need to protect, maintain and enhance geomorphological functions and services. • The need to influence how land is managed, promoting sustainable patterns of land use. • The need to conserve and enhance soil quality and function (including carbon sequestration). • The need to protect and avoid damage to Wales' geodiversity and conserve and enhance sites designated for geological interest. • The need to manage impacts on soil resources, including control of pollution and remediation of contaminated land.
Water	• The need to maintain and improve water quality. • The need to maintain seasonal flows in groundwater and surface water. • The need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively. • The potential effects of climate change and the need to build climate change resilience into the water environment and water management. • The need to prevent the deterioration of Water Framework Directive waterbodies, achieve protected area objectives and achieve water body status objectives.
Air Quality	• The need to minimise emissions of pollutant gases and particulates and enhance air quality
Climatic Factors	• The need to reduce travel and promote sustainable modes of transport. • The need to reduce GHG 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	• The need to ensure that water service requirements of people and visitors can be met at all times, in a sustainable way; • The need to ensure that water services remain affordable; • The need to ensure that measures to manage drainage and wastewater do not adversely affect the health and well-being of any member of the community; • The need to ensure that vulnerable people are not affected by implementation of measures to manage drainage and wastewater; • The need to ensure that measures undertaken to manage drainage and wastewater do not have an adverse economic impact; • The need to avoid disruption through effects on the transport network; and • The need to ensure resilience of wastewater treatment and drainage infrastructure against climate change effects.
Material Assets and Resource Use	• The need to promote water efficiency measures. • The need to ensure that infiltration is managed. • The need to maintain the balance between wastewater capacity, use and constraints. • The need to reduce energy consumption and support low carbon and renewable energy production. • 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.

Topic Area	Key Environmental, Social and Economic Issues Relevant to the Draft DWMP
Cultural Heritage	• 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 promote access to Wales' cultural heritage sites within Welsh Water's ownership where possible and safe to do so. • The need to avoid damage to important wetland areas with potential for paleoenvironmental deposits.
Landscape	• The need to protect, conserve and enhance landscape character, taking into account the effects of climate change; • The need to ensure the special qualities of designated landscapes are protected; and • The need to minimise any adverse impacts upon landscape that may result from measures in the DWMP.

3.12 Limitations of the Data and Assumptions Made

3.12.1 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 Scoping Report's publication, the baseline or predicted future trends may have varied from those described above.

3.12.2 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** as well as the responses received to consultation on the Scoping Report 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 before highlighting the difficulties encountered during the assessment process.

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 DWMP sets out how Welsh Water intends to extend, improve and maintain a robust and resilient drainage and wastewater system. It will include those options that offer best value to customers and the environment, ensuring robust, resilient and sustainable drainage and wastewater services in the long-term. Key risks and operational requirements will be identified for each drainage and wastewater catchment, with the best value combination of measures selected from the following generic categories:

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

4.2.3 Whilst in theory there is potential for options under each of the generic categories to have likely significant effects (both positive and negative), it is from options in the combined foul sewer systems and the wastewater treatment categories that this likelihood is most significant. Negative effects are more likely to be associated with construction (land take and direct effects on designated and sensitive receptors) whilst operation is more likely to be associated with positive effects (through improvements to, or the prevention of future deterioration of, water quality). Inter-catchment transfers required under the combined and foul sewer systems category could have effects arising from direct land take and disturbance of any pipeline and construction corridor. The subsequent operation of any inter-catchment transfers could affect flows in receiving waters, changing fluvial geomorphology, rates of sedimentation, aquatic habitats and water quality with potential changes to species, which may be significant if the location affected is a designated site or

feature, such as a European site or where the affected location provides functionally linked habitat and species to a designated site.

4.2.4 The characteristics of the options and the potentially wide ranging nature of the construction and operational effects has been taken into account, along with the key policy objectives identified from the review of other plans and programmes relevant to the assessment (**Section 2**) and the economic, social and environmental issues arising from the analysis of the baseline (**Section 3**) to define the scope of the assessment in terms of the topics set out in Schedule 2 of the SEA Regulations.

4.2.5 **In this instance, all SEA topics identified by Schedule 2 of the SEA Regulations have been scoped in for assessment**.

Geographic Scope

4.2.6 The geographic extent of the SEA will reflect the operational area covered by the plan (see **Figure 1.1**) and includes most of Wales, and parts of Herefordshire and Deeside.

4.2.7 In considering the adverse effects on European sites, a study area extending at least 10km outside the boundary of the plan has been taken into account, although, it is recognised that when considering hydrological connectivity and the potential effects of an individual option, a distance beyond 10km may be required.

4.2.8 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

4.2.9 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".

4.2.10 **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 proposed programme of options (and reasonable alternatives) for the prioritised catchments has been 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 also been informed by:

- the previous SEA assessment frameworks used to complete the SEA of Welsh Water's WRMP19, WRMP24 and Drought Plan;
- the review of relevant plans and programmes and the associated key policy objectives and messages (**Section 2** and **Appendix C)**
- the baseline information and key issues contained in **Section 3.**

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. The final column maps the SEA assessment objectives onto the Well-being Goals (from S4 of the Well-being and Future Generation Act 2015).

Table 4.2 Assessment Framework

Topic	Objective	Guide Questions	Welsh Government Well-being Goal(s)
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.	• 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 promote climate change resilience of both designated and non-designated sites? • 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 prevent the spread/introduction of invasive non-native species?	*A prosperous Wales* *A resilient Wales* *A healthier Wales* *A globally responsible Wales*
Soils, Land Use and Geology	2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the	• Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation? • Will it avoid damage to, protect and enhance where possible protected sites designated for their geological	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*

Topic	Objective	Guide Questions	Welsh Government Well-being Goal(s)
	appropriate and efficient use of land.	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)? • Will it contribute towards a catchment-wide approach to land management?	
Water – Quantity and Quality	3. To protect and enhance the quality and quantity of surface and groundwater resources.	<u>Quantity</u> • Will it minimise the 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? <u>Quality</u> • 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?	*A prosperous Wales* *A resilient Wales* *A healthier Wales*
Water – Flood Risk	4. To reduce or manage flood risk.	• 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?	*A resilient Wales* *A healthier Wales*
Air	5. To minimise emissions of pollutant gases and particulates and enhance air quality.	• 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)?	*A resilient Wales* *A healthier Wales*
Climatic Factors	6. To reduce greenhouse gas emissions.	• 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? • Will the option affect carbon sequestration?	*A resilient Wales* *A globally responsible Wales*
	7. To adapt and improve resilience to the threats of climate change.	• 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?	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Population	8. To promote a sustainable economy and maintain and enhance the	• Will it ensure that sufficient wastewater treatment capacity is in place to support predicted increases in population (including any seasonal changes)?	*A prosperous Wales* *A resilient Wales* *A more equal Wales*

Topic	Objective	Guide Questions	Welsh Government Well-being Goal(s)
	economic and social well-being of local communities.	• 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?	*A globally responsible Wales* *A Wales of cohesive communities*
Human Health	9. To protect and enhance human health and well-being.	• 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?	*A prosperous Wales* *A globally responsible Wales* *A resilient Wales* *A healthier Wales* *A more equal Wales* *A Wales of cohesive communities*
Material Assets - Water Resources	10. To promote and enhance the sustainable and efficient use of resilient water resources.	• 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?	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Material Assets – Waste and Resource Use	11. To minimise waste, promote resource efficiency and move towards a circular economy.	• 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)?	*A prosperous Wales* *A resilient Wales* *A globally responsible Wales*
Cultural Heritage	12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeological important sites.	• 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? • Will it protect or enhance (where relevant) Welsh language and culture?	*A Wales of vibrant culture and thriving Welsh language* *A globally responsible Wales*
Landscape	13. To conserve, protect and enhance landscape and townscape character and visual amenity.	• 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?	*A Wales of vibrant culture and thriving Welsh language* *A globally responsible Wales*

4.4 Assessment Methodology

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

- **Assessment of generic interventions** to provide an indication of the effects arising from the broad option types proposed.
- **Screening of options** to identify where there is the potential for the option to have a significant effect based on sensitivity of the location.
- **Prioritised catchment option assessment**: to identify, describe and evaluate the effects of the selected and screened-in preferred options for each prioritised catchment, identified following consideration of the key risks and operational requirements.
- **Preferred programme assessment**: to identify, describe and evaluate the cumulative effects assessment of the preferred programme of options for the prioritised catchments, to 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 DWMP, 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.

4.4.2 The approach to these is described in more detail below with the assessment outputs summarised in **Section 5** and the detailed assessments contained in **Appendix E**.

Assessment of Generic Interventions

4.4.3 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:

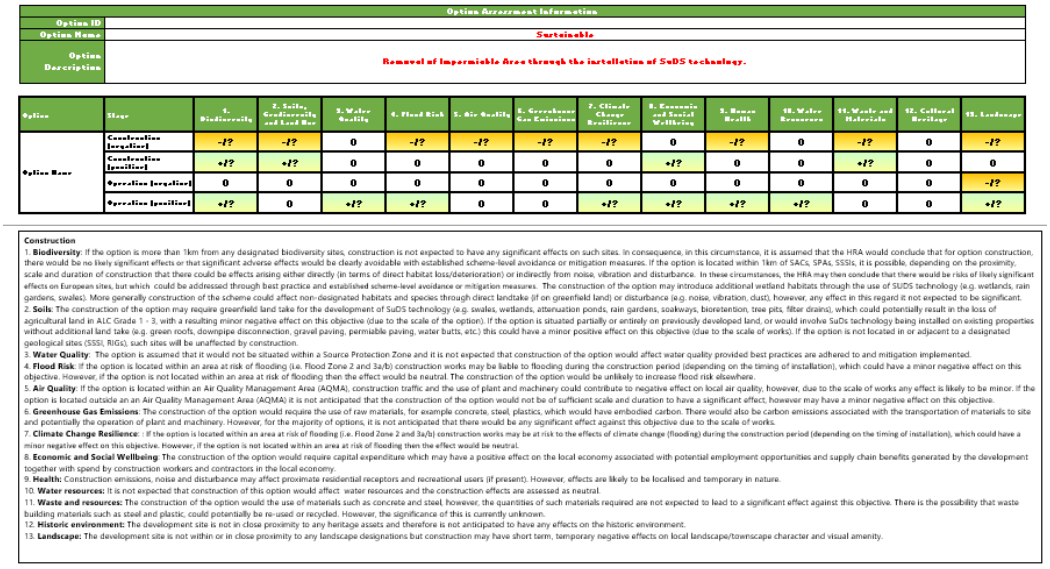
- removal of impermeable area through the installation of SuDS technology;
- increasing storage/capacity in the drainage and wastewater network.

4.4.4 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.

4.4.5 A matrix similar to that shown in **Table 4.3** has been used to capture the assessment of each feasible option in a consistent manner; a key to the meaning of the symbols 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 Impermiable Area through the installation of SuDS technology.

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
	Operation (negative)	0	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, 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 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, 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, permiable 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 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 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:** 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.	?

Screening of Interventions

4.4.6 The options have been screened to identify where there is the potential for the option to have a significant effect based on sensitivity of the location. This has taken into account the international and national designated features and assets where an effect could be significant if development occurred within/adjacent (up to 1km) of the site, and which in consequence could affect the deliverability of the option. The features considered have been as follows:

- Biodiversity: Ancient Woodland, NNRs, Ramsar sites, SACs, SPAs and SSSIs.
- Soils, Geology and Land Use: Geological SSSIs and Historic landfills*.

- Water: Source Protection Zones*.
- Heritage: Listed Buildings*, Scheduled Monuments and WHS.
- Landscape: AONB and National Parks.

(* where option is directly located in/on the feature)

4.4.7 There are other designations and features that could influence consideration of effects, such as ALCs, AQMA, Conservation Areas, Flood Zone 2/3, Historic Parks and Gardens, Historic Battlefields, LNRs and which have then been taken into account if the option were screened in for assessment.

Prioritised Catchment Interventions Assessment

4.4.8 The construction and operational effects of each selected and screened-in intervention for each prioritised catchment has been assessed against the 13 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.

4.4.9 The assessment of effects includes 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);
- the potential effect on vulnerable communities or sensitive sites;
- any mitigation measures with the potential to avoid, minimise, reduce, mitigate or compensate for the identified effect(s) with evidence (where available).
- any assumptions used; and
- the reasons for any uncertainty, where this is identified.

4.4.10 Where relevant, other information and assessments including the HRA has been referenced as appropriate. A matrix similar to that shown in **Table 4.3** is used to capture the assessment of each option in a consistent manner; a key to the meaning of the symbols is presented in **Table 4.4**.

Preferred Programme Assessment

4.4.11 In addition to the consideration of the effects of the selected combination of options for the prioritised catchments, the assessment of the effects of the preferred programme of options reflected in the DWMP will be undertaken. This will ensure that the strategic effects of plan have been identified, described and evaluated.

Assessment of Plan Alternatives

4.4.12 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

guidance[203] 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 guidance[204] 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.

4.4.13 For the purposes of this SEA, any alternative selection of options for the prioritised catchments will be considered as reasonable alternatives. In addition, any reasonable alternatives that operate at the plan level will also be considered, where identified.

Assessment of Secondary, Cumulative and Synergistic Effects

4.4.14 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

4.4.15 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. This is presented in **Appendix D**.

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

4.5.1 A high-level analysis of the impact that the draft DWMP (where relevant) will have on the achievement of the seven well-being goals for Wales and the objective for SMNR, has also been undertaken and reported in Section 5 of this Environmental Reports. This will be similar to that completed for the relevant WRMP19s but updated to take into account any guidance from the Welsh Government and the Future Generations Commissioner for Wales.

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

[203] EC (2003) *Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment.*
[204] 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]

whole process, it was necessary to balance the need for enough information to undertake a robust assessment, while retaining its strategic focus.

- Only limited quantitative information is currently available for each option. For example, information such as the amount of materials required, operational power requirements and operational carbon emissions have not been consistently quantified. Consequently, it has been necessary to estimate the likely resource use, energy consumption and carbon emissions for each option. These qualitative estimates have used capex as the proxy for construction scale, activity and resultant benefit. In this respect, the estimates of resource use, energy consumption and carbon emissions 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.
- It is assumed that there is sufficient WwTW capacity to ensure that flows passed to a WwTW 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.
- 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** to provide an outline of the effects arising from the broad option types proposed, reflecting the reasonable alternatives considered by Welsh Water.
- **Section 5.3: Screening of options** to identify where there is the potential for the option to have a significant effect based on the nature of the option and the sensitivity of the location.
- **Section 5.4: Assessment of the prioritised catchment options** to identify, describe and evaluate the effects of the selected and screened-in preferred options for each prioritised catchment.
- **Section 5.5: Assessment of the preferred programme** to identify, describe and evaluate the cumulative effects assessment of the preferred programme of options for the prioritised catchments.
- **Section 5.6: Contribution of the Draft DWMP to Wales' Well-being Goals and the Objective for SMNR.**
- **Section 5.7: Mitigation.**

5.2 Assessment of generic interventions

5.2.1 The options proposed in the draft DWMP options fall into two broad option types (in addition to a third 'mixed' type, combining elements of the two):

- **Sustainable options**, which seek to redirect flows of water from the wastewater/sewer network by mimicking more natural drainage regimes. These options effectively 'remove' impermeable surfaces in urban areas (such as roads, roofs etc.) through the use of Sustainable Drainage Systems (SuDS). These systems involve either physically replacing impermeable surfaces with permeable surfaces (for example permeable/gravel paving and green roofs) or redirecting water to areas where it can infiltrate into the ground (for example swales, rain gardens, tree pits, soakaways, filter drains) or be stored (for example water butts, ponds, wetlands). These methods thereby remove or attenuate surface water runoff from entering the sewer network by increasing infiltration and residence time in the catchment, thereby reducing the frequency and severity of flooding.
- **Traditional options**, which involve increasing the capacity of the drainage and wastewater network, through methods such as the installation of underground storage tanks, the upgrading/upsizing of drainage and wastewater infrastructure, such as pipelines and sewers, the installation of additional pipelines to temporarily divert water and new or enhanced pumping facilities to move water. This increased capacity allows the drainage and wastewater network to more effectively respond to high rainfall or storm events, thereby reducing the frequency and severity of flooding.

5.2.2 Generic assessments of each of these option types were undertaken and are summarised in **Table 5.1**, with commentary on the likely effects of each option type provided below. 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 uncertainties, owing to the fact that for generic options the scale and location of the option, proximity to sensitive receptors and sensitivity of potential receptors, are not specified.

Table 5.1 Generic Assessment of the Effects of the Broad Option Types

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
Sustainable	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	+/?
Traditional	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	-/?	-/?
	Operation (positive)	+/?	0	+/?	+/?	0	0	+/?	+/?	+/?	+/?	0	0	0

Construction

5.2.3 Both option types have been assessed as potentially having a negative effect on SEA Objective 1 (Biodiversity), associated with the potential for construction activity to affect designated or non-designated sites and species, either through direct land take (if situated on greenfield land) or disturbance (e.g. noise, vibration, dust, air pollution). Sustainable options may also lead to a positive effect associated with the creation of wetland habitats through the implementation of SuDS infrastructure.

5.2.4 Both option types have been assessed as potentially having a negative effect on SEA Objective 2 (Soils, Geodiversity and Land Use) if they require greenfield land take, particularly if situated on best and most versatile agricultural land (ALC Grades 1-3). However, both option types have been assessed as potentially having a positive effect if situated on previously developed land (PDL).

5.2.5 Both option types have been assessed as potentially having a negative effect on SEA Objectives 4 (Flood Risk) and 7 (Climate Change Resilience) if construction is situated in an area at high risk of flooding.

5.2.6 Both option types would require vehicle movements (for example, to transport materials to site) and the use of plant/machinery for construction, hence a negative effect has been determined against Objective 5 (Air Quality). Both option types would also require materials with embodied carbon with associated negative effects on SEA Objectives 6 (Greenhouse Gas Emissions) and 11

(Waste and Materials). However, waste materials could potentially be recycled or reused, with an associated positive effect on Objective 11.

5.2.7 Capital expenditure associated with both option types could have a positive effect on SEA Objective 8 (Economic and Social Wellbeing), whilst emissions, noise and disturbance associated with construction of both option types (where they are situated in close proximity to residential or recreational receptors) may have a negative effect on Objective 9 (Human Health).

5.2.8 Both option types have been assessed as potentially having a negative effect on SEA Objective 12 (Historic Environment), if they are situated on or adjacent to any heritage assets. Additionally, both option types have also been assessed as potentially having a negative effect on Objective 13 (Landscape), if they are situated within or within close proximity to any designated landscapes and/or could have negative effects on local landscape/townscape character and visual amenity.

5.2.9 It is not expected that either option type would have any effects on SEA Objectives 3 (Water Quality) or 10 (Water Resources), assuming construction best practice and mitigation is implemented.

Operation

5.2.10 Both option types have been assessed as potentially having a positive effect on SEA Objective 3 (Water Quality) associated with the potential for positive effects on receiving water quality, which could also beneficial effects on water dependent designated conservation sites (if present) and biodiversity (Objective 1).

5.2.11 Both option types have been assessed as potentially having a positive effect on SEA Objectives 4 (Flood Risk) and 7 (Climate Change Resilience) by reducing the frequency and severity of flooding that could affect communities, so increasing the resilience to the effects of climate change

5.2.12 The traditional option type has been assessed as potentially leading to a minor negative effect on greenhouse gas emissions (Objective 6) if energy would be required during the operational phase of the option (for example for pumping infrastructure).

5.2.13 Both option types have been assessed as potentially having positive effects on economic and social wellbeing (Objective 8) and human health (Objective 9) by reducing flooding and ensuring surface water and bathing water quality is maintained within statutory limits. Additional green areas created as the result of the implementation of SuDS infrastructure such as swales and wetlands, as part of the sustainable option type, may also lead to additional positive effects on health and social wellbeing.

5.2.14 Both options have been assessed as potentially having a positive effect on SEA Objective 10 (Water Resources) by either reducing the water entering the wastewater system (sustainable option) and/or providing additional capacity in the system (traditional option) resulting in a positive effect on network infiltration.

5.2.15 Both option types have been assessed as potentially having a negative effect on SEA Objective 12 (Historic Environment) and Objective 13 (Landscape), if they would result in any permanent above ground infrastructure that could affect the setting of any designated features/areas and more generally, the local landscape/townscape character and visual amenity.

5.2.16 It is not anticipated that either option type would require any additional land take, vehicle movements or materials (with associated waste generation) during operation, hence a neutral effect has been identified against SEA Objectives 2 (Soils, Geodiversity and Land Use), 5 (Air Quality) and 11 (Waste and Materials) across both option types.

5.3 Screening of options

5.3.1 Welsh Water has identified 160 options for the 19 prioritised L4 areas, located in 18 L3 areas within 10 river basin catchments to manage flooding and pollution from the wastewater assets in the future.

5.3.2 These options have been screened in a two-stage process to identify where there is the potential for the option to have a significant effect based on sensitivity of the location. This has taken into account the international and national designated features and assets where an effect could be significant if development occurred within/adjacent (up to 1km) of the site, and which in consequence could affect the deliverability of the option. The features considered have been as follows:

- Biodiversity: Ancient Woodland, NNRs, Ramsar sites, SACs, SPAs and SSSIs.
- Soils, Geology and Land Use: Geological SSSIs and Historic Landfills*.
- Water: Source Protection Zones*.
- Heritage: Listed Buildings*, Scheduled Monuments and WHS.
- Landscape: AONB and National Parks.

(* where option is directly located in/on the feature).

5.3.3 **Stage 1** of the screening identified those options that were at sufficient distance (>1km) from the identified sensitive receptors to conclude that there were no direct or indirect effects likely to arise, taking into account the nature of the schemes proposed. The conclusion was revised to take into account the findings of the HRA, which considered the potential for effects for European sites at distance from the options and their operation.

5.3.4 **Stage 2** provided further scrutiny of those options screened in, taking into account:

- the nature of the proposed works;
- the location of the proposed works and the extent to which construction activity would take place on/in existing developed areas and disturbed ground;
- the receptor potentially affected and the reasons for the designation;
- the presence of any pollutant pathways between the proposed activity and the receptor; and
- the extent to which there was other development already present, located between the proposed location of the option and the receptor that would effectively screen and mitigate any dust, air pollution and/or noise disturbance arising.

5.3.5 As a result of this screening:

- **Stage 1**: 33 options were screened out from further consideration as they were at sufficient distance (>1km) from the identified sensitive receptors to conclude that there were no direct or indirect effects likely to arise, taking into account the nature of the schemes proposed.
- **Stage 2**: 57 options were screened out from further consideration taking into account the nature of the proposed option, the receptors affected, the location, and the presence of any pollutant pathways.

5.3.6 As a consequence, 70 options from 14 L4 areas were screened in for assessment.

5.4 Prioritised catchment option assessment

5.4.1 **Table 5.2** identifies those prioritised catchments and the number of options that have been assessed to identify, describe and evaluate their likely significant environmental effects.

Table 5.2 Options Screened in for Assessment

L2 River basin catchment	L4 drainage area	Number of options screened in for assessment
Carmarthen Bay and the Gower	Gowerton	2
	Llanelli Coastal	1
Clwyd	Kinmel Bay	2
Conway	Ganol STW	6
Dee	Five Fords (Wrexham)	2
	Llanasa (Nr Prestatyn)	5
Llyn and Eryri	Bangor Treborth	9
	Porthmadog	4
Meirionydd	Tywyn	3
South East Valleys	Cardiff Bay	2
	Cilfynydd	1
	Newport Nash	29
Tawe to Cadoxton	Pen-Y-Bont (Merthyr Mawr	2
	Swansea Bay	2
Total		70

5.4.2 Each catchment is briefly summarised, along with the selected options, and the effects of the options are then identified. Detailed assessments of each option summarised are contained at **Appendix E.**

Carmarthen Bay and the Gower

5.4.3 The Carmarthen Bay and the Gower catchment extends from Carmarthen Bay to the Llyn Brianne Reservoir to the north and includes the western end of the Brecon Beacons National Park and is estimated to have a population of approximately 263,000.

5.4.4 There is a total sewer length of 1,291km, where:

- 659km is associated to the foul system;
- 107km is associated to the surface water system; and
- 496km is associated to the combined system.

5.4.5 There are 87 WwTW, 284 SPSs, and 217 CSOs across this river basin catchment.

5.4.6 The main rivers of the catchment drain to Carmarthen Bay and includes the main rivers Cothi, Tywi, Taf and Llwchr. The most significant urban areas are Llanelli, Gowerton, Carmarthen and Ammanford.

5.4.7 Following river basin screening and BRAVA, the L4 areas of Gowerton and Llanelli Coastal were identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected for each area.

Gowerton

5.4.8 **Table 5.3** summarises the options that are proposed for Gowerton.

Table 5.3 Gowerton Options

Option Id	Option Name	Option Description
50628-A-RZ004-DFL.001688_4a-2025-2050-M	001688_Mixed_2050	Increasing the diameter of the existing pipes to 525mm diameter for an approximate length of 164m.
50628-A-RZ005-DFL.003065_4a-2025-2050-M	003065_Mixed_2030-2050	2.2ha paved area removal, 2ha of roof area removal from upstream flooding location. Residual flooding resolved with a smaller 512m3 storage tank.

5.4.9 **Table 5.4** summarises the effects arising from the options that are proposed for Gowerton.

Table 5.4 Assessment of the Effects of Gowerton 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
50628-A-RZ004-DFL.001688_4a-2025-2050-M	**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	0	0	0	0	-	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
50628-A-RZ005-	**Construction (negative)**	-	-	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
DFL.003065_4a-2025-2050-M	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	0

5.4.10 No significant effects have been identified during the assessment of the Gowerton options. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the small scale of the proposed schemes.

Llanelli Coastal

5.4.11 **Table 5.5** summarises the options that are proposed for Llanelli Coastal.

Table 5.5 Llanelli Coastal Options

Option Id	Option Title	Option Description
53021-A-RZ003-DFL.001636_4a-2025-2050-M	001636_Mixed_2030-2050	1,020 m3 offline tank is created by weiring out water and 25m of newly laid sewer. It is then pumped to the downstream network. The existing pipe network is upsized and a flap valve is placed at the end of conduit to restrict the backup and flooding caused upstream. 1.4 ha of impermeable area removed.

5.4.12 **Table 5.6** summarises the effects arising from the options that are proposed for Llanelli Coastal.

Table 5.6 Assessment of the Effects of Llanelli Coastal 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
53021-A-RZ003-DFL.001636_4a-2025-2050-M	Construction (negative)	-	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
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	+/?

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

Clwyd

5.4.14 Clwyd consists of 48 wastewater treatment works catchments with an approximate total population of 116,800. There is a total sewer length of 622km, where:

- 236km is associated to the foul system;
- 204km is associated to the surface water system; and
- 167km is associated to the combined system.

5.4.15 There are 48 WwTW, 117 SPSs, and 65 CSOs across this river basin catchment.

5.4.16 The main river in the Clwyd catchment is the River Clwyd, which stretches from the Clocaenog Forest to the Irish Sea at Rhyl. The River Clwyd flows through the county of Denbighshire, but the river basin also covers parts of Flintshire and Conwy.

5.4.17 Following river basin screening and BRAVA, the L4 areas of Kinmel Bay was identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected.

Kinmel Bay

5.4.18 **Table 5.7** summarises the options that are proposed for Kinmel Bay.

Table 5.7 Kinmel Bay Options

Option Id	Option Title	Option Description
3137-AB-RZ02-DFL.002958-2025-2050-T1	Towyn West Flooding - Storage	This option (offline tanks and upsizing pipes) aims to reduce flooding within 50m of a WSC property.
3137-AB-RZ01-DFL.003478-2025-2050-M1	Abergele North Flooding - Green Engineering	Combination of hard engineering and SUDs options to resolve flooding including removal of ground infiltration by relining FC sewers where known infiltration occurs and CCTVing other sections and applying sample rate for repair; and removal of impermeable area by SuDs methods (adding swale).

5.4.19 **Table 5.8** summarises the effects arising from the options that are proposed for Kinmel Bay.

Table 5.8 Assessment of the Effects of Kinmel Bay 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
3137-AB-RZ02-DFL.002958-2025-2050-T1	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	0	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
3137-AB-RZ01-DFL.003478-2025-2050-M1	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	0	0	0	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

Construction effects

5.4.20 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of options 3137-AB-RZ02-DFL.002958-2025-2050-T1 and 3137-AB-RZ01-DFL.003478-2025-2050-M1 as more than 40% of the proposed construction area of these options is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

Operational effects

5.4.21 No significant effects have been identified during the assessment of the Kinmel Bay options for operation. However, a range of minor positive effects have been identified and assessed, reflecting the small scale of the proposed schemes.

Conway

5.4.22 Conwy consists of 27 wastewater treatment works catchments with an approximate total population of 92,000. There is a total sewer length of 631km, where:

- 188km is associated to the foul system,
- 191km is associated to the surface water system and
- 233km is associated to the combined system.

5.4.23 There are 27 WwTW, 97 SPSs, and 68 CSOs across this river basin catchment level.

5.4.24 The main river in the Conwy catchment is the River Conwy, which stretches from the Migneint Moor to Conwy Bay through the county of Conwy.

5.4.25 Following river basin screening and BRAVA, the L4 areas of Ganol STW was identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected.

Ganol STW

5.4.26 **Table 5.9** summarises the options that are proposed for Ganol STW.

Table 5.9 Ganol STW Options

Option Id	Option Title	Option Description
3333-A-RZ03-DFL.001563-2025-2030-S1	Llandudno East Flooding - Paved area removal	All paved area (1.3ha) removed to drain to SUDs
3333-A-RZ03-DFL.001563-2025-2050-T1	Llandudno East Flooding - Traditional Storage	164m³ storage tank added with a conduit and pump. An additional 9m³ of storage is required for 2050 and so this would be delivered at the same time - 173m³. Upsizing of multiple pipes upstream the outfall.
3333-A-RZ03-DFL.001563-2030-2050-S2	Llandudno East Flooding - Paved & roof area removal	Additional to the 2030 version of this option all roof area (0.8ha) impermeable areas removed to drain to SUDs
3333-A-RZ03-DFL.001569/UK0014788-2025-2050-M3	West Shore Spill & Flooding - Traditional Storage & Diversion	Part of catchment disconnect from network and sent to WwTW via new SPS. Disconnection occurs at railway line. Removal of 5.3ha of upstream impermeable area.
3333-A-RZ04-DFL.002190-2025-2030-M1	Old Colwyn Flooding - Combined Option	Reline pipes in foul sub-catchments upstream of WSC. Removal of areas from storm sub-catchments and cut storm network in two (creating new outfall).
3333-A-RZ06-DFL.000982-2025-2050-T4	Deganwy Flooding - New storm system	Removal of 0.5ha of impermeable areas, with addition of new SW system.

5.4.27 **Table 5.10** summarises the effects arising from the options that are proposed for Ganol STW.

Table 5.10 Assessment of the Effects of Ganol STW 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
3333-A-RZ03-DFL.001563-	**Construction (negative)**	-	-	0	0	-	-	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
2025-2030-S1	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	-	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
3333-A-RZ03-DFL.001563-2025-2050-T1	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	0	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
3333-A-RZ03-DFL.001563-2030-2050-S2	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	0	0	0	0	-	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
3333-A-RZ03-DFL.001569/UK0014788-2025-2050-M3	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
	Operation (positive)	+	0	++	++	0	0	++	++	++	+	0	0	0
3333-A-RZ04-DFL.002190-2025-2030-M1	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	+	+	+	+	0	0	0
3333-A-RZ06-DFL.000982-2025-2050-T4	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	0	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

Construction effects

5.4.28 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of option 3333-A-RZ03-DFL.001569/ UK0014788-2025-2050-M3 as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk

of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

Operational effects

5.4.29 No significant effects have been identified during the assessment of the Ganol options for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the small scale of the proposed schemes.

Dee

5.4.30 Dee consists of 103 wastewater treatment works catchments with an approximate total population of 529,000. There is a total sewer length of 3,339km, where:

- 1,233km is associated to the foul system;
- 771km is associated to the surface water system; and
- 1,301km is associated to the combined system.

5.4.31 There are 102 WwTW, 515 SPSs, and 343 CSOs across this river basin catchment level.

5.4.32 The main river in the Dee catchment is the River Dee, which stretches from the Snowdonia National Park to the Dee Estuary. The River Dee flows through the counties of Gwynedd, Conwy, Denbighshire, Wrexham, Flintshire and Cheshire.

5.4.33 Following river basin screening and BRAVA, the L4 areas of Five Fords (Wrexham) and Llanasa (Nr Prestatyn) were identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected for each area.

Five Fords (Wrexham)

5.4.34 **Table 5.11** summarises the options that are proposed for Five Fords (Wrexham).

Table 5.11 Five Fords (Wrexham) Options

Option Id	Option Title	Option Description
675-A-RZ03-DFL.001426-2025-2030-T1	Johnstown - Bypass relief and upsize (1/2)	New foul sewer bypass and upsizing and gradient change along route.
675-A-RZ03-DFL.001426-2030-2050-S1	Johnstown - Roof IA removal (2/2)	Additional to the 2030 version of this option 0.2ha of roof has been removed via SuDs.

5.4.35 **Table 5.12** summarises the effects arising from the options that are proposed for Five Fords (Wrexham).

Table 5.12 Assessment of the Effects of Five Fords (Wrexham) 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
675-A-RZ03-DFL.001426-2025-2030-T1	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	0	0	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
675-A-RZ03-DFL.001426-2030-2050-S1	Construction (negative)	---/?	0	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	0	0	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

Construction effects

5.4.36 A likely significant negative uncertain effect has been identified against Objective 1 (Biodiversity) for the assessment of options 675-A-RZ03-DFL.001426-2025-2030-T1 and 675-A-RZ03-DFL.001426-2030-2050-S1 due to the potential for works to directly affect the features of Johnstown Newt Sites SAC through land take, encroachment and disturbance arising from noise, vibration and pollutant emissions; however, there are uncertainties associated, due to the refinement needed on scheme details and assumptions made on siting and potential mitigation which would require further investigation and revision.

Operational effects

5.4.37 A likely significant negative uncertain effect has also been identified for option 675-A-RZ03-DFL.001426-2030-2050-S1 due to potential effects during the operational phase on Johnstown Newt Sites SAC linked to the siting of SuDs. The intermittent flows and variable wetland water level resultant from the stormwater flows could be detrimental to newt breeding/populations; however, there are uncertainties related to some option elements which would require further investigation. The HRA does however note that a range of measures and designs for drainage systems have been developed to minimise risks to Great Crested Newt (CGN) populations, (e.g. sumpless gullies) and which could be suitable in this instance to ensure no adverse effects.

Llanasa (Nr Prestatyn)

5.4.38 **Table 5.13** summarises the options that are proposed for Llanasa (Nr Prestatyn).

Table 5.13 Llanasa (Nr Prestatyn) Options

Option Id	Option Title	Option Description
846-A-RZ04-DFL.002545-2025-2030-S1	Prestatyn East Flooding - Green Engineering	Green Engineering – approximately 1.5 ha road area removed via SuDs
846-A-RZ04-DFL.002545-2030-2050-S2	Prestatyn East Flooding - Green Engineering	Green Engineering – 0.04 ha roof area removed via SuDs
846-A-RZ03-DFL.001262-2025-2030-M1	Gronant Flooding - Green Engineering	Development of SuDs scheme (a wetland of 62m^2) and the addition of a screen due to the type of wastewater, plus a conduit.
846-A-RZ03-DFL.001262-2030-2050-M2	Gronant Flooding - Green Engineering	Increase in the wetland size of 2030 by 8m^2 to account for the excess flooding in 2050.
846-A-RZ02-DFL.001103-2025-2050-T1	Ffnonngroew Flooding - Storage	142m^3 of offline storage with pumped return / 34m^3 additional in 2050

5.4.39 **Table 5.14** summarises the effects arising from the options that are proposed for Llanasa (Nr Prestatyn).

Table 5.14 Assessment of the Effects of Llanasa (Nr Prestatyn) 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
846-A-RZ04-DFL.002545-2025-2030-S1	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
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+
846-A-RZ04-DFL.002545-2030-2050-S2	Construction (negative)	-	0	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	0	0	0	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+
846-A-RZ03-DFL.001262-2025-2030-M1	Construction (negative)	---/?	-	0	---	-	0	--	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. Historic Environment	13. Landscape
	Operation (negative)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+
846-A-RZ03-DFL.001262-2030-2050-M2	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	0	0	0	0
	Operation (positive)	+	0	+	+	0	0	+	+	0	+	0	0	+
846-A-RZ02-DFL.001103-2025-2050-T1	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 effects

5.4.40 A likely significant negative uncertain effect has been identified against Objective 1 (Biodiversity) for the assessment of options 846-A-RZ03-DFL.001262-2025-2030-M1, 846-A-RZ03-DFL.001262-2030-2050-M2 and 846-A-RZ02-DFL.001103-2025-2050-T1, due to the potential for works to directly affect the features and functional habitat of the Dee Estuary SPA/Ramsar through land take, encroachment and/or disturbance arising from noise, vibration and pollutant emissions; however, there are uncertainties associated, due to the refinement needed on scheme details and assumptions made on siting and potential mitigation which would require further investigation/and revision.

5.4.41 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of options 846-A-RZ03-DFL.001262-2025-2030-M1, 846-A-RZ03-DFL.001262-2030-2050-M2 and 846-A-RZ02-DFL.001103-2025-2050-T1, as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

5.4.42 No other likely significant effects have been identified during the assessment of the construction period of the Llanasa options, however, a range of minor positive and minor and moderate negative effects have been identified, reflecting the small scale of the proposed schemes.

Operational effects

5.4.43 No significant effects have been identified during the assessment of the operational phase of the Llanasa options. However, a range of minor positive and negative effects have been identified and assessed for construction and operation, reflecting the small scale of the proposed schemes.

Llyn and Eryri

5.4.44 Llyn and Eryri consists of 91 wastewater treatment works catchments with an approximate total population of 131,000. There is a total sewer length of 912km, where:

- 248km is associated to the foul system;
- 67km is associated to the surface water system; and
- 572km is associated to the combined system.

5.4.45 There are 91 WwTW, 190 SPSs, and 191 CSOs across this river basin catchment level.

5.4.46 The Llyn and Eryri catchment covers part of the county of Gwynedd, including the Llyn Peninsula, Snowdonia and the Glaslyn Estuary. The catchment is covered by a series of rivers, including; the Soch, the Gwyrfai, the Dwyfawr, the Erch, the Glaslyn, the Ogwen and the Caledffrwd.

5.4.47 Following river basin screening and BRAVA, the L4 areas of Bangor Treborth and Porthmadog were identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected for each area.

Bangor Treborth

5.4.48 **Table 5.15** summarises the options that are proposed for Bangor Treborth.

Table 5.15 Bangor Treborth Options

Option Id	Option Title	Option Description
3242-A-RZ02-3261-2025-2030-S2	2. Menai Bridge Faelog Causeway - Impermeable Area Removal (road and paved)	Option consist of 0.06 ha impermeable area removal (road and paved) to improve CSO spill performance.
3242-A-RZ02-3261-2030-2050-S3	2. Menai Bridge Faelog Causeway - Impermeable Area Removal additional (Road and Paved)	Option consist of an additional 0.9 ha impermeable area removal (road and paved) to improve CSO spill performance by 2050.
3242-A-RZ02-3262-2025-2050-M3	2. Menai Bridge Porth Wrach - Impermeable Area Removal and pump rate increase	Option consists of 1 ha of impermeable area removal (roads and paved) and a pump upgrade to 38 l/s, to improve CSO spill performance.
3242-A-RZ02-3265-2025-2050-T1	1. Llandegfan Menai PS - Ground Infiltration Removal	50% reduction in baseflow and 15% reduction in ground infiltration.
3242-A-RZ04-1837-2025-2030-M1	Bangor - Impermeable area removal (roads and paved) and ground infiltration reduction.	Impermeable area removal of 38 ha (road and paved area), and ground infiltration and baseflow reduction to improve CSO spill performance.
3242-A-RZ04-1837-2030-2050-S2	Bangor - Impermeable area removal (roofs)	Impermeable area removal 13 ha roof area to improve CSO performance from 2030 to 2050.

Option Id	Option Title	Option Description
3242-A-RZ04-71508-2025-2030-M1	2. Bangor Coleg Normal - Impermeable Area removal, pipe upsize and weir level change	Option consists of removing all road and paved area that drains to the FC system in this section of the model (total area of 1.6 ha). Some upsizing (from 900mm to 1200mm) and a weir level to be increased.
3242-A-RZ04-71508-2030-2050-S2	2. Bangor Coleg Normal - Impermeable area (roofs) removal	Additional impermeable area removal of 0.1 ha of roof to improve CSO spill performance.
3242-A-RZ04-BANGOR GORAD Y GYT-2025-2050-T1	Bangor CSO - Weir level increase and storage option	Option consists of two storage tanks, one tank sized 128 m^3 next to the CSO and another tank sized 89 m^3 downstream at Gorad y Gyt PS downstream to resolve detriment. The option also consists of a pipe upsize to 600mm. This option is predicted to reduce spills at the CSO in 2030 and 2050.

5.4.49 **Table 5.16** summarises the effects arising from the options that are proposed for Bangor Treborth.

Table 5.16 Assessment of the Effects of Bangor Treborth 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
3242-A-RZ02-3261-2025-2030-S2	Construction (negative)	-	0	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	0	0	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+/?
3242-A-RZ02-3261-2030-2050-S3	Construction (negative)	-	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	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
3242-A-RZ02-3262-2025-2050-M3	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	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
3242-A-RZ02-3265-2025-2050-T1	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	0
3242-A-RZ04-1837-2025-2030-M1	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	0	+/?
3242-A-RZ04-1837-2030-2050-S2	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	0	+/?
3242-A-RZ04-71508-2025-2030-M1	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	0	+/?
3242-A-RZ04-71508-2030-2050-S2	Construction (negative)	-	0	0	0	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	0	0	0	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+/?
3242-A-RZ04-BANGOR GORAD Y GYT-2025-2050-T1	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	0	0	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0

Construction effects

5.4.50 A likely significant negative effect has been identified against Objective 6 (Greenhouse Gas Emissions) for the assessment of option 3242-A-RZ04-1837-2025-2030-M1, associated with the requirement for significant quantities of materials with embodied carbon, reflecting the scale of the scheme.

5.4.51 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of option 3242-A-RZ04-1837-2025-2030-M1 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.

5.4.52 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of option 3242-A-RZ04-1837-2025-2030-M1 associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme(s).

Operational effects

5.4.53 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of option 3242-A-RZ04-1837-2025-2030-M1 reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed schemes of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.54 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option 3242-A-RZ04-1837-2025-2030-M1, reflecting the scale of the scheme and corresponding maintenance of surface water and bathing water quality.

Porthmadog

5.4.55 **Table 5.17** summarises the options that are proposed for Porthmadog.

Table 5.17 Porthmadog Options

Option Id	Option Title	Option Description
972-A-RZ01-729 - BORTH Y GEST-2025-2030-M2	2. Borth y Gest - Impermeable Area Removal + small storage	Option consists of 1.7ha of Impermeable area removal (road and paved) to reduce spill count to below 40 in 2030.
972-A-RZ01-729 - BORTH Y GEST-2030-2050-S2	2. Borth y Gest - Impermeable Area Removal	Impermeable area removal option, of an additional 0.4 ha of roof area.
972-A-RZ01-DFL.004028-2025-2030-T2	2. Tremadog - Two offline storage tanks	Offline storage tank of 460 m^3 added, diverting backed up flows away from properties at risk flooding. The option also consists of another storage tank of 495 m^3. Tank intercepts backed up flows protecting WSC.
972-A-RZ01-DFL.004028-2030-2050-S1	1. Tremadog - Impermeable area removal	Option consists of the removal of 0.3ha of impermeable area that is currently draining to the FC system according to the model.

5.4.56 **Table 5.18** summarises the effects arising from the options that are proposed for Porthmadog.

Table 5.18 Assessment of the Effects of Porthmadog 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
972-A-RZ01-729 - BORTH Y GEST-2025-2030-M2	**Construction (negative)**	-	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
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
972-A-RZ01-729 - BORTH Y GEST-2030-2050-S2	**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	0	-	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
972-A-RZ01-DFL.004028-2025-2030-T2	**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	-	-	-

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 (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
972-A-RZ01-DFL.004028-2030-2050-S1	**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	0	-	-
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

5.4.57 No significant effects have been identified during the assessment of the Porthmadog options. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the small scale of the proposed schemes.

Meirionydd

5.4.58 Meirionnydd consists of 41 wastewater treatment works catchments with an approximate total population of 38,000. There is a total sewer length of 296km, where:

- 80km is associated to the foul system,
- 20km is associated to the surface water system; and
- 186km is associated to the combined system.

5.4.59 There are 41 WwTW, 98 SPSs, and 61 CSOs across this river basin catchment level.

5.4.60 The Meirionnydd catchment covers parts of the counties of Gwynedd, Ceredigion and Powys. The River Dyfi and the River Mawddach are the main rivers in the catchment.

5.4.61 Following river basin screening and BRAVA, the L4 areas of Tywyn was identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected.

Tywyn

5.4.62 **Table 5.19** summarises the options that are proposed for Tywyn.

Table 5.19 Tywyn Options

Option Id	Option Title	Option Description
3244-A-RZ01-DFL.003059-2025-2030-T1	1. Tywyn Beach Flooding - Storage	Storage and pipe upsize option which the model predicts will resolve flooding at all the nodes within 50m of the WSC in Tywyn.

3244-A-RZ01-DFL.003059-2025-2050-T2	Tywyn Beach Flooding - SW Separation	A new storm network, where surface water flows no longer enter the FC system, which is predicted to resolve flooding at all nodes within 50m of the WSC.
3244-A-RZ01-DFL.003059-2030-2050-S1	Tywyn Beach Flooding - Storage & IA Removal	Additional to the 2030 version of this option impermeable area has been removed via SuDs (Paved- 0.06 ha, Roof-0.04 ha).

5.4.63 **Table 5.20** summarises the effects arising from the options that are proposed for Tywyn.

Table 5.20 Assessment of the Effects of Tywyn 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
3244-A-RZ01-DFL.003059-2025-2030-T1	**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	0	0	-
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
3244-A-RZ01-DFL.003059-2025-2050-T2	**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	0	0	0	0	-
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
3244-A-RZ01-DFL.003059-2030-2050-S1	**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	0	0	0	-
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

Construction effects

5.4.64 No significant effects have been identified during the assessment of the Tywyn options for construction. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the small scale of the proposed schemes.

Operational effects

1.1.1 A likely significant negative uncertain effect has been identified against Objective 1 (Biodiversity) for the assessment of option 3244-A-RZ01-DFL.003059-2025-2050-T2 due to the potential for operation to directly affect the features of Lleyn Peninsula and the Sarnau SAC through potential

effects from stormwater run-off entering the site; however, there are uncertainties associated, due to the refinement needed on scheme details and assumptions made on siting which would require further investigation. It is however noted that the HRA does conclude that there would be a number of mitigation measures available, including partial treatment or diversion to alternative discharge locations.

South East Valleys

5.4.65 South East Valleys consists of 24 wastewater treatment works catchments with an approximate total population of 118,000. There is a total sewer length of 5,593km, where:

- 1,321km is associated to the foul system;
- 1,225km is associated to the surface water system; and
- 2,993km is associated to the combined system.

5.4.66 There are 24 WwTW, 305 SPSs, and 552 CSOs across this river basin catchment level.

5.4.67 The main rivers in the South East Valleys catchment are: Ebbw, Sirhowy, Taff and Ely. The Ebbw and Sirhowy flow to the Usk estuary and Rhymney and the Taff and Ely flow to the Severn estuary. Due to the location of the catchment, these are valleys rivers, which flow from the steep locations of the Brecon Beacons ending at the lower coastal areas of Cardiff and Gwent.

5.4.68 Following river basin screening and BRAVA, the L4 areas of Cardiff Bay, Cilfynydd and Newport Nash were identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected for each area.

Cardiff Bay

5.4.69 **Table 5.21** summarises the options that are proposed for Cardiff Bay.

Table 5.21 Cardiff Bay Options

Option Id	Option Title	Option Description
33785-P-RZ002-DFL.003636-2025-2050-T	Rhymney River No1 area	Scheme to provide an offline storage tank of 3,220m^3. Scheme to provide 493m3 offline storage tank based on the reference option assessment for 2050.
33785-FG-RZ002-DFL.000531-2025-2050-T	Rhymney River No2 area	Offline storage tank of 4,650m3 and Upsize pipes to 300mm for 126m, 525mm for 89m and removed the flap valve in the branch. Scheme to provide 22m^3 offline storage tank based on the reference option assessment for 2050

5.4.70 **Table 5.22** summarises the effects arising from the options that are proposed for Cardiff Bay.

Table 5.22 Assessment of the Effects of Cardiff Bay 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
33785-P-RZ002-DFL.003636-2025-2050-T	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	0	0	0	0
	Operation (positive)	0	0	+	++	0	0	++	++	++	+	0	0	0
33785-FG-RZ002-DFL.000531-2025-2050-T	Construction (negative)	-	-	-/?	--	--	--	-	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	0	0
	Operation (positive)	0	0	+	++	0	0	++	++	++	+	0	0	0

5.4.71 No significant effects have been identified during the assessment of the Cardiff Bay options. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the small scale of the proposed schemes.

Cilfynydd

5.4.72 **Table 5.23** summarises the options that are proposed for Cilfynydd.

Table 5.23 Cilfynydd Options

Option Id	Option Title	Option Description
30843-AB-RZ005-DFL.004152-2025-2050-S	River Taff - Sustainable Option (Flow reduction)	Remove 5.8 ha road area through the provision of SuDS (including swales), wetland attenuating rain gardens, soakaways, filter drains and bioretention). Remove 1.2 ha of roof runoff by disconnecting downpipes.

5.4.73 **Table 5.24** summarises the effects arising from the options that are proposed for Cilfynydd.

Table 5.24 Assessment of the Effects of Cilfynydd 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
30843-AB-RZ005-DFL.004152-2025-2050-S	Construction (negative)	-	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	-	-
	Operation (positive)	0	0	+	++	0	0	++	++	++	++	0	0	+

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

Newport Nash

5.4.75 **Table 5.25** summarises the options that are proposed for Newport Nash.

Table 5.25 Newport Nash Options

Option Id	Newport Nash Option Area	Option Title	Option Description
30996-B-RZ006-71494-2025-2050-M	**B**	Shaftesbury Park, Newport	Disconnect 9.3 ha road and 13.6 ha of roof area upstream of the CSO by 2050. Provide storage of 53,857m^3 within the CSO compound.
30996-C-RZ007-32112-2025-2050-T	**C**	Newport Liswerry Pill PS	Storage of 60,647 m^3 at the CSO to reduce the spill count to zero by 2050.
30996-D-RZ001-DFL.003655.DFL.002101-2025-2050-M	**D**	Nash No1 - Newport	Scheme to remove 0.3 ha of road and 0.6 ha of roof area by 2030. The remaining flooding resolved by upsizing pipe from 225mm to 300mm for 57m.
30996-D-RZ002-DFL.002802.DFL.003655-2025-2050-T	**D**	Newport ORB	Scheme to provide 1,664m^3 offline storage tank based on the reference option assessment for 2051.
30996-D-RZ001-71492-2025-2030-T	**D**	Jacks Pill Newport EOF	Storage of 15,290 m^3 at the CSO to reduce the spill count to zero by 2030.

Option Id	Newport Nash Option Area	Option Title	Option Description
30996-D-RZ001-71492-2030-2050-T	**D**	Jacks Pill Newport EOF	Scheme to provide offline storage in the parking lot near the CSO premises (storage of 26 m^3 by 2050)
30996-D-RZ001-71490-2025-2030-M	**D**	Newport single street (1/2)	Disconnect 36 ha road area upstream of the CSO by 2030. Provide storage of 16,908 m^3 within the CSO compound.
30996-D-RZ001-71490-2030-2050-M	**D**	Newport single street (2/2)	Provide additional offline storage tank (1,041m3).
30996-D-RZ001-71493-2025-2030-M	**D**	Nash No2 Newport (1/2)	Disconnect 16 ha road area upstream of the CSO by 2030. Provide storage of 14,736 m^3 within the CSO compound.
30996-D-RZ001-71493-2030-2050-M	**D**	Nash No2 Newport (2/2)	Provide additional offline storage tank (839m3).
30996-E-RZ001-31970-2025-2050-M	**E**	Caerleon Town SPS Storm	Option is to disconnect 6.3 ha road and 3.2 ha of roof area upstream of the CSO by 2050 and provide storage of 2,674 m^3 within the CSO compound.
30996-E-RZ001-71491-2025-2050-M	**E**	CSO, Caerleon	Option is to disconnect 6.6 ha of road and 4.2 ha of roof area upstream of the CSO by 2050, and provide storage of 8,031 m^3 within the CSO compound.
30996-E-RZ001-33156-2025-2030-M	**E**	St Cadocs Hospital CSO, Newport (2025-2030)	Option is to disconnect 4.1 ha of road area upstream of the CSO by 2030 and provide storage of 1,200 m^3 within the CSO compound.
30996-E-RZ001-33156-2030-2050-M	**E**	St Cadocs Hospital CSO, Newport 2030-2050)	Option is to provide storage of 14 m^3 at the CSO to reduce the spill count to zero by 2050
30996-F-RZ001-70410-2025-2050-M	**F**	Magor PS CSO	Disconnect 4.7 ha road and 3.3 ha of roof area upstream of the CSO by 2050. Provide storage of 2,213m^3 within the CSO compound.
30996-F-RZ001-DFL.003490-2025-2050-S	**F**	Nash No 3	Disconnecting 1.4 road ha and 0.3 ha roof area from properties upstream of SPS by 2050 to resolve flooding.
30996-H-RZ002-33125-2025-2030-M	**H**	No1 CSO, Chepstow	Option is to disconnect 12 ha road area upstream of the CSO by 2030, construct SuDS and provide storage of 3,962 m^3 within the CSO compound.

Option Id	Newport Nash Option Area	Option Title	Option Description
30996-H-RZ002-33125-2030-2050-M	**H**	No1 CSO, Chepstow	Option is to provide storage of 495 m^3 at the CSO to reduce the spill count to zero by 2050.
30996-H-RZ002-73173-2025-2030-M	**H**	Fairfield SPS CSO, Sedbury	Option is to disconnect 6.9 ha road area upstream of the CSO by 2030, construct SuDS and provide storage of 3,917 m^3 within the CSO compound
30996-H-RZ002-73173-2030-2050-M	**H**	Fairfield SPS CSO, Sedbury	Option is to provide storage of 365 m^3 at the CSO to reduce the spill count to zero by 2050.
30996-H-RZ001-33124-2025-2050-M	**H**	No2 CSO, Chepstow	Option is to disconnect 2.1 ha road and 10 ha of roof upstream of the CSO by 2050, and provide storage of 52m^3 within the CSO compound.
30996-H-RZ002-31881-2025-2050-M	**H**	Nash No 4 CSO	Option is to disconnect 1.5 ha road and 1.4 ha of roof area upstream of the CSO by 2050, and provide storage of 76 m^3 within the CSO compound.
30996-H-RZ002-71901-2025-2030-M	**H**	Chepstow North PS EOF	Option is to disconnect 3.7 ha road area upstream of the CSO by 2030, construct SuDS and provide storage of 6,088 m^3 within the CSO compound.
30996-H-RZ002-71901-2030-2050-M	**H**	Chepstow North PS EOF	Option is to provide storage of 332 m^3 at the CSO to reduce the spill count to zero by 2050.
30996-H-RZ001-33129-2025-2030-M	**H**	No 3 Chepstow Pt1	Option is to disconnect 5.2ha road area upstream of the CSO by 2030, construct SuDS and provide storage of 8,056m^3 within the CSO compound.
30996-H-RZ001-33129-2030-2050-M	**H**	No 3 Chepstow Pt 2	Option is to provide storage of 869m^3 at the CSO to reduce the spill count to zero by 2050.
30996-H-RZ002-71902-2025-2030-M	**H**	Sedbury PS EOF	Option is to disconnect 4.7ha road area upstream of the CSO by 2030, construct SuDS and provide storage of 5,144m^3 within the CSO compound.
30996-H-RZ002-71902-2030-2050-M	**H**	Sedbury PS EOF	Option is to provide storage of 649m^3 at the CSO to reduce the spill count to zero by 2050.
30996-H-RZ001-72172-2025-2050-M	**H**	Warren Slade PS CSO / EO	Option is to disconnect 0.2ha road and 0.5ha of roof area upstream of the CSO by 2050, and provide storage of 12m^3.

5.4.76 The following tables summarises the effects arising from the options that are proposed for Newport Nash.

Newport Nash Area B

5.4.77 Table **5.26** summarises the options that are proposed for Newport Nash B.

Table 5.26 Assessment of the Effects of Newport Nash B

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
30996-B-RZ006-71494-2025-2050-M	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	0	+

Construction

5.4.78 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of option 30996-B-RZ006-71494-2025-2050-M, as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention

5.4.79 A likely significant negative effect has been identified against Objective 5 (Air Quality) for the assessment of option 30996-B-RZ006-71494-2025-2050-M, arising from a 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 works would partially take place within an AQMA.

5.4.80 A likely significant negative effect has been identified against Objective 6 (Greenhouse Gas Emissions) for the assessment of option 30996-B-RZ006-71494-2025-2050-M, associated with the requirement for significant quantities of materials with embodied carbon, reflecting the scale of the scheme.

5.4.81 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of option 30996-B-RZ006-71494-2025-2050-M, 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.

5.4.82 A likely significant negative effect has been identified against Objective 9 (Human Health) during the assessment of option 30996-B-RZ006-71494-2025-2050-M, reflecting the scale of construction and associated emissions, noise and disturbance that would affect proximate residential and recreational receptors.

5.4.83 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of option 30996-B-RZ006-71494-2025-2050-M, associated with the

requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.

5.4.84 No other likely significant effects have been identified during the assessment of the construction period of option 30996-B-RZ006-71494-2025-2050-M, however, a range of minor positive and minor and moderate negative effects have been identified.

Operation

5.4.85 A likely significant positive effect has been identified against Objective 3 (Water Quality) during the assessment of option 30996-B-RZ006-71494-2025-2050-M, reflecting the scale of the scheme and potential for positive effect on receiving water quality.

5.4.86 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of option 30996-B-RZ006-71494-2025-2050-M, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed scheme of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.87 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option 30996-B-RZ006-71494-2025-2050-M, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding and/or maintenance of surface water and bathing water quality.

5.4.88 A likely significant positive effect has been identified against Objective 10 (Water Resources) during the assessment of option 30996-B-RZ006-71494-2025-2050-M, reflecting the scale of the option and corresponding reduction in the quantity of water entering the drainage and wastewater system and provision of additional capacity in the drainage and wastewater system and resulting positive effect on network infiltration.

5.4.89 No other likely significant effects have been identified during the assessment of the operational period of option 30996-B-RZ006-71494-2025-2050-M, however, a range of minor positive and negative effects have been identified.

Newport Nash Area C

5.4.90 Table **5.27** summarises the options that are proposed for Newport Nash C.

Table 5.27 Assessment of the Effects of Newport Nash C

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
30996-C-RZ007-32112-2025-2050-T	Construction (negative)	-	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	0
	Operation (positive)	+	0	+++	+++	0	0	+++	+++	+++	+++	0	0	0

Construction Effects

5.4.91 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of option 30996-C-RZ007-32112-2025-2050-T, as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention

5.4.92 A likely significant negative effect has been identified against Objective 5 (Air Quality) for the assessment of option 30996-C-RZ007-32112-2025-2050-T, arising from a 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.

5.4.93 A likely significant negative effect has been identified against Objective 6 (Greenhouse Gas Emissions) for the assessment of option 30996-C-RZ007-32112-2025-2050-T, associated with the requirement for significant quantities of materials with embodied carbon, reflecting the scale of the scheme.

5.4.94 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of option 30996-C-RZ007-32112-2025-2050-T, 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.

5.4.95 A likely significant negative effect has been identified against Objective 9 (Human Health) during the assessment of option 30996-C-RZ007-32112-2025-2050-T, reflecting the scale of construction and associated emissions, noise and disturbance that would affect proximate residential and recreational receptors.

5.4.96 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of option 30996-C-RZ007-32112-2025-2050-T, associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.

5.4.97 No other likely significant effects have been identified during the assessment of the construction period of option 30996-C-RZ007-32112-2025-2050-T, however, a range of minor positive and minor and moderate negative effects have been identified.

Operational Effects

5.4.98 A likely significant positive effect has been identified against Objective 3 (Water Quality) during the assessment of option 30996-C-RZ007-32112-2025-2050-T, reflecting the scale of the scheme and potential for positive effect on receiving water quality.

5.4.99 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of option 30996-C-RZ007-32112-2025-2050-T, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed scheme of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.100 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option 30996-C-RZ007-32112-2025-2050-T, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding and maintenance of surface water and bathing water quality.

5.4.101 A likely significant positive effect has been identified against Objective 10 (Water Resources) during the assessment of option 30996-C-RZ007-32112-2025-2050-T, reflecting the scale of the option and provision of additional capacity in the drainage and wastewater system and resulting positive effect on network infiltration.

5.4.102 No other likely significant effects have been identified during the assessment of the operational period of option 30996-C-RZ007-32112-2025-2050-T, however, a minor positive effect has been identified against one other objective (Objective 1).

Newport Nash Area D

5.4.103 Table **5.28** summarises the options that are proposed for Newport Nash D.

Table 5.28 Assessment of the Effects of Newport Nash D

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
30996-D-RZ001-DFL.003655.DFL.002101-2025-2050-M	Construction (negative)	-	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
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+
30996-D-RZ002-DFL.002802.DFL.003655-2025-2050-T	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	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 (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-D-RZ001-71492-2025-2030-T	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	0	0
	Operation (positive)	+	0	++	++	0	0	++	++	++	++	+/?	0	0
30996-D-RZ001-71492-2030-2050-T	Construction (negative)	-	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	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-D-RZ001-71490-2025-2030-M	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	0	0
30996-D-RZ001-71490-2030-2050-M	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	0	0	0	0	0	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-D-RZ001-71493-2025-2030-M	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	0
30996-D-RZ001-71493-2030-2050-M	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	0	0	0	0	0	0
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0

Construction Effects

5.4.104 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of all options in the Newport Nash D Area as more than 40% of the proposed construction area of each of the schemes is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

5.4.105 A likely significant negative effect has been identified against Objective 5 (Air Quality) for the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, arising from a 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 schemes.

5.4.106 A likely significant negative effect has been identified against Objective 6 (Greenhouse Gas Emissions) for the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, associated with the requirement for significant quantities of materials with embodied carbon, reflecting the scale of the schemes.

5.4.107 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, 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.

5.4.108 A likely significant negative effect has been identified against Objective 9 (Human Health) during the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, reflecting the scale of construction and associated emissions, noise and disturbance that would affect proximate residential and recreational receptors.

5.4.109 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the schemes.

5.4.110 A likely significant negative effect has been identified against Objective 12 (Historic Environment) during the assessment of option 30996-D-RZ001-71490-2025-2030-M, due to the scale of works and associated potential for works to affect the setting of a large number designated heritage assets (including a large number of Listed Buildings contained within the area of the works, Scheduled Monuments in close proximity to the works and Historic Parks and Gardens and Conservation Areas located either within or adjacent to the works).

5.4.111 No other likely significant effects have been identified during the assessment of the construction period of the options in the Newport Nash D Area options, however, a range of minor and moderate positive and negative effects have been identified.

Operational Effects

5.4.112 A likely significant positive effect has been identified against Objective 3 (Water Quality) during the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, reflecting the scale of the schemes and potential for positive effect on receiving water quality.

5.4.113 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, reflecting the scale of the schemes and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed schemes of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.114 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, reflecting the scale of the schemes and corresponding reduction in the frequency and severity of flooding and maintenance of surface water and bathing water quality.

5.4.115 A likely significant positive effect has been identified against Objective 10 (Water Resources) during the assessment of options 30996-D-RZ001-71490-2025-2030-M and 30996-D-RZ001-71493-2025-2030-M, reflecting the scale of the option and corresponding reduction in the water entering the drainage and wastewater system and provision of additional capacity in the drainage and wastewater system and resulting positive effect on network infiltration

5.4.116 No other likely significant effects have been identified during the assessment of the operational period of the Newport Nash D Area options, however, a range of minor and moderate positive and negative effects have been identified.

Newport Nash E

5.4.117 Table **5.29** summarises the options that are proposed for Newport Nash E.

Table 5.29 Assessment of the Effects of Newport Nash E

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
30996-E-RZ001-31970-2025-2050-M	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	0	+
30996-E-RZ001-71491-2025-2050-M	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	+
30996-E-RZ001-	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. Historic Environment	13. Landscape
33156-2025-2030-M	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	+
30996-E-RZ001-33156-2030-2050-M	Construction (negative)	-	-	0	0	0	0	0	0	-	0	-	-	-
	Construction (positive)	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

Construction effects

5.4.118 A likely significant negative effect has been identified against Objective 5 (Air Quality) for the assessment of option 30996-E-RZ001-71491-2025-2050-M, arising from a 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 works would take place in close proximity to an AQMA.

5.4.119 A likely significant negative effect has been identified against Objective 6 (Greenhouse Gas Emissions) for the assessment of option 30996-E-RZ001-71491-2025-2050-M, associated with the requirement for significant quantities of materials with embodied carbon, reflecting the scale of the scheme.

5.4.120 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of option 30996-E-RZ001-71491-2025-2050-M, 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.

5.4.121 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of option 30996-E-RZ001-71491-2025-2050-M, associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.

Operational effects

5.4.122 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of option 30996-E-RZ001-71491-2025-2050-M, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed scheme of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.123 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of option 30996-E-RZ001-71491-2025-2050-M, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding and/or maintenance of surface water and bathing water quality.

5.4.124 A likely significant positive effect has been identified against Objective 10 (Water Resources) during the assessment of option 30996-E-RZ001-71491-2025-2050-M, reflecting the scale of the option and corresponding reduction in the quantity of water entering the drainage and wastewater system and/or provision of additional capacity in the drainage and wastewater system and resulting positive effect on network infiltration.

Newport Nash F

5.4.125 Table **5.30** summarises the options that are proposed for Newport Nash F.

Table 5.30 Assessment of the Effects of Newport Nash F

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
30996-F-RZ001-70410-2025-2050-M	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	0	0
30996-F-RZ001-DFL.003490-2025-2050-S	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	-	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

Construction effects

5.4.126 A likely significant negative uncertain effect has been identified against Objective 1 (Biodiversity) for the assessment of option 30996-F-RZ001-70410-2025-2050-M due to the potential for works to directly affect the features of the Gwent Levels - Magor and Undy SSSI through land take, encroachment and/or disturbance arising from noise, vibration and pollutant emissions; however, there are uncertainties associated, due to the refinement needed on scheme details and assumptions made on siting and potential mitigation which would require further investigation and/or revision.

5.4.127 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of option 30996-F-RZ001-DFL.003490-2025-2050-S as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk of flooding.

However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

Operational effects

5.4.128 No significant effects have been identified during the assessment of the Newport Nash (Area F) options for operation. However, a range of minor and moderate positive and negative effects have been identified and assessed, reflecting the small scale of the proposed schemes.

Newport Nash H

5.4.129 Table **5.31** summarises the options that are proposed for Newport Nash H.

Table 5.31 Assessment of the Effects of Newport Nash H

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
30996-H-RZ002-33125-2025-2030-M	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	+
30996-H-RZ002-33125-2030-2050-M	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	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-H-RZ002-73173-2025-2030-M	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	0	+
30996-H-RZ002-73173-2030-2050-M	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
30996-H-RZ002-	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. Historic Environment	13. Landscape
73173-2030-2050-M	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	+
30996-H-RZ002-31881-2025-2050-M	Construction (negative)	-	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	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	+
30996-H-RZ002-71901-2025-2030-M	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	+
30996-H-RZ002-71901-2030-2050-M	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	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-H-RZ001-33129-2025-2030-M	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	+
30996-H-RZ001-33129-2030-2050-M	Construction (negative)	-	-	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	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-H-RZ002-71902-2025-2030-M	Construction (negative)	-	-	0	0	---	---	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	+
30996-H-RZ002-71902-2030-2050-M	**Construction (negative)**	-	-	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	-	-
	Operation (positive)	+	0	+	+	0	0	+	+	+	+	0	0	0
30996-H-RZ001-72172-2025-2050-M	**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

5.4.130 A likely significant negative uncertain effect has been identified against Objective 1 (Biodiversity) for the assessment of 30996-H-RZ002-73173-2025-2030-M, due to the potential for works to affect the features of designated site River Wye (Lower Wye)/Afon Gwy (Gwy Asaf) SSSI, through land take, encroachment and/or disturbance arising from noise, vibration and pollutant emissions/discharges to the watercourse; however, there are uncertainties associated, due to the refinement needed on scheme details and assumptions made on siting and potential mitigation which would require further investigation/and revision.

5.4.131 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71901-2030-2050-M, as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

5.4.132 A likely significant negative effect has been identified against Objective 5 (Air Quality) for the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, arising from a 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 schemes, and that the works would take place in close proximity to an AQMA.

5.4.133 A likely significant negative effect has been identified against Objective 6 (Greenhouse Gas Emissions) for the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, associated with the requirement for significant quantities of materials with embodied carbon, reflecting the scale of the schemes.

5.4.134 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, associated with the significant capital expenditure that the construction of the schemes would involve, and which would be expected to generate benefits in respect of the supply chain and local employment opportunities.

5.4.135 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the schemes.

Operational effects

5.4.136 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, reflecting the scale of the schemes and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed schemes of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.137 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, reflecting the scale of the schemes and corresponding reduction in the frequency and severity of flooding and/or maintenance of surface water and bathing water quality.

5.4.138 A likely significant positive effect has been identified against Objective 10 (Water Resources) during the assessment of options 30996-H-RZ002-71901-2025-2030-M and 30996-H-RZ002-71902-2025-2030-M, reflecting the scale of the options and corresponding reduction in the quantity of water entering the drainage and wastewater system and/or provision of additional capacity in the drainage and wastewater system and resulting positive effect on network infiltration.

Tawe to Cadoxton

5.4.139 The Tawe to Cadoxton covers an area stretching into the Brecon Beacons National Park in the north as far as Craig-y-nos and Aber-llia to Barry and South West Cardiff in southern extent and is estimated population equivalent of approximately 797,000.

5.4.140 Tawe to Cadoxton consists of 31 wastewater treatment works catchments and there is a total sewer length of 4,615km, where:

- 1,572km is associated to the foul system;
- 898km is associated to the surface water system; and
- 2,098km is associated to the combined system.

5.4.141 There are 31 WwTW, 453 SPSs, and 417 CSOs across this river basin catchment level.

5.4.142 There are several main rivers within the L2 including the Rivers Cadoxton, Thaw, Colhugh, Ogmore, Afan, Neath and Tawe. The Tawe to Cadoxton catchment covers several major urban areas including Cardiff West, Barry, Bridgend, Port Talbot and Swansea.

5.4.143 Following river basin screening and BRAVA, the L4 areas of Pen-Y-Bont (Merthyr Mawr) and Swansea Bay were identified as being subject to current and future risks that required intervention to be considered in the draft DWMP, with best value schemes selected for each area.

Pen-Y-Bont (Merthyr Mawr)

5.4.144 **Table 5.32** summarises the options that are proposed for Pen-Y-Bont (Merthyr Mawr).

Table 5.32 Pen-Y-Bont (Merthyr Mawr) Options

Option Id	Option Title	Option Description
50743-A-RZ008-DFL.000393_4a-2025-2050-M	000393_Mixed_2030-2050	Reline 1.2km of sewer to remove 50% baseflow. 2,818m^3 tanks connected by a flap valve at the bottom and a weir at the top. Reduction of an existing weir level (by 0.1m) and constructing additional weir connected via a 27m long sewer to a storage tank.
50743-A-RZ008-DFL.002828_4a-2025-2050-T	002828_Traditional_2030-2050	50% infiltration reduction from sewer by relining 57m. Upsizing 525m of pipes and creating an offline tank of 405m^3 volume to store excess water, which can then be pumped back to the sewer network.

5.4.145 **Table 5.33** summarises the effects arising from the options that are proposed for Pen-Y-Bont (Merthyr Mawr).

Table 5.33 Assessment of the Effects of Pen-Y-Bont (Merthyr Mawr) 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
50743-A-RZ008-DFL.000393_4a-2025-2050-M	**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	0	0
50743-A-RZ008-DFL.002828_4a-2025-2050-T	**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	0	0	0	-	0
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0

5.4.146 No significant effects have been identified during the assessment of the Pen-Y-Bont (Merthyr Mawr) options. However, a range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the small scale of the proposed schemes.

Swansea Bay

5.4.147 **Table 5.34** summarises the options that are proposed for Swansea Bay.

Table 5.34 Swansea Bay Options

Option Id	Option Title	Option Description
53100-A-RZ008-DFL.Rhyddings Terrace_4a-2025-2050-M	Swansea Bay_Mixed_2050	2 ha of paved impermeable area removed upstream of flooding location. A smaller 270m^3 offline tank built to store flooding via weir. It is then pumped at 14l/s to the downstream network, controlled by a RTC, which will then return the flows to the sewer once the storm is complete and DWF conditions are met.
53100-A-RZ003-DFL.002873_4a-2025-2050-M	002873_Sustainable_2025-2050	Major impermeable area removal around Swansea Industrial Estate. Disconnecting cark parks and large industrial unit roof connections and connecting into nearby watercourse. Upsizing of Langdon SPS and Fenrod SPS. 12.7ha of IA removed. 295m of sewer upsizing, 4228m rising main and pumping station upgrades required for residual flooding and 3.6ha of IA removed

5.4.148 **Table 5.35** summarises the effects arising from the options that are proposed for Swansea Bay.

Table 5.35 Assessment of the Effects of Swansea Bay 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
53100-A-RZ008-DFL.Rhyddings Terrace_4a-2025-2050-M	**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	0	0	0	0	-	-
	Operation (positive)	0	0	+	+	0	0	+	+	+	+	0	0	0
53100-A-RZ003-DFL.002873_4a-	**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. Historic Environment	13. Landscape
2025-2050-M	**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

5.4.149 A likely significant negative effect has been identified against Objective 4 (Flood Risk) for the assessment of the 002873_Sustainable_2025-2050 option, as more than 40% of the proposed construction area is located within Flood Zone 3, and so could be subject to the risk of flooding. However, the coincidence of works to resolve flood risk (within an area of flood risk) reflects the implementation of the DWMP strategic objectives and the prioritisation of areas for intervention.

5.4.150 A likely significant negative effect has been identified against Objective 5 (Air Quality) for the assessment of the 002873_Sustainable_2025-2050 option, arising from a 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.

5.4.151 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) for the assessment of the 002873_Sustainable_2025-2050 option 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.

5.4.152 A likely significant negative effect has been identified against Objective 11 (Waste and Materials) during the assessment of the 002873_Sustainable_2025-2050 option associated with the requirement for significant quantities of materials and potential waste, reflecting the scale of the scheme.

5.4.153 No other likely significant effects have been identified during the assessment of the construction period of the Swansea Bay options, however, a range of minor positive and minor and moderate negative effects have been identified.

Operational Effects

5.4.154 A likely significant positive effect has been identified against Objective 4 (Flood Risk) and Objective 7 (Climate Change Resilience) during the assessment of the 002873_Sustainable_2025-2050 option reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding that could affect communities. The operation of the proposed schemes of scale, in contributing to the three strategic objectives (water quality, water quantity and resilience and maintenance), will increase the sustainability of the network and contribute towards improvement of resilience to the effects of climate change.

5.4.155 A likely significant positive effect has been identified against Objective 8 (Economic and Social Wellbeing) and Objective 9 (Human Health) during the assessment of the 002873_Sustainable_2025-2050 option, reflecting the scale of the scheme and corresponding reduction in the frequency and severity of flooding.

5.4.156 A likely significant positive effect has been identified against Objective 10 (Water Resources) during the assessment of the 002873_Sustainable_2025-2050 option, reflecting the scale of the option and corresponding reduction in the quantity of water entering the drainage and wastewater system and provision of additional capacity in the system and resulting positive effect on network infiltration.

5.4.157 No other likely significant effects have been identified during the assessment of the operational period of the Swansea Bay options, however, a range of minor positive and effects have been identified.

Summary

5.4.158 **Table 5.36** summarises the effects arising for each of the L4 drainage areas from those options screened for assessment.

Table 5.36 Summary of the Assessment Findings

L2 River basin catchment	L4 drainage area	Number of options screened in	Likely significant effects identified	Comments
Carmarthen Bay and the Gower	Gowerton	2	☒	No likely significant effects identified. A range of minor and moderate positive and negative effects for construction and operation have been identified and assessed, reflecting the small scale of the proposed schemes
	Llanelli Coastal	1	☒	
Clwyd	Kinmel Bay	2	☑	Two proposed schemes with likely significant negative effects against one SEA objective during construction.
Conway	Ganol STW	6	☑	One proposed scheme with likely significant negative effects against one SEA objective during construction.
Dee	Five Fords (Wrexham)	2	☑	Two proposed schemes with likely significant negative effects against one SEA objective during construction. In operation, likely significant positive effects against one SEA objective.
	Llanasa (Nr Prestatyn)	5	☑	Two proposed schemes with likely significant negative effects against one SEA objectives during construction.
Llyn and Eryri	Bangor Treborth	9	☑	One proposed scheme with likely significant negative effects against two SEA objectives and one likely significant positive effect during construction. In operation, likely significant positive effects against four SEA objectives
	Porthmadog	4	☒	No likely significant effects identified.

L2 River basin catchment	L4 drainage area	Number of options screened in	Likely significant effects identified	Comments
Meirionydd	Tywyn	3	☑	One proposed scheme with likely significant negative effects against one SEA objective during operation.
South East Valleys	Cardiff Bay	2	☒	No likely significant effects identified.
	Cilfynydd	1	☒	No likely significant effects identified.
	Newport Nash	29	☑	17 proposed schemes with likely significant negative effects against up to five SEA objectives and one likely significant positive effect during construction. In operation, likely significant positive effects against up to five SEA objectives.
Tawe to Cadoxton	Pen-Y-Bont	2	☒	No likely significant effects identified.
	Swansea Bay	2	☑	One proposed scheme with likely significant negative effects against three SEA objectives and one likely significant positive effect during construction. In operation, likely significant positive effects against five SEA objectives.
Total		70		

5.5 Secondary, Cumulative and Synergistic Effects

5.5.1 The SEA regulation requires 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 measures within a catchment (summarised in **Section 5.4** 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 Draft DWMP programme

5.5.2 The extent to which the draft DWMP options can act cumulative 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 L4 drainage area, a L2 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.

5.5.3 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 5.7**). 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'.

5.5.4 Operationally, the options included in the draft DWMP will deliver against one or more of the three strategic objectives:

- **Water Quantity** - Reduce the risk of (internal and external) flooding to communities;
- **Water Quality** - Management of our water quality, services and the environment; and
- **Resilience and Maintenance** - Adaptiveness to change while maintaining critical services and protecting the environment.

5.5.5 For example, the modelling that underpins the DWMP has identified those CSOs where there are or are predicted to be over 40 spills per year and identifies solutions to progressively reduce this frequency. Options will therefore always reduce CSO spills relative to the current baseline (which will be beneficial or at least neutral in terms of operational effects). In consequence, in operation, the options 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.

5.5.6 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).

5.5.7 In **Table 5.37**, 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 5.37 General Commentary on the Potential for Cumulative Effects

Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with Other Plans and Programmes?
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.	Cumulative effects are most likely where options are located within same L4 drainage area of L2 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. Severn and the Dee Estuaries, both designated as Ramsar, SAC and SPAs). For three L4 areas (Five Fords, Llanasa and Newport Nash), proposed schemes (whether traditional or SUDs) potentially could, through direct construction effects on functional habitat and/or the creation of wetlands, have effects on the features recognised within designated sites (Johnstown Newt Sites SAC, the Dee Estuary Ramsar and SPA and the River Usk SAC). However, it is very likely that the effects could be avoided or mitigated using established measures although additional information may be required to determine the likely location of proposed infrastructure relative to the designated sites. Many of the schemes have been undertaken to reduce flooding (albeit focused on WSC) by introducing temporary storage and/or transfer of flows to WwTW. This will reduce	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.

Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with Other Plans and Programmes?
	peak volumes and flows, and the resultant mobilisation of pollutants and entrainment of debris with relatively beneficial effects on downstream water quality (and associated receptors). In addition, a number of options within this draft DWMP are being undertaken to specifically reduce CSO spills to SAC, with the objective of achieving zero spills by 2050. In consequence, the cumulative effects of operating the proposed schemes will be positive on the designated features (compared to not implementing the options), as flows that would otherwise spill are passed to the downstream WwTW for treatment in accordance with the WwTW's consents. Those sustainable options may also lead to cumulative positive effect through the creation of wetland habitats, suitable for protected species e.g. amphibians and wetland birds.	
2. To protect and enhance soil quantity, quality and functionality and geodiversity and ensure the appropriate and efficient use of land.	Many of the traditional schemes 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.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
3. To protect and enhance the quality and quantity of surface and groundwater resources.	Cumulative effects are most likely where measures are located within same L4 drainage area or L2 catchment. Many of the schemes have been undertaken to reduce flooding (albeit focused on WSC) by introducing temporary storage. This will reduce peak volumes and flows, and the resultant mobilisation of pollutants and entrainment of debris with relatively beneficial effects on downstream water quality (and associated receptors). In addition, a number of options within this draft DWMP are being undertaken to specifically reduce CSO spills to SAC, with the objective of achieving zero spills by 2050. In consequence, in many instances, from the operation of the schemes, consistent with the contribution to the planning objectives, the cumulative effects of operating the schemed will be positive on water quality and quantity (by increasing infiltration and residence time of water within the catchment).	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
4. To reduce or manage flood risk.	Many of the schemes have been undertaken to reduce flooding (albeit focused on WSC) by introducing increased network capacity, flow diversions. temporary storage, and a range of SUDs schemes. Cumulative significant positive effects will occur within each L4 drainage area and aggregate up to the L2 catchment and which are reflected in the DWMP 'flood benefits' identified. The use of SUDs schemes in particular provide an opportunity to address the effects of urban creep (and the growth in impermeable surfaces within developed areas), which then exacerbate the risks of flooding.	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 L4 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.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP

Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with Other Plans and Programmes?
	Cumulatively, and associated with the scale of future investment, it is estimated that embodied carbon associated with the 160 selected schemes is likely to exceed 100,000 tonnes, 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 Welsh Water's current energy use).	measure and other plans and programmes.
7. To adapt and improve resilience to the threats of climate change.	The DWMP used datasets that included those from the NRW Flood Risk Assessment Wales (FRAW) project, which including considering the effects 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 DWMP takes an approach to each risk area that seeks to preferentially provide a sustainable approach, which aligns with the overall catchment strategy. Where the sustainable approach has not been sufficient to resolve the issues, a mixed approach has been developed which comprises elements of sustainable engineering and hard engineering. The use of SUDs schemes in particular provide an opportunity to address the effects of climate change by increasing infiltration and residence time of water within drainage and catchment areas. Many of the schemes have been undertaken to reduce flooding (albeit focused on WSC) by introducing increased network capacity, flow diversions. temporary storage. Cumulatively this has been assessed to contribute significant positive effects.	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 the period 2025 to 2050, and if all 160 schemes are implemented has a cumulative capex value of greater than £1bn, and so would average a spend of some £40m per annum, or an average of some £7m per scheme. Many of the identified schemes are phased to begin work in the period 2025 – 2030, with further elements then developed. Cumulatively, it represents a significant investment in essential infrastructure which would, given its longevity create long term economic benefits and employment opportunities in the water and construction sectors of Wales. Direct, indirect and induced employment opportunities, given the focused areas of investment could also be beneficial to the communities in each L4 area.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.
9. To protect and enhance human health and well-being.	Many of the schemes have been undertaken to reduce flooding on WSC by introducing increased network capacity, flow diversions. temporary storage, and a range of SUDs schemes, and will have a direct effect on any affected customers health and well-being. The DWMP, by reducing flooding and ensuring surface water and bathing water quality is maintained within statutory limits will also contribute cumulative to communities' health in catchment areas. Additional greenspace areas created as the result of the implementation of SuDS infrastructure such as swales and wetlands, as part of the sustainable option type, may also lead to additional positive effects on community health and social 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.	Potential for cumulative effects depending on the nature, location and timing of the draft DWMP measure and other plans and programmes.

Objective	Potential for Cumulative Effects of the DWMP Programme?	Potential for Cumulative with 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.	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.	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

5.5.8 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.).

5.5.9 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:

- Welsh Water's Water Resources Management Plan 2019 and water resource demand (soon to be updated with WRMP24);
- National Policy Statements (NPS) and Nationally Significant Infrastructure Projects (NSIPs).

5.5.10 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.

5.5.11 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 WwTW discharges and CSO spills 'in combination' with agricultural inputs and nutrient neutrality. There is opportunity for Welsh Water, building on the learning from completing this first DWMP, to undertake a review of WwTW 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 WwTW capacity.

Welsh Water's Water Resources Management Plans

5.5.12 Welsh Water published its current Water Resources Management Plan (WRMP19) in March 2019 and is now working toward the preparation of its next plan, WRMP24. WRMP24 will include consideration of unconstrained, feasible and preferred plan options and adaptive plan pathways for water supply and demand management in Welsh Water's supply and operational area over at least the next 25 years, as well as any bulk supply arrangements with other water companies. Welsh Water's WRMP24 is also being developed alongside and integrated with the Water Resources West (WRW) Regional Plan.

5.5.13 Welsh Water'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.

5.5.14 There is commonality between some of the schemes considered in the DWMP and those proposed in 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 WRMP24 is seeking to reduce per capita water use, whereas the DWMP is seeking to reduce water entering the wastewater network. WRMP19 includes demand management measures for water resource zones[205] (WRZs) that include some of those L4 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 L4 areas identified in the DWMP.

National Policy Statements and Nationally Significant Infrastructure Projects

5.5.15 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 5.38**.

Table 5.38 Current Status of National Policy Statements

National Policy Statement (NPS)	Status	Are Potential Locations of NSIPs included in the NPS?
Overarching Energy EN-1[206]	Designated July 2011	No
Fossil Fuel Electricity Generating Infrastructure EN-2	Designated July 2011	No
Renewable Energy Infrastructure EN-3	Designated July 2011	No

[205] Section 4.4. of the WRPG defines a water resource zone as "*an area within which the sources of water and distribution of water to meet demand, is largely self-contained (with the exception of agreed bulk transfers)*".

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

National Policy Statement (NPS)	Status	Are Potential Locations of NSIPs included in the NPS?
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	Draft published January 2018	No

5.5.16 The draft DWMP is not expected to have any adverse cumulative effects in-combination with the NPSs listed above. This is because the NPSs 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.

5.5.17 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, one (Wylfa) is located within the Welsh Water DWMP area, although it is not in any current L4 drainage or L2 catchment areas.

5.5.18 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 water demand in the Welsh Water region. Similarly, the Airports NPS concerns runway capacity in the South East of England only.

5.5.19 Defra is currently preparing a 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.

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

5.6.1 As set out in **Section 1.6**, the *Well-being of Future Generations (Wales) Act 2015* places a duty on public bodies including Welsh Water 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.

5.6.2 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".

5.6.3 The well-being goals and SMNR objective have been mapped to the SEA objectives that comprise the SEA assessment framework (see **Section 4.3**). Through the assessment of the draft DWMP measures against the SEA objectives, it is therefore possible to assess the contribution that the implementation of the Plan would make to the achievement of the goals and objective.

5.6.4 A matrix has been used to record this assessment and is presented in **Table 5.39** below. Informed by the assessment of the measures against the SEA objectives, as well as the cumulative effects of the draft DWMP (as summarised in the preceding section), a judgement has been made regarding whether, and the extent to which, the draft DWMP would support or detract from the achievement of each well-being goal (and by extension, the SMNR objective) in-turn with commentary provided to justify the conclusions reached.

Table 5.39 Assessment of the Contribution of the Draft DWMP to the Well-being Goals for Wales

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
A prosperous Wales: An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently	SEA Objectives 1, 2, 3, 7, 8, 9, 10, 11	↕	The assessment of the draft DWMP has identified that, where options involve the construction of new infrastructure, the associated capital expenditure may generate benefits in respect of the supply chain and local employment creation. At the individual scheme level such benefits are likely to vary, depending on the size, scale and duration of the proposed intervention, and have collectively been assessed as supporting the achievement of the well-being goal 'a prosperous Wales'. The operation of the proposed schemes, in contributing to the three strategic objectives

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.			(water quality, water quantity and resilience and maintenance), minimising the risks of flooding to WSC and increasing the sustainability of the network will in-turn support economic and population growth and improve resilience to the effects of climate change. The assessment of the draft DWMP schemes against the SEA objectives has also, however, highlighted the potential for direct and indirect adverse environmental effects which has been assessed as not supporting the achievement of this well-being goal. These effects would be most significant during the construction of the schemes involving significant infrastructure which would include resource use and embodied carbon
A resilient Wales: A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).	SEA Objectives 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	↕	Overall, the draft DWMP seeks to contribute to three strategic objectives (water quality, water quantity and resilience and maintenance). The use of SUDs schemes in particular provides an opportunity to address the effects of climate change on frequency and intensity of rainfall events. By increasing infiltration and residence time of water within drainage and catchment areas and by creating new wetland habitats, it will improve resilience to the effects of climate change, supporting the achievement of the well-being goal 'a resilient Wales'. The assessment of the draft DWMP against the SEA objectives has identified the potential for direct and indirect adverse environmental effects which has been assessed as not supporting the achievement of this well-being goal. These effects would be particularly felt during construction, where there could be effects on (inter alia) biodiversity, soils, water and landscape which contribute to the resilience of Wales' ecosystems. However, these effects would be largely temporary, and it is likely that adverse impacts would be mitigated where possible at the project level.
A healthier Wales: A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.	SEA Objectives 1, 3, 4, 5, 9	↕	The draft DWMP will seek to reduce flooding on WSC, contribute towards ensuring surface water and bathing water quality requirements are met and create new greenspaces and localised habitats that has collectively been assessed as supporting the achievement of the well-being goal 'a healthier Wales'. Emissions to air, alongside noise and vibration disturbance, during construction of the hard engineering elements of proposed schemes (where applicable) may have minor adverse effects on human health which has been assessed as not supporting the achievement of this well-being goal. However, any adverse impacts in this regard would be temporary and localised and, further, are likely to be managed through the implementation of best practice construction methods.
A more equal Wales: A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio	SEA Objectives 8, 9	↑	As noted above, the draft DWMP will contribute to the three strategic objectives (water quality, water quantity and resilience and maintenance), minimising the risks of flooding to WSC and increasing the sustainability of the network. By prioritising interventions based on risks (of flooding, or to the environment), schemes have been proposed for North, South West and Southern Wales, ensuring that those most adversely affected, irrespective of

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
economic background and circumstances).			location, or circumstance have been helped. This has been assessed as supporting the achievement of the well-being goal 'a more equal Wales'. The assessment of the draft DWMP has identified that, where measures involve the construction of new infrastructure, the associated capital expenditure may generate benefits in respect of the supply chain and local employment creation. At the individual scheme level such benefits are likely to vary, depending on the size, scale and duration of the proposed intervention; however, cumulatively they have been assessed as supporting the achievement of this well-being goal.
A Wales of cohesive communities: Attractive, viable, safe and well-connected communities.	SEA Objectives 8, 9	↕	The draft DWMP will contribute to the three strategic objectives (water quality, water quantity and resilience and maintenance), minimising the risks of flooding to WSC and contribute towards ensuring surface water and bathing water quality requirements are met. This has been assessed as supporting the achievement of the well-being goal 'a Wales of cohesive communities'. Emissions to air, alongside noise and vibration disturbance, during construction of the supply-side measures (where applicable) may have minor adverse effects on host communities which has been assessed as not supporting the achievement of this well-being goal. However, any adverse impacts in this regard would be temporary and localised and, further, are likely to be managed through the implementation of best practice construction methods. The assessment of the draft DWMP measures against the SEA objectives has also highlighted the potential for direct and indirect adverse environmental effects including in respect of landscape which could affect the attractiveness of communities. However, any effects in this regard would be temporary and localised.
A Wales of vibrant culture and thriving Welsh language: A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.	SEA Objective 12, 13	↕	The draft DWMP will contribute to the three strategic objectives (water quality, water quantity and resilience and maintenance), which, in minimising flood risks and supporting economic and social well-being will provide foundations for the protection and enhancement of Welsh culture. The draft DWMP reflects guidance that includes Cadw's Conservation Principles, Planning Policy Wales and the Technical Advice Note 24: the historic environment. Scheme development and assessment has taken into account new infrastructure locations, and the proximity and effects on World Heritage Sites, Scheduled Monuments and Listed Buildings. In consequence, at present, the assessment of the draft DWMP against the SEA objectives has identified adverse effects in respect of cultural heritage during the construction or operational phases of the options. Where appropriate, mitigation of any likely effects on the significance of a historic asset and its setting, consistent with the guidance has been considered. Overall, the draft DWMP is expected to make a mixed contribution to the achievement of the well-being goal, 'a Wales of vibrant culture and thriving Welsh language'.

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
A globally responsible Wales: A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.	SEA Objectives 1, 2, 6, 7, 8, 9, 10, 11, 12 , 13	↔	Taking into account the nature and scale of the draft DWMP, and that effects associated with their construction and operation would be predominantly felt at a local/sub-regional level, it is not expected that the draft DWMP would make a contribution to this well-being goal. It is recognised that the construction and operation of the measures would result in resource use and greenhouse gas emissions; however, in the context of national (Wales) and global emissions, any impact in this regard would be negligible.

Key

Symbol	Effect
↑	The draft DWMP supports the achievement of the well-being goal.
↔	The draft DWMP will not make a contribution to the achievement of the well-being goal.
↓	The draft DWMP does not support the achievement of the well-being goal.

5.6.5 **Table 5.39** demonstrates that the draft DWMP is likely to support the achievement of the majority of the well-being goals for Wales. This principally reflects the contribution of the DWMP to the three strategic objectives (water quality, water quantity and resilience and maintenance).

5.6.6 The construction (where applicable) and operation of many of the draft DWMP measures will unavoidably require the use of natural resources and generate greenhouse gas emissions and could also result in adverse environmental effects, particularly during construction. However, the implementation of the draft DWMP will seek to reduce flooding on WSC, increase the sustainability of the network, support economic and population growth, contribute towards ensuring surface water and bathing water quality requirements are met, create new greenspaces and improve resilience to the effects of climate change, making a long term contribution to the well-being goals for Wales and the objective for SMNR.

5.7 Mitigation and Enhancement

5.7.1 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.

5.7.2 Specific mitigation measures could include, for example:

- The adoption of best practice construction techniques (such as the use of sediment traps) in order to minimise or avoid the effects of construction on designated sites.

- Designing all surface water management systems to be 'amphibian friendly' to ensure no adverse effects on newt populations, taking into account the potentially intermittent flows and standing water.
- River flow and water quality monitoring during the implementation of supply-side measures.
- The rental or re-use of onsite equipment in order to minimise resource use.

5.7.3 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 the continue to perform effectively and support the gain in biodiversity envisaged.

Species Specific Measures and Biodiversity

5.7.4 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).

5.7.5 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.

Scheme Design and Planning

5.7.6 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

5.7.7 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:

- NRW, SEPA & NIEA, Guidance for Pollution Prevention (GPPs) (which are replacing the previous Pollution Prevention Guidelines (PPGs) when published) [online]. Available at: http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

  - PPG1: Understanding Your Environmental Responsibilities - Good Environmental Practices (July 2013; under review);

  - GPP5: Works and maintenance in or near water (January 2017);

  - PPG6: Working at construction and demolition sites (March 2012; under review);

  - GPP21: Pollution incident response planning (July 2017); and

  - PPG22: Incident response - dealing with spills (April 2011; under review).

- Venables R. *et al*. (2000) Environmental Handbook for Building and Civil Engineering Projects. 2nd Edition. Construction Industry Research and Information Association (CIRIA), London.

5.7.8 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

5.7.9 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. Welsh Water 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.

5.7.10 To maximise economic benefits in the Welsh Water 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

5.7.11 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.

5.7.12 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

5.7.13 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.

5.7.14 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).

Future DWMP cycles

5.7.15 The development of the current draft DWMP has represented a significant endeavour and has required the design, development and implementation of a variety of new tools and approaches, notably in assessing risks, developing and modelling solutions and in developing optimised programmes of intervention. The focus of this iteration of the plan on the risks to customers and European sites from internal flooding and CSO spills has led to the development of interventions, which in construction are relatively low risk (with effects having the potential to be mitigated if best practice measures are applied) and which in operation should contribute towards enhancing the quality of each locality.

5.7.16 Recognising however, that future Welsh Water DWMPs will include consideration of other aspects of drainage and wastewater management, including consideration of the need to address future WwTW capacity which may require significant investment, there is further opportunities to integrate environmental considerations earlier into the decision making to help expedite the development of a best value options which in turn would contribute to a best value plan. To do so, it is suggested that the following are considered when undertaking any future SEA of a future DWMP:

- **Assessment of generic interventions.** Retain and update the generic intervention assessments already undertaken of the 'sustainable options' and the 'traditional options', supplementing them with the early assessment of the other generic interventions to be considered by Welsh Water such as:
  - Customer Side Management
  - Indirect measures influencing policy.
  - Wastewater Treatment:
- **Screening of options** to identify where there is the potential for the option to have a significant effect based on sensitivity of the location. This was undertaken in the current draft DWMP once selected interventions had been developed and taken through the optimisation process for each L4 drainage area; however, an initial high-level screening could also be undertaken, analogous to the high-level screening stage in the WRMP process but utilising a GIS constraints approach to highlight key risks in each planning area being considered (and so earlier on within the plan development process). These could 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).
  - Cultural Heritage (World Heritage Sites, Scheduled Monuments, Listed Buildings, Historic Battlefields).
  - Landscape (National Parks, AONBs).

  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.
- **Prioritised catchment option assessment**: to identify, describe and evaluate the effects of the selected and screened-in preferred options at an individual and L3 catchment level. It is suggested that the assessment of individual options could be supplemented by taking into account the wider network, and the consequences of storing temporarily and piping water 'downstream' for treatment at a WwTW.
- **Preferred programme assessment**: to supplement the current qualitative identification, description and evaluation of the cumulative effects assessment of the preferred programme of options with further quantified information where possible e.g. addressing water flows, quality and/or carbon emissions (in aggregate).

5.7.17 There are several challenges relating to water quality at present and for the future, particularly when considering the cumulative effects on receiving waters of WwTW discharges and CSO spills 'in combination' with agricultural inputs and nutrient neutrality. Welsh Water are encouraged to build on the learning from completing the first DWMP and to support the development of the next DWMP by undertaking a review of WwTW consents, focused on the effects of discharges on receiving waters, taking into account the consequences of implementing interventions that go beyond current planning objectives and existing and planned WwTW capacity.

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 **YYYY.**

6.1.3 **Please e-mail your responses to DWMP@dwrcymru.com.**

6.2 Next Steps

6.2.1 The draft DWMP and accompanying documents including this Environmental Report has then been published for consultation. Following consultation, Welsh Water 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. Welsh Water 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 Welsh Water will continue to develop its final DWMP in consultation with stakeholders. Subject to the approval of Welsh Ministers, Welsh Water 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 Welsh Water 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 Welsh Water or by other relevant organisations such as the NRW. For example, Welsh Water 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. A substantial amount of relevant information is also collated by the NRW[207], and via the Welsh Government StatsWales website[208].

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

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)	Welsh Water, Natural Resources Wales (NRW)	Additionally, open communication between NRW and Welsh Water results in up-to-date information and identification of any potential issues.
	Biological monitoring (macroinvertebrates, macrophytes, fisheries, bird surveys)	Welsh Water	Monitoring/investigations undertaken as part of NEP may support this indicator.
	Intermittent discharges impact on bathing or shellfish waters	Welsh Water	Welsh Water maintains a list of all intermittent discharges to bathing or shellfish waters, using information on

[207] Natural Resources Wales (2019) *Evidence and Data*. Available online at: http://gov.wales/statistics-and-research/?lang=en https://naturalresources.wales/evidence-and-data/?lang=en

[208] Welsh Government (2019) *StatsWales: Environment and Countryside*. Available online at: https://statswales.gov.wales/Catalogue/Environment-and-Countryside

Objective	Indicator	Source of Information	Commentary
			the CSOs which have exceeded the relevant spill frequency thresholds.
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	Welsh Water	Welsh Water 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 completed as part of the NCA.
	Condition of sites designated for geological interest (e.g. geological SSSIs) on water industry land holdings	Welsh Water, NRW	Previous studies may also be used to inform monitoring and assessment.
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	Welsh Water, NRW	Previous studies may also be used to inform monitoring and assessment. For example Review of Consents (RoC) documentation and any previous NEP studies.
	Pollution incidents	Welsh Water	Welsh Water maintain a list of all pollution incidents which have occurred.
4. To reduce or manage flood risk.	Internal Sewer Flooding External Sewer Flooding Outcomes from Catchment Vulnerability Assessment (CVA): Catchment characterization which provides a mechanism to understand the vulnerability of the sewer catchment to flooding as a result of an extreme wet weather event.	Welsh Water, NRW	Welsh Water 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.	Quantity of greenhouse gas emissions per megalitre of water supplied.	Welsh Water	Welsh Water 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.	Welsh Water	Welsh Water should hold and record energy consumption data e.g. via accounts / invoices.
	Renewable energy generated or purchased.	Welsh Water	Welsh Water should record renewable energy generation data, in addition to data on renewable energy purchased e.g. via accounts / invoices.

Objective	Indicator	Source of Information	Commentary
7. To adapt and improve resilience to the threats of climate change.	Internal Sewer Flooding External Sewer Flooding Outcomes from Catchment Vulnerability Assessment (CVA): Catchment characterization which provides a mechanism to understand the vulnerability of the sewer catchment to flooding as a result of an extreme wet weather event.	Welsh Water, NRW	Welsh Water measure the number of incidents per year and keep a record of all flooding incidents per year.
8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.	Number of Welsh Water sites with public access which provide sporting, recreational and leisure resources and number of visits per year.	Welsh Water	Welsh Water hold information on the number of annual visitors to sites where specific visitor facilities are provided (e.g. Llyn Brenig). 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).	Welsh Water	Welsh Water 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 (%).	Welsh Water	Welsh Water 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.	NRW	NRW monitors the compliance of bathing waters and report this annually.
	Number of nuisance-related complaints e.g. noise, dust.	Welsh Water	Welsh Water could record the number of nuisance-related complaints made in relation to implementation of the DWMP.
	Pollution Incidents Internal Sewer Flooding External Sewer Flooding Intermittent discharges impact on bathing or shellfish waters Sewer Collapses Sewer Blockages	Welsh Water NRW	Welsh Water 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	Welsh Water	Welsh Water report these data to Ofwat as part of the annual returns process.

Objective	Indicator	Source of Information	Commentary
11. To minimise waste, promote resource efficiency and move towards a circular economy.	Amount of recycled / reused materials used	Welsh Water (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	Welsh Water (services data)	Information on waste disposal to landfill should be held by Welsh Water.
	Chemicals Use in Water Treatment	Welsh Water (services data)	Information (quantities, composition) on chemical use should be held in accounts.
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.	Welsh Water, Cadw	Cadw's regional field monument wardens monitor the condition of all statutorily protected monuments on a five-year programme.
13. To conserve, protect and enhance landscape and townscape character and visual amenity.	Loss or damage to landscape character and features of designated sites.	Welsh Water	Welsh Water could record the number and size of infrastructure built within designated landscape sites.

DWMP Annual Review

6.4.6 Welsh Water is also required to publish a specific annual review of the DWMP in line with the requirements outlined in the national framework.[209] 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.

[209] 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

Glossary and Abbreviations

Term	Definition
AONB	Area of Outstanding Natural Beauty. An area of countryside considered to have significant landscape value.
AQMA	Air Quality Management Area. These are areas which have been identified by local authorities as unlikely to reach national air quality objectives.
BEIS	Department for Business, Energy and Industrial Strategy. The department brings together responsibilities for business, industrial strategy, science, innovation, energy, and climate change.
Cadw	Cadw is the Welsh Government's historic environment service.
CEMP	Construction Environment Management Plan. A Plan which details management measures to adopt and implement during construction activities to avoid and manage construction effects on the environment and surrounding communities.
CFMP	Catchment Flood Management Plan. A plan that considers and looks to address all types of inland flooding, from rivers, groundwater, surface water and tidal flooding.
CO_2	Carbon dioxide. A naturally occurring gas, also a by-product of burning fossil fuels and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance.
Cumulative effects	Effects that occur where several individual activities which each may have an insignificant effect, combine to have a significant effect.
DCO	Development Consent Order. A consent by a Minister for a Nationally Significant Infrastructure Project. This will combine a grant of planning permission with a range of other separate consents, such as listed building consent.
Defra	Department for Environment, Food and Rural Affairs. The UK government department responsible for safeguarding the natural environment, supporting the food and farming industry, and sustaining the rural economy.
DWMP	Drainage and Wastewater Management Plan.
EA	Environment Agency. The environmental regulator for England. The Agency's role is the enforcement of specified laws and regulations aimed at protecting the environment, in the context of sustainable development, predominantly by authorising and controlling radioactive discharges and waste disposal to air, water and land.
EIA Directive	Environmental Impact Assessment Directive, which covers the Directive 2014/52/EU which amended Directive 2011/92/EU on the assessment of the

Term	Definition
	effects of certain public and private projects on the environment which itself updated the original Directive (85/337/EEC).
EMP	Environmental Management Plan. This is a document that sets out the required measures to manage the environmental effects of development and to demonstrate compliance with relevant legislation.
ES	Environmental Statement. An Environmental Statement contains an Environmental Impact Assessment (EIA) completed in accordance with Directive 2014/52/EU and UK implementing regulations. The ES must include at least the information reasonably required to assess the likely significant environmental effects of a development. The ES is submitted with an application for development consent.
FRMP	Flood Risk Management Plans.
GHG	Greenhouse gases. These gases absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect.
Ha	Hectare; a metric unit of area defined as 10,000 square metres.
HGV	Heavy Goods Vehicle. A heavy goods vehicle (HGV) is the term for any truck with a gross combination mass (GCM) of over 3.5 tonnes. It is defined in defined in Directive 2001/116/EC. There are sub-categories for vehicles between 3.5 tonnes and 12 tonnes and for all goods vehicles over 12 tonnes.
HRA	Habitats Regulations Assessment. This is an assessment of whether a draft plan or project is likely to have a significant effects on any European sites (either alone or 'in combination' with other plans or projects); and, if so, whether these effects will result in any adverse effects on that site's integrity with reference to the site's conservation objectives. This is undertaken in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) and Directive 92/433/EEC (the 'Habitats Directive').
t CO_2 eq	Tonnes of carbon dioxide equivalent. This is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global warming potential by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.
N2K (Natura 2000) sites	Natura 2000 is a network of nature protection areas in the territory of the European Union. It is made up of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated respectively under the Habitats Directive and Birds Directive. The network includes both terrestrial and marine sites (Marine Protected Areas (MPAs)).
NEP	National Environmental Programme.
NPPF	National Planning Policy Framework. The framework first published by the then Department for Communities and Local Government in 2012 sets out the planning policies for England and how these are expected to be applied. This has been revised in 2019 and 2021.

Term	Definition
NRW	Natural Resources Wales. The environmental regulator in Wales. It was created in 2013 with a mission to ensure that the environment and natural resources of Wales are sustainably maintained, enhanced, and used, now and in the future. Its regulatory responsibilities includes the regulation of the disposal of radioactive wastes from nuclear sites, as well as other premises in Wales. All permits relating to sites generating or disposing of radioactive waste in Wales are issued by Natural Resources Wales. Compliance with these permits at nuclear sites is currently carried out by the Environment Agency specialists on behalf of Natural Resources Wales, but enforcement is undertaken directly by Natural Resources Wales.
NTS	Non-Technical Summary. Summarises the findings of this SEA.
RIGS	Regionally important geological and geomorphological sites (RIGS). The sites are locally designated sites of local, national and regional importance for geodiversity (geology and geomorphology) in the United Kingdom.
NOx	Nitrogen oxides. NOx is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts.
NSIP	Nationally significant infrastructure projects. These are large scale developments that require development consent under the Planning Act 2008.
ONS	Office for National Statistics (ONS). The UK's largest independent producer of official statistics and its recognised national statistical institute. The ONS is responsible for collecting and publishing statistics related to the economy, population and society at national, regional and local levels. The ONS also conducts the census in England and Wales every 10 years.
PPW	Planning Policy Wales. PPWs provides the land use planning policy for Wales. It is supplemented by a series of Technical Advice Notes (TANs) and Minerals Technical Advice Notes (MTANs).
Ramsar	Ramsar sites are wetlands of international importance, designated under the Ramsar Convention (first signed in 1971).
RBMP	River Basin Management Plan
SAC	Special Areas of Conservation are strictly protected sites designated under the Habitats Directive.
SDP	Sustainable Drainage Plan.
SEA	Strategic Environmental Assessment. An iterative process to identify, describe and evaluate the likely significant effects of a plan or programme (and any reasonable alternatives). It is undertaken in compliance with Directive 2001/42/EC and UK implementing regulations (SI 2004/1633, SI 2004/1656, SR 2004/280).
SEA Directive	Strategic Environmental Impact Assessment Directive. Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment.

Term	Definition
Secondary effects	Effects that do not occur as a direct result of a plan or activity, but occur at distance from the direct impacts or as a result of a complex pathway.
SPA	Special Protected Areas are strictly protected sites classified in accordance with Article 4 of the Birds Directive.
SPZ1	Groundwater Source Protection Zone 1. SPZs are areas defined by the Environment Agency as areas that highlight the risk of groundwater contamination from any activities that might cause pollution in the area. SPZ1 is the inner protection zone; it is defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.
SSSI	Site of Special Scientific Interest. A SSSI is an area notified by nature conservation agencies as an area of land which is 'of special interest by reason of any of its flora, fauna, or geological or physiographical features'.
SuDS	Sustainable Drainage Systems are water management practices and facilities designed to redirect flows of water from the wastewater/sewer network by mimicking more natural drainage regimes to remove and/or attenuate surface water runoff and by increasing infiltration.
Synergistic effects	Effects that interact to produce a total effect that is greater than the sum of the individual effects.
TPU	Tactical Planning Unit: A consolidation of Wastewater Treatment Works (WwTW) and its catchments joined together by its river drainage system. This will include a detailed assessment of risks and opportunities as well as setting out long-term plans for the interventions needed.
WaSC	Water and Sewerage Companies.
WFD	Water Framework Directive. Directive 2000/60/EC establishing a framework for Community action in the field of water policy.
WRMP	Water Resource Management Plan
WSC	Customers receiving drainage and wastewater services below agreed service levels.
WwTW	Wastewater Treatment Works.

Appendix A
Quality Assurance Checklist

The Government's Guidance on SEA[210] 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 C** 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 C**.
Conflicts that exist between SEA objectives, between SEA and plan objectives and between SEA objectives and other plan objectives are identified and described.	Conflicts between the SEA objectives and the options put forward by Welsh Water have been identified in the assessment matrices included in **Appendix E**.
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 B**).
The assessment focuses on significant issues.	The scope of the assessment reflects the geographic extent of the Welsh Water 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 3.12**.
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.

[210] 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** 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** 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 Welsh Water area are described in **Section 3**.
Difficulties such as deficiencies in information or methods are explained.	Baseline data limitations are discussed in **Section 3.12**. 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 5.5 (**and for the effects on the well-being goals and SMNR, **Section 5.6)**. 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 5.7** 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 B** 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 B**).
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 Welsh Water.
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 Welsh Water 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 Welsh Water 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 5.7** of this report and **Appendix E**.

Appendix B
Schedule of Scoping Consultation Responses

Consultation on the Dŵr Cymru Welsh Water Drainage and Wastewater Management Plan (DWMP) environmental assessment methodologies took place between 22nd October to 26th November 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.

The method statements were issued to Cadw, the Environment Agency (EA), Historic England (HE), Natural England (NE), Natural Resources Wales (NRW) and Welsh Government.

Responses were received to the SEA Scoping Report from Cadw, HE, NE, NRW. No response was received from EA and Welsh Government.

Table B1.1 presents a summary of the responses to the SEA Scoping Report.

Table B0.1 Responses to consultee comments on the SEA Scoping Report

Consultee	Comments	Consultation Response
Cadw	With regards to cultural heritage, Cadw agrees that the Scoping Report sets out sufficient information to establish the context for the SEA, identifies the main economic, social and environmental issues, and sets out an appropriate approach to the SEA.	Noted.
Historic England (HE1)	We welcome the reference on page 11 of the document under 'options development' Q1 2020 to Q4 2021 where impacts to the historic environment and heritage assets will be reflected in the guidelines and principles.	Noted. The comment refers to information provided in the DCWW document '*Introduction to the Drainage and Wastewater Management Plan: Strategic Context*' provided to consultees to provide context and an overview of the DWMP for the SEA Scoping Report and HRA Method Statement.
HE2	When considering the natural environment, it should be understood that there is a historic character to the wider landscape and that the historic environment needs to be recognised as part of a holistic whole; i.e. when considering rivers and beaches, increasing flood resilience creating, or 'Natural Capital' (England only) there should be an awareness that the environments being studied are also cultural landscapes and this will need due consideration.	Noted. The approach set out in the SEA Framework includes guide questions relating to avoiding "l*oss of landscape features and local distinctiveness*" (SA Objective 13). Additionally, SA Objective 12 (inter alia) "*avoid damage to, conserve or enhance the historic environment… features, places and spaces, that enhance local distinctiveness*." It is considered that these guide questions would support broader consideration envisaged in the comment.
HE3	Within the framework of the high level DWMP objectives (Water Quantity, Quality and Resilience, page 19) this may include focussing on issues such as: • Being cognisant of the potential impact of changes in groundwater flows and chemistry on preserved organic and palaeoenvironmental remains (Water Quality) • The potential for unrecorded buried and waterlogged archaeology within the 'natural' floodplain/estuarine/coastal deposit sequences (Resilience, i.e. impacted by natural flood management schemes) • The potential impact of hydro-morphological adaptations on heritage assets: this can include the modification/removal of historic in-channel structures, such as weirs / coastal and • estuarine features such as historic sea defences; as well as physical changes to rivers/the coastline with the potential to impact on archaeological and palaeoenvironmental remains (Water Quantity).	Noted. The comment refers to information provided in the DCWW document '*Introduction to the Drainage and Wastewater Management Plan: Strategic Context*' provided to consultees to provide context and an overview of the DWMP for the SEA Scoping Report and HRA Method Statement. "*The need to avoid damage to important wetland areas with potential for paleoenvironmental deposits*" is a key sustainability issue relevant to the DWMP. The SEA Framework includes specific reference to such matters under SA Objective 12: • *"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?"*

Consultee	Comments	Consultation Response
HE4	Historic England are keen to remain involved in the process and to have the opportunity to comment on area/site/project specific proposals as they emerge to ensure that the historic environment is fully considered.	Noted. The Draft DWMP and Environmental Report will be made available for consultation.
Natural England (NE1)	The main environmental issues identified within the SEA are relevant to the draft DWMP. Natural England would further advise the following. 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.	Noted. Table NTS1 presents the key environmental, social and economic issues relevant to the Draft DWMP. Under climatic factors, this includes • *"the need to reduce GHG 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."* Under water, this also includes the "*The potential effects of climate change and the need to build climate change resilience into the water environment and water management*" as referenced. Whilst the specific issue identified in the comment is missing from those presented in the SEA Scoping Report, the opportunities for mitigation and enhancement are captured in the SEA objectives that have then been used to undertake the assessment.
NE2	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.	Table NTS1 includes the following issues: • "*The need to maintain and enhance biodiversity and the resilience of ecosystems, including sites designated for their nature conservation value.* • *The need to address the climate emergency and nature emergencies together.* • *The need to sustainably manage biodiversity assets, taking into account the effects of climate change."* Additionally, under climatic factors the following is included:

Consultee	Comments	Consultation Response
		• *"the need to increase environmental resilience to the effects of climate change."* It is considered that this is effective in addressing the point raised in the comment.
NE3	Natural England supports the proposed approach to the SEA of the dDWMP and additionally would advise the following: 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. Using specific targets or indicators within the objective setting allows collecting data, making predictions and monitoring the impact of the plan more effective. Objectives should follow the SMART principle – Specific, Measurable, Achievable, Realistic, and Time bound and should relate to the state of the environment that is intended to be reached through the plan. Additionally, input indicators could be used in the objective setting, these inputs should clearly lay out which actions will be taken & should be linked to clear outcomes.	Noted. Typically, SEA objectives tend not to state direct compliance, as they are "a statement of what is intended, specifying a desired direction of change" [ODPM et al (2005), A Practical Guide to the SEA Directive] 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 have been used to assess the effects.
NE4	Section 2.2 Overview – Table 2.1 – Plans and Programmes relevant to the SEA of the DWMP. Site Improvement Plans (SIPs) for relevant impacted protected sites – e.g. Natural England - Site Improvement Plan: River Wye (SIP199) should also be included. This should feed into the Key Policy Objectives (Table 2.2) identified in other Plan and Programmes relevant to the assessment of the DWMP for Biodiversity, Flora and Fauna.	Table 2.1 and Table 2.2 of the Environmental Report has been revised to include reference to Natural England - Site Improvement Plans.
NE5	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'	Noted. 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'. Section 2 and Appendix B presents the review of plans and programmes, including reference to the Habitats Regulations, the Wildlife & Countryside Act and the Conservation of Habitats & Species

Consultee	Comments	Consultation Response
		Regulations. This has identified the relevant objectives which are reflected and summarised in Table 2.2, which in turn informs the SEA assessment objectives.
NE6	Table 4.2 – Draft Assessment Framework - Proposed Guide Questions 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?	Noted. Typically, SEA objectives tend not to state direct compliance, as they are "a statement of what is intended, specifying a desired direction of change" [ODPM et al (2005), A Practical Guide to the SEA Directive] 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 have been used to assess the effects. The guide questions for 'Biodiversity, Flora and Fauna' will be revised to include the additional suggested question "*Will it promote climate change resilience of both designated and non-designated sites*?".
NE7	Table 4.2 – Draft Assessment Framework - Proposed Guide Questions 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?	Noted. 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 have been used, as appropriate in the completion of the SEA notably when identifying, describing and evaluating the likely significant effects of the DWMP on biodiversity.
NE8	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.	Noted. Table 4.3 was presented as an example of the assessment matrix. A separate matrix has been provided to record the cumulative, synergistic and secondary effects.
Natural Resources Wales	NRW accepts that a review of DCWW wastewater permits will be delivered as part of the development of their National Environment Programme currently underway to inform AMP8 business planning, but believes it is important that as far as is practical the new standards	Noted. It is not for the SEA to set out or account for compliance with particular permitting standards that may be forthcoming through the

Consultee	Comments	Consultation Response
	must be highlighted and accounted for in the DWMP and accompanying products (including HRA and SEA).	AMP8 planning processes. Further consideration is given in relation to the HRA separately.

Appendix C
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) *The Convention on the Conservation of Migratory Species of Wild Animals*	
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. 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. Overarching objectives set for the Parties are: • 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. Setting targets is the responsibility of member states.	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.
Council of Europe (1979) *The Convention on the Conservation of European Wildlife and Natural Habitats (The Bern Convention)*	
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. The principal objectives are: • 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. Targets for Contracting Parties are: • 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; Promoting education and disseminating general information on the need to conserve species of wild flora and fauna and their habitats.	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.
Council of Europe (1985) *The Convention for the Protection of the Architectural Heritage of Europe (The Granada Convention)*	
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.	The SEA assessment framework should include an objective on the conservation and enhancement of heritage and decision making criteria on architectural heritage.
Council of Europe (1992) *Convention on the Protection of Archaeological Heritage (The Valetta Convention)*	
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 planers to ensure optimum conservation of archaeological heritage.	The SEA assessment framework should include an objective on the conservation and enhancement of heritage and decision making criteria on archaeological heritage.
Council of Europe (2000), *The European Landscape Convention (The Florence Convention)* (became binding March 2007)	

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 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. The aims of the Convention are to promote landscape protection, management and planning, and to organise European co-operation on landscape issues. 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.	The DWMP should take landscape into account. The SEA assessment framework should include an objective on landscape.
Council of Europe (2003) *European Soils Charter*	
Sets out common principles for protecting soils across the European Union area.	The DWMP should take soils into account. The SEA assessment framework should include an objective on soils.
European Commission (1991) *The Nitrates Directive 91/676/EEC*	
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. 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.	The DWMP should be consistent with the aim to reduce water pollution caused by nitrates from agriculture. The SEA assessment framework should include water quality.
European Commission (1991) *Urban Waste Water Treatment Directive 1991/271/EEC*	
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.	The DWMP will need to reflect the guidelines and legislation set out in the directive. The SEA assessment framework should include water quality.
European Commission (1992) *The Habitats Directive 1992/43/EEC*	
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. 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.	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. The SEA assessment framework should incorporate sites protected for their nature conservation importance.
European Commission (1998) *Drinking Water Directive 1998/83/EC*	
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	The DWMP should seek to ensure the continuity of a safe and secure drinking water supply and

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**
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. Standards constitute legal limits. Sets limits for microbiological and chemical parameters in drinking water. Also gives indicator parameters.	protect or improve drinking water quality where possible. The SEA assessment should consider the effects on water and human health.
European Commission (1999) Directive on the *Landfill of Waste 99/31/EC*	
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. 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. 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.	The DWMP should take the effects on waste to landfill into account. The SEA assessment should consider the effects on water, soil, air, human health and waste
European Commission (2000) *The Water Framework Directive 2000/60/EC*	
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: • 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. Key targets and indicators relevant to the DWMP and SEA are: • 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; • 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.	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. The SEA assessment framework should include water quality, water resources, sustainable water use, and biodiversity.
European Commission (2001) *Directive on the Assessment of the Effects of Certain Plans and Programmes on the Environment (The SEA Directive) 2001/42/EC*	

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 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". 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.	Driver for SEA. Need to ensure all topics identified in the SEA Directive are 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.
European Commission (2002) *Directive on the Energy Performance of Buildings 2002/91/EC*	
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 *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.* The Directive highlights how the residential and tertiary sectors, the majority of which are based in buildings, accounts for 40% of EU energy consumption.	The SEA should highlight any opportunities for new buildings associated with the DWMP to contribute to improved energy performance.
European Commission (2002) *The Environment Noise Directive (END) 2002/49/EC*	
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. The underlying principles of the Directive are similar to those underpinning other overarching environment policies (such as air or waste), i.e.: • 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. • 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.	The DWMP will need to have regard to the requirements of the END. The SEA assessment framework should include for the protection against excessive 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

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**
	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*	
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: • 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. 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. 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. 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.	The DWMP will need to comply with set limits. The SEA assessment should include a guide question relating to the effects of options on the water quality at designated bathing waters.
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*	
The Directive establishes: • 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

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**
	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 fresh water 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*	
The *Thematic Strategy for Soil Protection* 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. 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: (1) Preventing further soil degradation and preserving its functions: • 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. (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. 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.	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 waste water management measures.
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*	

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 Directive: • 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: • 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*	

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 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). 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: • 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. The Directive also requires Marine Protected Areas (MPAs) to be established to support the achievement of GES.	The SEA assessment framework should incorporate assessment criteria relating to the quality of the marine environment.
European Commission (2009) *Directive on the Conservation of Wild Birds 2009/147/EC* (codified version of Council Directive 79/409/EEC as amended)	
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: • 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). Requirements to ensure that introduction of non-native birds do not threatened other biodiversity (Article 11).	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.

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**
European Commission (2009) *Promotion of the use of energy from renewable sources Directive 2009/28/EC*	
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. 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. 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%.	The DWMP should seek to contribute towards increasing the proportion of energy from renewable energy sources. The SEA assessment framework should include consideration of use of energy from renewable energy sources.
European Commission (2010) *Energy 2020 - A Strategy for Competitive, Sustainable and Secure Energy*	
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: 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. Energy 2020 is part of Resource-Efficient Europe, one of the seven key initiatives of Europe 2020.	The SEA assessment framework should include criteria relating to energy where appropriate
European Commission (2010) *Europe 2020 - A Strategy for Smart, Sustainable and Inclusive Growth*	
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. There are also five key target areas for the EU to achieve by 2020: 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.	The SEA assessment framework should include criteria relating to employment, R&D, climate change and poverty where relevant.

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**
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: • 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: • energy distributors achieving 1.5% energy savings per year through energy efficiency measures; • improving the efficiency of heating systems, installing double glazed windows or insulating roofs;	The DWMP should seek to contribute towards targets for energy efficiency. The SEA assessment framework should include consideration of energy consumption and efficiency.

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**
• 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. The new amending Directive on Energy Efficiency (2018/2002) was agreed to update the policy framework to 2030 and beyond. 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. 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. 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 Other elements in the amended directive include: • 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) *Towards Social Investment for Growth and Cohesion 2014-2020*	
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.	The DWMP should have regard of the Europe 2020 targets.
European Commission (2014) *The EU Regulation on invasive alien (non-native) species 1143/2014/EU*	
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 minimise and mitigate the human health or economic impacts that these species can have.	The SEA assessment framework should include guide questions relating to invasive species
European Commission (2014) *Seventh Environmental Action Programme*	
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:	The SEA assessment framework should, where relevant, reflect the objectives of the proposal for the 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**
European Commission (2014) *A Policy Framework for Climate and Energy in the Period from 2020 to 2030*	
The 2030 climate and energy framework was adopted in 2014 and builds on the 2020 targets. It sets three key targets for 2030: • 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. The greenhouse gas emissions and renewable energy targets are binding, while the energy efficiency target will be reviewed in 2020.	The DWMP should support longer term targets for reducing greenhouse gas emissions, increasing renewable energy and energy efficiency. The SEA assessment framework should include the consideration of energy and greenhouse gas emissions.
European Commission (2015) *'Closing the loop - An EU Action Plan for the Circular Economy' policy package*	
This document sets out actions to implement the European Commission's long-term vision of significantly reducing waste landfilling and increasing recycling.	The SEA should consider opportunities for the DWMP to contribute/enable the circular economy. The SEA assessment framework should contain an objective/guide question relating to material/resource use and waste.
European Commission (2016) *National Emissions reduction Commitments (NEC) Directive 2016/2284/EU*	
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). 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. The directive introduces a number of new reporting requirements for Member States. These include annual information on emissions of a number of pollutants: • 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); persistent organic pollutants (POPs) including selected polycyclic aromatic hydrocarbons (PAHs), dioxins and furans, polychlorinated biphenyls (PCBs) and hexachlorobenzene (HCB).	The DWMP should seek to reduce the emissions of the pollutants listed under the directive, where possible. The SEA assessment framework should include an objective and guide questions relating to air pollution/pollutant emissions.
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	
The proposal supports the environment and climate action objectives of the European Green Deal. 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. Building on the European Green Deal, it has the following six priority objectives:	The SEA assessment framework should, where relevant, reflect the objectives of the proposal for the 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**
• 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)	
European Commission (2020) *Biodiversity strategy for 2030*	
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. • 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.	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.
European Commission (2021) *EU strategy on adaptation to climate change*	
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: • to make adaptation smarter; • to make adaption swifter; • to make adaption more systemic, and; • to step up international action on adaptation to climate change.	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.
ICOMOS (2011) *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*	
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.	The SEA Framework should include an objective on the conservation and enhancement of heritage.
IUCN (2013) *World Heritage Advice Note: Environmental Assessment*	
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.	The DWMP should seek to contribute towards the protection of World Heritage Sites. The SEA assessment framework should include objectives and guide questions relating to the conservation of World Heritage Sites. The SEA assessment should

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**
	also reflect/incorporate the principles of the guidance, where relevant.
UNEP (1973) *Convention on International Trade in Endangered Species of Wild Fauna and Flora*	
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.	The DWMP should seek to ensure the protection of vulnerable species. The SEA assessment framework should incorporate the protection of animal and plant species.
UNESCO (1971) *Ramsar Convention on Wetlands of International Importance*	
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. The original emphasis was on the conservation and wise use of wetlands primarily to provide habitat for waterbirds, 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. '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). 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: ○ 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 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.	The DWMP should ensure the protection and wise use of wetlands. The SEA assessment framework should incorporate the protection of wetland sites listed under the Ramsar convention.
UNESCO (1972) *Convention Concerning the Protection of the World Cultural and Natural Heritage*	
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: ○ 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	The DWMP should seek to protect cultural heritage sites. The SEA assessment framework should include an objective on heritage and archaeological issues.
UNESCO (2001) *Convention on the Protection of Underwater Cultural Heritage*	
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	The DWMP should seek to protect cultural heritage sites.

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**
cultural heritage. This includes obligations to preserve such heritage, a preference for in situ preservation, and no commercial exploitation.	The SEA assessment framework should include an objective relating to cultural heritage.
United Nations (1992) *Convention on Biological Diversity (The Rio Convention)*	
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.	The DWMP should seek to protect and enhance biodiversity. The SEA assessment framework should include protection and enhancement of biodiversity
United Nations (1997) *The Kyoto Protocol to the UN Framework Convention on Climate Change*	
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.	The DWMP should aim to reduce greenhouse gas emissions. The SEA assessment framework should include objectives/guide questions related to reducing greenhouse gas emissions.
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)*	
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. 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.	The development of the DWMP needs to be a transparent process. 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.
United Nations (2002) *The World Summit on Sustainable Development*	
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. 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. 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.	The DWMP should promote sustainable development. The SEA should help to deliver sustainable development through the balanced assessment of the DWMP.
United Nations (2016) *The Paris Agreement*	
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.	The DWMP should aim to reduce greenhouse gas emissions.

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 SEA assessment framework should include greenhouse gas emissions.
United Nations Framework Convention on Climate Change (UNFCCC) (2011) *The Cancun Agreements*	
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. 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. The Cancun Agreements' main objectives cover: o Mitigation o Transparency of actions o Technology o Finance o Adaptation o Forests o Capacity building	The DWMP should aim to reduce greenhouse gas emissions and support climate change mitigation and adaption. The SEA assessment framework should include greenhouse gas emissions and climate change.
World Commission on Environment and Development (1987) *Our Common Future (The Brundtland Report)*	
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: o to propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; o 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; o to consider ways and means by which the international community can deal more effectively with environment concerns; and o 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.	The SEA and DWMPshould seek to contribute to sustainable development.
World Health Organisation (2004) *Children's Environment and Health Action Plan for Europe*	
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: o 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; o equity, i.e. giving priority to protection of children at highest risk, and particularly of children who are neglected, abandoned, disabled,	The DWMP should have regard to the requirements of the Action Plan. The SEA assessment framework should include for the protection of human health and vulnerable members of the community.

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**
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.	

National 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**
BEIS (2011) *Carbon Plan: Delivering our Low Carbon Future*	
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. Specific actions relate to secure and low carbon energy, reducing energy in homes and communities, reducing business and industrial emissions, and low carbon transport.	The DWMP should, where possible, contribute towards increasing the proportion of energy from renewable energy sources. The SEA assessment framework should include consideration of the use of energy from renewable energy sources.
BEIS (2011*) National Policy Statements for Energy Infrastructure*	
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: - 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). 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. The NPSs reiterate and are underpinned by the target to cut greenhouse gas emissions by at least 80% by 2050, compared to 1990 levels.	The DWMP may need to consider the potential impact of major energy proposals drainage and wastewater management in the plan area. The SEA should consider the cumulative effects of the DWMP and any major energy proposals.
BEIS (2011) *Planning our electric future: a White Paper for secure, affordable and low carbon electricity*	
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.	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.
BEIS (2011) *UK Renewable Energy Roadmap*	
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. 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.	The DWMP should contribute towards increasing the proportion of energy from renewable energy sources. The SEA assessment framework should include consideration of the use of energy from renewable energy sources.

National 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**
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	
Cadw, CCW and ICOMOS (UK) (International Council on Monuments and Sites) (2001) Register of Landscapes of Historic Importance	
Two-volume Register of Landscapes of Historic Interest in Wales. This advisory and non-statutory document highlights what are considered to be the best examples of different types of historic landscape in Wales and was the first step towards raising the profile of historic landscapes in Wales.	The DWMP and SEA should consider and take account of any potential impacts to heritage landscapes and assets.
Canal & River Trust (2015) *Living Waterways Transform Places & Enrich Lives: Our 10 Year Strategy*	
The strategy sets out goals for the organisation for the next ten years. These are themed under: • Waterways, including: '*To encourage and grow the number of people boating, using and enjoying the waterways*' and '*To look after the heritage and wildlife on our canals and rivers for people to enjoy now and in the future'*; • Place, including: '*To provide havens for people to escape to away from the pressures of modern life*' and '*Enhance wildlife habitats and the natural landscape'*; • Prosperity, including: '*Our waterways to drive and be a catalyst for regeneration and developments that make a difference to the local area'* and '*To contribute to local economies and to provide opportunities and livelihoods for local people'*; and • People, including: '*Communities to feel ownership of, and get involved with caring for, their local waterway*' and '*To offer something for everyone to enjoy*'. These are in addition to goals relating to Influence and Resources.	The DWMP should avoid causing detrimental effects on canals and rivers. The SEA assessment framework should include objectives which take into account the goals of the strategy and the protection of rivers and canals.
Canal and River Trust (2015) *Water Resources Strategy 2015 – 2020*	
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.	The DWMP should take into consideration the potential impact on the supply of water to the inland waterway network within the Welsh Water area. The SEA should consider the effects of the DWMP on the long-term supply of water to the canal network.
Climate Change Committee (2020) *The path to Net Zero and progress on reducing emissions in Wales*	
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. One of the reports looks into how Wales is progressing against previous requirements to reduce its carbon footprint. Key to achieving these targets is: • Adopting low-carbon solutions; • Expanding low-carbon energy supplies; • Reduce demand for high-carbon activities; and • Transforming land away from agriculture.	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 greenhouse gas emissions by 2050. The SEA should have an objective relating to sustainable development that references the need to reduce greenhouse gas emissions.
Countryside Council for Wales (CCW) (2003) *Priority Habitats of Wales*	
Provides information about Wales' priority habitats, as identified by UK Biodiversity Action Plans.	The DWMP and SEA objectives will need to consider the protection of priority habitats.

National 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**
DCMS and Welsh Government (2007) *Heritage Protection for the 21st Century*	
The document has three core principles: • 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.	The assessment framework should include objectives which take into account the White Paper's principles.
Defra (2006) *Shoreline Management Plan Guidance*	
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: • 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, • meet international and national nature conservation legislation and aim to achieve the biodiversity objectives.	The DWMP should seek to align with the objectives of the guidance where appropriate. The SEA should take into account the effects of the DWMP on areas with a SMP.
Defra (2007) *Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt*	
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) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*	
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 (2010) *Air Pollution: Action in a Changing Climate*	
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.

National 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**
Defra (2011) *UK National Ecosystem Assessment* and Defra (2014) *UK National Ecosystems Assessment Follow on, Synthesis of Key Findings*	
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 'Objective-led' approach, many of the services relevant to the DWMP can be considered through the objectives and guide questions for example: • Provisioning Services: Freshwater • Provisioning Services: Biodiversity • Regulating Services: Water Regulation • Cultural services: Recreation and ecotourism • Cultural services: Cultural heritage values • Cultural services: Aesthetic 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).
Defra (2012) *The UK Climate Change Risk Assessment 2012 Evidence Report*	
This report identifies five themes that form the priorities for adaptation in the UK. These themes are as follows: • Agriculture & Forestry; • Business; • Health & Wellbeing; • Buildings & Infrastructure; and • Natural Environment.	The SEA should take into account the need for climate change adaptation.
Defra (2017) *Air Quality Plan for Nitrogen Dioxide (NO2) in UK*	
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.	The DWMP should have regard to the air quality plans and specific local measures. The SEA should consider the effects of the DWMP on air quality.
Defra, Scottish Government, Welsh Government (2015) *The Great Britain Invasive Non-native Species Strategy*	

National 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**
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: • 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. The strategy covers the period 2015 to 2020.	The DWMP should seek to avoid the spread of invasive species. The SEA should consider the effects of the Regional Plan and WRMPs on biodiversity.
Defra and Welsh Government (2014) *River Basin Planning Guidance*	
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.	The DWMP should take into account the contents of this statutory guidance
Environment Agency (2007) *Soil: A Precious Resource*	
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.	The DWMP should ensure the sustainable management of soil resources. SEA objectives should reflect and consider relevant priorities from the Soil: A Precious Resource publication.
Environment Agency (2008) *Better Sea Trout and Salmon Fisheries: Our Strategy for 2008-2021*	
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: 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 There are twelve more detailed targets lying below these broad goals which relate to salmon and fisheries.	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. 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.
Environment Agency (2009) *Water for People and the Environment - Water Resources Strategy for England and Wales*	
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'. 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. This strategy sets out the following objectives: • 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; • Flexible and incremental solutions in water resources management allow adaptation to climate change as it happens;	The objectives for the DWMP should reflect these objectives, where relevant. The SEA should seek to promote the protection and enhancement of water resources and to encourage sustainable management of the resource.

National 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**
• 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. The strategy includes a number of actions for Environment Agency and others to develop targets for water reduction and efficiency.	
Environment Agency (2010) *Water Resources Action Plan for England and Wales*	
The strategy has four main aims: • 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.	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.
Environment Agency (2013) *Managing Water Abstraction*	
Managing Water Abstraction sets out how the EA 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) *Meeting Our Future Water Needs: A National Framework for Water Resources*	
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 DCWW operational area falls partly within) made up of the 17 English water companies and other water users. The framework explores England's long term water needs for:	The DWMP should align with the framework, where relevant.

National 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**
• public water supplies • agriculture • the power and industry sectors • environmental protection For the Water Resources West Region the framework estimates that additional public water supply needs between 2025 and 2050 are 639 Ml/d. 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. 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. The plans need to address the following: • Increasing resilience to drought • Greater environmental improvement • Reducing long term water usage • Reducing leakage • Reducing the use of drought permits and orders • Increasing supplies. The framework states that plans must include: • 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. 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.	
Environment Agency (2020) *Water Company Drought Plan guideline*	
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.	The DWMP and the SEA should consider the guideline, where relevant.
Environment Agency, OfWAT and Natural Resources Wales (2021) *Water Resources Planning Guideline*	
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. 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.	The DWMP should align with the WRMP as suggested in the guideline. The SEA should seek to ensure that water supplies and resources are maintained or enhanced in line with the Water Resources Planning Guidelines.
Environment Agency (undated) *Restoring Sustainable Abstraction Programme*	
EA 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	The DWMP should seek to contribute to contribute toThe SEA should include a guide question relating to water resources.

National 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**
past decisions. EA investigates where over-abstraction has occurred and work with local people to restore sustainable supplies.	
Future Generations Commissioner for Wales (2020) *The Future Generations Report 2020*	
Producing a Future Generations Report every five years, which provides an assessment of the improvements public bodies should make in relation to their wellbeing objectives, is a statutory duty of the Future Generations Commissioner under the Well-being of Future Generations (Wales) Act 2015. The report includes (as required by the act): • An assessment of how public bodies can better safeguard the ability of future generations to meet their own needs; and take greater account of the long-term impact of the things they do. • A summary of evidence gathered, and activities undertaken, by the Commissioner during the reporting period. • A summary of the reviews conducted by the Commissioner; an account of any research or other study undertaken. • Any other information the Commissioner considers appropriate. This report provides advice, guidance and tools for public bodies involved in making the aspirations set out in the act a reality for people in Wales. It is also showcases actions that are taking in place in Wales and across the world.	The DWMP should consider how it can contribute to the seven well-being goals set out in the Wellbeing of Future Generations Act. The DWMP should take into consideration the recommendations of the report. The SEA Framework should reflect the seven well-being goals.
HM Government (1975) *Salmon and Freshwater Fisheries Act 1975*	
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) *Reservoirs Act*	
The Reservoirs Act 1975 provides a legal framework to ensure the safety against failure of large raised reservoirs. The act applies to reservoirs that hold at least 25,000 cubic metres of water above natural ground level. 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. Under the Reservoirs Act 1975 reservoir owners (undertakers) have ultimate responsibility for the safety of their reservoirs. 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).	The DWMP should consider any effects of options on reservoirs capacity, functioning and downstream flows.
HM Government (1979) *Ancient Monuments and Archaeological Areas Act 1979*	
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. The SEA assessment framework should include consideration of Scheduled Monuments.
HM Government (1981) *Wildlife and Countryside Act 1981*	
The Act makes it an offence (with exceptions) to; • Intentionally kill, injure or take any wild bird or their eggs or nests;	The DWMP must ensure full compliance with the Act.

National 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**
• 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. 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.	The SEA should ensure a positive contribution to the wildlife within the operational area.
HM Government (1990) *Environmental Protection Act*	
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.	The DWMP must ensure compliance with the Act. The SEA assessment framework should include waste and nuisance.
HM Government (1990) *Planning (Listed Buildings and Conservation Areas) Act 1990*	
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.	The DWMP should seek to avoid adverse impacts on cultural heritage assets. The SEA assessment framework should include specific objectives relating to cultural heritage.
HM Government (1990) *Town and Country Planning Act 1990*	
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.	The DWMP must ensure full compliance with the Act. The SEA should include objectives and guide questions relating to biodiversity, land use, and landscape.
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.
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) *UK Biodiversity Action Plan*	
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: • 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*	

National 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**
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 wate; 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 also includes provisions relating to remediation of contaminated land, waste and the designation of Air Quality Management Areas.	The DWMP must ensure compliance with the Act. The SEA assessment framework should include waste and air quality.
HM Government (2000) *The Countryside and Rights of Way (CROW) Act 2000*	
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) *The National Heritage Act 2002*	
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) *The Water Act 2003*	
The four broad aims of the Act are: • 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: • are given a duty to prepare and publicise drought plans; • are placed under a duty to agree and publicise water resource management plans; and • 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) *The Water Environment (WFD) (England and Wales) Regulations 2003*	
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) *Securing the Future; Delivering UK Sustainable Development Strategy*	
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

National 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**
	natural environment, are considered when assessing the potential impacts of the DWMP
HM Government (2006) *Climate Change and Sustainable Energy Act 2006*	
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 emissions. Consider whether the monitoring arrangements can be utilised to monitor the effects of the DWMP.
HM Government (2006) *Natural Environment and Rural Communities Act 2006*	
The Act: • 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 provides for flexible administrative arrangements in connection with functions relating to the environment and rural affairs and certain other functions; and for connected purposes.	The DWMP and SEA should have regard to protected wildlife sites and species, landscapes and rights of way.
HM Government (2007) *Water Resources Management Plan Regulations 2007*	
These Regulations set out the process for the preparation of WRMPs.	The DWMP should considered these regulations, where relevant.
HM Government (2008) *The Climate Change Act 2008* and *The Climate Change Act 2008 (2050 Target Amendment) Order 2019*	
This Act aims: • 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. 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. 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. The Climate Change Act (2050 Target Amendment) Order 2019 amended the act by changing the 2050 target for the reduce greenhouse gas emissions from 'at least 80%' to 'at least 100%' (net zero).	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) *The Energy Act 2008*	
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. The key elements of the Act:	The DWMP should have regard to the provisions in the Act.

National 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**
• 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; • 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. 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.	The SEA should include objectives relating to energy and resource use.
HM Government (2008) *Planning Act 2008*	
This Act introduced a new system for nationally significant infrastructure planning, alongside further reforms to the Town and Country Planning system.	The DWMP should consider any unforeseen NSIP proposals that come forward prior to adoption which may affect water resources in the region. 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.
HM Government (2009) *The Eels (England and Wales) Regulations 2009* (as amended 2011)	
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.	The SEA and DWMP should have regard to eel populations.
HM Government (2009) *The Groundwater (England and Wales) Regulations 2009*	
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. Substances controlled under these regulations fall into two categories: a) 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. b) 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.	The DWMP will need to comply with the requirements of the Regulations where appropriate. The SEA assessment should include an objective relating to the effects of options on groundwater quality.
HM Government (2009) *Marine and Coastal Access Act 2009*	
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.	The DWMP should take into account its effects on coastal areas, where appropriate.

National 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**
	The SEA assessment should take into account the effects of the actions on the coast where relevant.
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: • 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: • 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: • 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*	

National 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**
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. 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.	The DWMP should help to contribute to the resilient and efficient management of water. In order to ensure future water management is resilient SEA should consider resilience to climate change and should consider the human environment.
HM Government (2013) *The Energy Act 2013*	
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: • Decarbonisation • Electricity Market Reform (EMR) • Nuclear Regulation • Government Pipeline and storage system • Strategy and policy statement • Customer protection	The DWMP should comply with the act, where relevant. The SEA should include guide questions relating to energy use and carbon emissions.
HM Government (2014) *Water Act 2014*	
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.	The DWMP help to ensure that future water management is resilient, efficient and customer focused
HM Government (2015) *The Environmental Damage (Prevention and Remediation) (England) Regulations 2015*	
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. Applies to the most serious categories of environmental damage, including: • 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.	The SEA should seek to ensure that the guidance provided by the regulations is considered when assessing the DWMP.
HM Government (2015) *Infrastructure Act 2015*	
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.	The SEA assessment framework should include guide questions relating to invasive species.
HM Government (2015) *Ozone-Depleting Substances Regulations 2015*	
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.	The DWMPshould have regard to the requirements of the regulations. The SEA assessment framework should include emissions to air.
HM Government (2015) *Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015*	

National 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**
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.	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 (2016) *Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018)*	
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.	The DWMP should accord with these Regulations.
HM Government (2017) Second UK Climate Change Risk Assessment (CCRA2)	
This report outlines the UK and Devolved Governments' views on the key climate change risks and opportunities that the UK faces. The report endorses the six priority risk areas identified in the independent evidence report by the Adaptation Sub-Committee: • from flooding and coastal change • to health and well-being from high temperatures • due to water shortages • to natural capital • to food production and trade • from pests and diseases and invasive non-native species The report summarises that the most important risks to Wales are: • Risks to infrastructure (from all sources of flooding) • Risk to public water supplies from drought and low flows • Risks from some land management practices exacerbating flood risk • Risks to ecosystems and agriculture businesses from changes in climatic • conditions • Risks to communities from all sources of flooding and sea-level rise • Risks to infrastructure, business and buildings from high river flows, • erosion and extreme weather • Risks and opportunities from changes to agriculture and forestry • productivity • Risks to people's health and well-being and associated service delivery • from high temperatures, flooding and extreme weather	The DWMP should ensure that proposals are resilient to the effects of climate change. Where possible, options should be considered that enhance resilience to the risks of climate change. The SEA should consider the effects of options on climate change resilience.
HM Government (2017) *Conservation of Habitats and Species Regulations 2017*	
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. 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. New provisions implement aspects of the Marine & Coastal Access Act 2009. These provisions provide for:	The DWMP must ensure full compliance with the Regulations. The SEA should take into account the effects of the actions on biodiversity.

National 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**
• 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.	
HM Government (2017, updated 2019) *UK Clean Growth Strategy: Leading the way to a low carbon future*	
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: • Power Sector; • Buildings; • Industry; • Natural Resources; • Transport; and, • Devolved Administrations.	The SEA should have an objective/guide questions relating to sustainable development that references the need to reduce carbon emissions across all sectors.
HM Government (2018) *A Green Future: Our 25 Year Plan to Improve the Environment*	
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. The six key areas for action are: • Using and managing land sustainably, which includes embedding an 'environmental net gain' principle for development (including housing and infrastructure) • 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	The DWMP may influence the environmental benefits and pressures identified in the Environment Plan, such as: • Clean air • Clean and plentiful water • Thriving plants and wildlife • 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 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.
HM Government (2020) *Energy White Paper: Powering our Net Zero Future*	
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:	The DWMP should consider if it can support the delivery of the aims of the white paper.

National 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**
• 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	The SEA should include objectives and guide questions relating to energy use and carbon emissions.
HM Treasury (2016) *National Infrastructure Delivery Plan*	
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.	The DWMP should consider the content and commitments of the plan.
JNCC and Defra (2012) *UK Post-2010 Biodiversity Framework*	
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.	The DWMP should support the protection and enhancement of biodiversity. The SEA assessment should include criteria relating to the protection of species and habitats.
Ministry for Housing, Communities and Local Government (MHCLG, formerly Department for Communities and Local Government) (2014) *National Planning Policy for Waste*	
Sets out detailed waste planning policies for local authorities. States that planning authorities need to: • 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.	The DWMP need to consider the potential impact of proposals on waste generation and on waste management facilities in the DWMP plan area area. The SEA should consider the effects of the DWMP on waste generation and management capacity.
MHCLG (2021) *National Planning Policy Framework 2021*	
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. 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. The NPPF requires that the planning system should be genuinely plan-led and that plans should: 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; c) be shaped by early, proportionate and effective engagement between plan makers and communities, local organisations, businesses, infrastructure providers and operators and statutory consultees; d) contain policies that are clearly written and unambiguous, so it is evident how a decision maker should react to development proposals; e) be accessible through the use of digital tools to assist public involvement and policy presentation; and f) serve a clear purpose, avoiding unnecessary duplication of policies that apply to a particular area (including policies in this Framework, where relevant).	The DWMP should take into consideration the policies set out in the NPPF insofar as they relate to the areas covered by the DWMP.

National Plans and Programmes	
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National Assembly for Wales (2015) *Well-being of Future Generations (Wales) Act 2015*	
The Act includes 7 goals that all public bodies should work towards: • 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 • A globally responsible Wales The Act establishes a statutory Future Generations Commissioner for Wales, whose role is to act as a guardian for the interests of future generations in Wales, and to support the public bodies listed in the Act to work towards achieving the well-being goals. The Act also establishes Public Services Boards (PSBs) for each local authority area in Wales. Each PSB must improve the economic, social, environmental and cultural well-being of its area by working to achieve the well-being goals.	The DWMP should consider how it can contribute to the seven well-being goals set out in the Act. The SEA Framework should reflect the seven well-being goals.
National Assembly for Wales (2016) *Historic Environment (Wales) Act 2016*	
The Act improves the existing systems for the protection and sustainable management of the Welsh historic environment. It also gives more effective protection to listed buildings and scheduled monuments and enhances existing mechanisms for the sustainable management of the historic environment. The Act also creates new measures that enables authorities to halt works if protected buildings or monuments are under threat from unauthorised activities and to take action against those who have damaged or destroyed monuments.	The DWMP should have regard to the requirements of the Act. The SEA assessment should include criteria relating to the protection of the historic environment.
National Assembly for Wales (2016) *Environment (Wales) Act 2016*	
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. Some of the specific provisions in the Act include: • 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.	The DWMP should enhance biodiversity, promote resilience in ecosystems and maintain and enhance biodiversity The SEA framework should include consideration of resilience in ecosystems and the maintenance and enhancement of biodiversity and resource use.
Natural England (2011) *UK Geodiversity Action Plan*	
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.	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.
Natural Resources Wales (2016) *The State of Natural Resources Report (SoNaRR)*	

National 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**
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).	The DWMP should have regard to opportunities to address risks and threats identified in the report and identify integrated solutions. 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.
Natural Resources Wales (2020) *Salmon and sea trout plan of action for Wales*	
This plan provides details of, the actions required to restore healthy and more sustainable populations of salmon and sea trout in Welsh rivers.	The SEA should seek to maintain or enhance the quality of habitats and biodiversity. The impacts of the DWMP on populations of salmon and sea trout should be addressed.
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*	
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: • 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*	
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: • 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.
Public Health Wales (2017) *Creating a Healthier, Happier and Fairer Wales*	

National 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**
This document creates the following commitments: • Improve health and wellbeing and reduce health inequalities; • Improve the quality, equity and effectiveness of healthcare services; and • Protect people from infectious and environmental hazards.	The DWMP should seek to contribute to the improvement of public health. The SEA should have objectives relating to improving health.
UKCP (2018) *UK Climate Projections UKCP18*	
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. The methodology gives a measure of the uncertainty in the range of possible outcomes; a major advance beyond previous national scenarios. 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.	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 aquatic habitats that may be affected by the DWMP will also be influenced by climate change.
UKTAG: Phase 3 Review of Environmental Standards	
UKTAG prepares technical guidance designed to facilitate consistent implementation of the WFD in the UK. 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.	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.
Valuing Our Environment Partnership (2010) *Valuing the Welsh Historic Environment*	
This document is a review and does not contain objectives or targets as such. It can be assumed however that the protection and enhancement of the historic environment is a key objective. It showed that in 2010 the historic environment contributes approximately £840 million to Wales's gross value added, some £1.8 billion in respect of output and supports 30,000 full time equivalent jobs.	The DWMP should consider effects of options on historic environment assets. The SEA should include a guide question relating to protecting and enhancing the historic environment.
Wales Biodiversity Partnership (2015) *Nature Recovery Action Plan Wales – the Biodiversity Strategy for Wales*	
The Nature Recovery Action Plan (NRAP) for Wales is the National Biodiversity Strategy and Action Plan for Wales. Part 1: *Our Strategy for Nature*, sets out the commitment to reversing the loss of biodiversity in Wales, and the objectives for action. The Objectives contained in the plan are to: 1. Engage and support participation and understanding to embed biodiversity throughout decision making at all levels. 2. Safeguard species and habitats of principal importance and improve their management	The DWMP should consider effects of options on biodiversity, species and habitats and seek to contribute towards the objectives of the plan. The SEA should include a objectives/guide questions relating to the protection of biodiversity, species and habitats

National 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**
3. Increase the resilience of our natural environment by restoring degraded habitats and habitat creation 4. Tackle key pressures on species and habitats 5. Improve our evidence, understanding and monitoring 6. Put in place a framework of governance and support for delivery It sets out how the United Nations Environment Programme's Convention on Biological Diversity's (CBD) Strategic Plan for Biodiversity (and the associated Aichi Biodiversity Targets for 2011-20 in Wales) is addressed in Wales. Part 2: *Our Action Plan*, sets out those actions which had been specifically identified to meet the objectives to reverse the decline of biodiversity. It has been refreshed for 2020-21 to provide focus and prioritisation within a fast changing policy context and the emerging ecological crisis. The 2015 Strategy for Nature will remain in place until it is realigned to address the post 2020 framework for the UN Convention on Biological Diversity. A number of objectives have been identified to address the issues that are driving the decline in our biodiversity, and to support recovery.	and prevention of biodiversity loss.
Waterwise (2017) *Water Efficiency Strategy for the UK*	
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.	The DWMP should take into account their possible impacts on water efficiency and aim to improve water efficiency. The SEA objectives should reflect the need improve water efficiency.
Welsh Government (1998) *Technical Advice Note 14: Coastal Planning*	
TAN 14 seeks to protect the coastline in relation to development, landscape, biodiversity and recreation	The DWMP should take into account its effects on coastal areas. The SEA assessment should take into account the effects of the options on the coast where relevant.
Welsh Government (2004) *Technical Advice Note 15: Development and Flood Risk*	
TAN 15 sets out a precautionary framework to guide planning decisions. The approach seeks to first, direct new development away from those areas which are at high risk of flooding and, second, where development has to be considered in high risk areas (Zone C), allow only those developments which can be justified to be located within such areas.	The DWMP should take account of flood risk management. The SEA should include a guide question relating to flood risk.
Welsh Government (2008) *One Wales One Planet: The Sustainable Development Scheme for Wales*	
One Wales One Planet seeks to build on the two previous Sustainable Development Schemes. It sets out proposals to promote sustainable development, how the Welsh Government will make sustainable development a reality for people in Wales, and the benefits that people will see from this, particularly in less well-off communities. The strategy states that the Welsh Government is committed to working in partnership with others and notes that businesses can: • Develop resource efficiency within the organisation and through supply chains, improving productivity and competitiveness; • Reduce waste; • Develop environmental and sustainability policies and targets; • Monitor performance and resource use and report publicly on them;	The DWMP should consider effects on sustainable development in Wales (where relevant). The SEA should include guide questions relating to improving resource efficiency, reducing waste, monitoring and public reporting, encouraging sustainable practices among the workforce and engaging with and supporting local communities. The SEA should also include

National 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**
• Engage with the workforce in both adopting sustainable practices and encouraging employees to become sustainable champions in their own communities; • Engage with and support local communities.	proposals for monitoring the effects of of the DWMP on the environment and sustainability and could utilise targets that arise from this document.
Welsh Government (2009) *Technical Advice Note 5: Nature Conservation and Planning*	
Technical Advice Note 5 sets out how the planning system should contribute to protecting and enhancing biodiversity and geological conservation. It stipulates that the planning system should: • work to achieve nature conservation objectives through a partnership between local planning authorities, Countryside Council for Wales (CCW), the Environment Agency Wales, voluntary organisations, developers, landowners and other key stakeholders; • integrate nature conservation into all planning decisions looking for development to deliver social, economic and environmental objectives together over time; • ensure that the UK's international and national obligations for site, species and habitat protection are fully met in all planning decisions; • look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally; • help to ensure that development does not damage, or restrict access to, or the study of, geological sites and features or impede the evolution of natural processes and systems especially on rivers and the coast; and • plan to accommodate and reduce the effects of climate change by encouraging development that will reduce damaging emissions and energy consumption and that help habitats and species to respond to climate change.	The DWMP should seek to protect and enhance biodiversity and geodiversity. SEA objectives should reflect the need to conserve and, where possible, enhance, biodiversity and geodiversity.
Welsh Government (2010) *National Transport Plan*	
The Plan sets out five strategic transport priorities for the next 5 years: • Reducing greenhouse gas emissions and other environmental impacts; • Integrating local transport; • Improving access between key settlements and sites; • Enhancing international connectivity; • Increasing safety and security.	The DWMPshould consider any transport-related implications arising from the options and seek to reflect the transport hierarchy where possible. The SEA assessment should include an objective on improving and/or integrating transport and reducing greenhouse gases.
Welsh Government (2012) *Energy Wales: A Low Carbon Transition*	
Energy Wales and the supporting delivery plan set out what the Welsh Government intends to do to drive the change to a sustainable, low carbon economy for Wales. The Welsh Government commits to: • Engage and support businesses that help to achieve Wales's low carbon ambition; • Ensure that regulatory processes are as simplified and efficient as they can be and provide businesses with clarity and stability; • Engage the UK Government to ensure that there is a credible framework for capital investment to support the transition to a low carbon economy; • Support vital energy intensive industries in the transition to a low carbon economy; • Pursue energy efficiency; • Focus on low carbon sources of energy generation and approaches which will help to deliver lower overall emissions; and • Assist the most vulnerable in Welsh society and work to ensure that costs of reform do not fall disproportionately on poor households. The delivery plan also sets out key delivery themes around low carbon energy, Anglesey Energy Island, energy efficiency and distributed energy generation.	The DWMP should seek to incorporate low carbon energy and energy efficiency. The SEA should include a guide question relating to climate change mitigation.
Welsh Government (2012) *Historic Environment Strategy for Wales*	

National 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**
This strategy summarises the areas which the Welsh Government will prioritise for action, and aims to protect Wales' heritage whilst encouraging public access, enjoyment and participation. The Strategy sets out the role of the historic environment in delivering tangible social, economic and environmental benefits for Welsh communities. It also aims to further develop the economic role of heritage in Wales and maximise educational, training and leisure opportunities.	The DWMP should seek to protect and enhance the historic environment. The SEA should include assessment criteria relating to protection and enhancement of the historic environment.
Welsh Government (2014, updated 2019) *Energy Wales: A Low Carbon Transition Delivery Plan*	
The Plan seeks to create a stronger, more resilient Wales that has sustainability to its core. The plan states that Wales has many opportunities to do this, including through delivering renewable energy, and should be well place to take advantage of the green transition.	The SEA should have objectives relating to sustainable development, protecting the natural environment and economic growth.
Welsh Government (2014) *Welsh Rural Development Plan Programme document 2014-2020*	
The Programme was adopted by the European Commission in May 2015. It is a 7 year investment programme supporting a wide range of activities which contribute to the following objectives: • fostering the competitiveness of agriculture; • ensuring the sustainable management of natural resources, and climate action; • achieving a balanced territorial development of rural economies and communities, including the creation and maintenance of employment.	The DWMP should consider the effect of options on rural areas. The SEA assessment should note where options will have significant effects on rural areas.
Welsh Government (2015) *Nature Recovery Plan for Wales*	
The Nature Recovery Plan for Wales is aimed at addressing the underlying causes of biodiversity loss by: • putting nature at the heart of decision-making • increasing the resilience of the natural environment • taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the UN Convention on Biological Diversity and the EU Biodiversity Strategy to halt the decline in Wales' biodiversity by 2020 and then reverse that decline. The objectives of the plan are to: • Engage and support participation and understanding to embed biodiversity throughout decision making at all levels. • Safeguard species and habitats of principal importance and improve their management • Increase the resilience of the natural environment by restoring degraded habitats and habitat creation • Tackle key pressures on species and habitats • Improve our evidence, understanding and monitoring • Put in place a framework of governance and support for delivery.	The DWMP should seek to protect and enhance biodiversity. SEA objectives should reflect the need to conserve and, where possible, enhance biodiversity.
Welsh Government (2015) *Water Strategy for Wales*	
This Strategy sets out long-term policy direction in relation to water. The aim is to ensure a more integrated and sustainable approach to managing water and associated services in Wales. This Strategy has been developed within this context and will contribute to the implementation of wider Welsh natural resource management policy. A more integrated approach to the way water resources in Wales are managed will help to promote the coordinated management of water, land and related resources. This in turn will enable the maximisation of economic and social benefits, including tackling poverty in an equitable way while protecting vital ecosystems and the environment. The Strategy aims ensure the long-term needs of a sustainable and resilient environment and that there are sufficient, reliable water resources and waste water services available in Wales. This approach will also drive green growth by providing an essential resource for businesses, as well as providing new opportunities for employment.	The DWMP will have a key role in contributing to the wider objectives of the Strategy. The SEA should include objectives/guide questions relating to sustainable resource use.

National 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**
Welsh Government (2016) *Energy Efficiency in Wales: A Strategy for the next 10 years 2016-2026*	
This strategy outlines the plan for energy efficiency in Wales. Green growth is predicted to be increasingly important to the Welsh economy and this document encourages such an industries growth. Energy efficiency also often has many economic benefits through reducing energy bills.	The SEA assessment framework should have objectives relating to sustainable development and energy efficiency.
Welsh Government (2016) *Guiding Principles for Developing Water Resources Management Plans (WRMP's) for 2020*	
The Guiding Principles set out the Welsh Government's expectations in terms of the role and content of WRMPs. The link is also made with recent legislation (including the Environment (Wales) Act and the Well-being of Future Generations (Wales) Act 2015. The process for preparing WRMPs is also set out in the document.	The DWMP should be prepared in line with the expectations and processes outlined in the guidance.
Welsh Government (2016) *Taking Wales Forward 2016-2021*	
Sets out how Welsh Government will deliver more and better jobs through a stronger, fairer economy, improve and reform our public services, and build a united, connected and sustainable Wales between 2016 and 2021. The document sets out its priorities under four key themes: • Prosperous and Secure • Healthy and Active • Ambitious and Learning • United and Connected.	The SEA should ensure that the four key themes are embedded within the SEA objectives. The DWMP should ensure it is aligned to, and help deliver against, the priorities grouped under the key themes.
Welsh Government (2016) *Technical Advice Note 12: Design*	
Technical Advice Note 12 sets out the Welsh Government's land use planning policy in respect of promoting sustainability through good design. It advocates a holistic approach to design that considers: Movement - promoting sustainable means of travel; Access- ensuring access for all; Character - sustaining or enhancing local character, promoting legible development, promoting a successful relationship between public and private space, promoting quality, choice and variety, promoting innovative design; Community safety - ensuring attractive, safe public spaces and security through natural surveillance; Environmental sustainability - achieving efficient use and protection of natural resources, enhancing biodiversity and designing for change.	The DWMP should promote good design in the development of any new facilities are required as part of plan measure. The SEA objectives should include the promotion of good design.
Welsh Government (2017) *Future Landscapes: Delivering for Wales*	
This report contains a review of all the Areas of Outstanding Natural Beauty and National Parks within Wales. The report highlights the importance of these landscapes to shaping identity. The report seeks to improve the governance of these important natural assets. The report highlights how much of Wales falls within either designation and how many of these designations are at risk.	The SEA should have objectives relating to the protection of important natural assets. The DWMP should seek to ensure that these important natural designations have their resilience improved to ensure they will and seek to support enhancement of Wales' many natural assets, where possible.
Welsh Government (2017) *Natural Resources Policy*	
The Natural Resources Policy (NRP) is the second statutory product of the Environment (Wales) Act. The focus of the NRP is the sustainable management of Wales' natural resources, to maximise their contribution to achieving goals within the Well-being of Future Generations Act. The policy sets out three National Priorities. These are: • Delivering nature-based solutions, • Increasing renewable energy and resource efficiency,	The DWMP should have regard to the National Priorities in the NRP. The SEA should include assessment criteria relating to protection and enhancement of

National 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**
• Taking a place-based approach. Nature-based solutions may include developing resilient ecological networks, climate change adaptation and mitigation, flood risk management, green infrastructure, better soil and peat bog management, among others.	the environment, ecology, soils, flooding and climate change.
Welsh Government (2017) *Prosperity for All: National Strategy (2017) and Annual Report 2018*	
This strategy establishes the Welsh government's desire to achieve a prosperous Wales that benefits everyone. The document outlines six areas that will be improved to afford a better life to the population of Wales. These six areas are: • Early Years; • Housing; • Social Care; • Mental Health; • Skills and Employability; and • Decarbonisation.	The SEA should have objectives/guide questions relating to housing, education/skills, sustainable development and providing new healthcare facilities, and decarbonisation. The DWMP should seek to contribute to the improvement of the six key areas set out in the strategy.
Welsh Government (2017) *Prosperity for All: Economic Action Plan*	
This plan is focused upon achieving economic growth whilst ensuring this growth delivers benefits for all. The document provides detail on how the Welsh government will achieve this through reducing economic inactivity, new technologies, decarbonising the employment sector, efficiencies and financing to name a few.	The SEA should have objectives relating to economic growth and sustainable development. The DWMP should look to achieve ambitious economic growth that is managed in a way that ensures the benefits of economic growth are experienced by the population of Wales.
Welsh Government (2017) *Technical Advice Note 24: The Historic Environment*	
The purpose of the TAN is to provide guidance on how the planning system in Wales considers the historic environment during development plan preparation and decision making on planning and Listed Building (LBC) applications. This TAN provides specific guidance on how the following aspects of the historic environment should be considered: • world heritage sites • scheduled monuments • archaeological remains • listed buildings • conservation areas • historic parks and gardens • historic landscapes • historic assets of special local interest	The DWMP should take into account its effects on the historic environment and consider the guidance where relevant. The SEA assessment should take into account the effects of the options on the historic environment.
Welsh Government (2018) *Priorities for the Historic Environment of Wales*	
Sets out Welsh Government's plans to protect Wales' historic sites, in partnership with others, and to encourage more people to visit them.	The DWMP should consider the priorities set out in the document and seek to protect the historic environment. The SEA assessment should include objectives/guide questions relating to the protection of heritage assets.

National 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**
Welsh Government (2018) *Woodlands for Wales: The Welsh Government's Strategy for Woodlands and Trees*	
This strategy affords protection to the woodlands and trees of Wales, which are identified as being important natural resources. The document stresses the importance that such resources play in maintaining and enhancing the natural environment of Wales.	The SEA should have an objective/guide question related to protecting the natural environment and make mention to the protection of trees. The DWMP should aim to contribute to the protection of woodlands and trees where possible.
Welsh Government (2019) *Prosperity for All: A Low Carbon Wales*	
This document seeks to work with the other documents in the Prosperity for All series but is focused upon reducing the carbon footprint of Wales. This would be achieved through encouraging sustainable development and using more sustainable technologies.	The SEA should have objectives relating to economic growth and sustainable development.
Welsh Government (2019) *Welsh National Marine Plan*	
The Plan sets out how Welsh Government will achieve sustainable development in the Welsh marine area through the sustainable management of marine natural resources. It covers both Welsh inshore and offshore waters and sets out the following vision, which will be achieved through the plan's objectives and policies: • During the 20 year view taken by the plan, Welsh seas are clean, healthy, safe, productive and biologically diverse: • Through an ecosystem approach, our seas are healthy and resilient and support a sustainable and thriving economy. • Through access to and enjoyment of the marine environment, health and wellbeing are improving. • Through Blue Growth more jobs and wealth are being created which is helping coastal communities become more resilient, prosperous and equitable with a vibrant culture. • Through the responsible deployment of low carbon technologies, the Welsh marine area is making a strong contribution to energy security and climate change emissions 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.
Welsh Government (2020) *Agriculture (Wales) White Paper (2020)*	
This white paper outlines the importance of farming to the Welsh economy whilst also being a source of locally grown food. It highlights the difficulties of Brexit and trade barriers with the EU, whilst also establishing a need to de-carbon the farming industry as much as possible but not in a way that compromises it.	The SEA should have objectives relating to the need to protect rural agriculture.
Welsh Government (2020) *Historic Environment and Climate Change in Wales*	
The plan describes the challenges posed by a changing climate on the historic environment. It identifies understanding can be improved on the processes involved and how they impact on the physical and cultural aspects of Wales's historic environment. It also discusses ways to build adaptive capacity and increase resilience by delivering adaptation actions. The plan is aimed at policy and plan makers, including the Welsh Government, local authorities and other public and third sector organisations, as well as nongovernmental organisations, including academic institutions, which are all described as having a vital role to play in developing and implementing the actions identified in the plan.	The DWMP should consider where it can contribute to the delivery of adaptation actions. The SEA assessment should include objectives/guide questions relating to climate change adaption and the protection of heritage assets.
Welsh Government (2020) *National Strategy for Flood and Coastal Erosion Risk Management in Wales*	
This Strategy sets out how Welsh Government intend to manage the risks from flooding and coastal erosion across Wales over the next 10 years, whilst strengthening and clarifying roles and responsibilities. It sets out the policies and direction for all Welsh Flood Risk Management	The DWMP should consider the aims and objectives of the strategy.

National 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**
Authorities to follow, with measures to explain how this will be achieved, which can be considered as its action plan. The Welsh Government considers FCERM as a priority area, this is set out through the Strategy. The aim of the strategy is to Reduce the risk to people and communities from flooding and coastal erosion and the strategy contains five objectives: A. Improving our understanding and communication of risk B. Preparedness and building resilience C. Prioritising investment to the most at risk communities D. Preventing more people becoming exposed to risk E. Providing an effective and sustained response to events.	The SEA should include objectives and guide questions relating to flooding and coastal erosion.
Welsh Government (2020) *The Nature Recovery Action Plan for Wales 2020 – 21*	
The Nature Recovery Action Plan for Wales refreshes the original plan published in 2015. The Plan sets out five themes for action: Spatial action: • Maintaining and enhancing resilient ecological networks Transformative: • Increasing Knowledge and Knowledge Transfer; • Realising new Investment and funding; • Upskilling and capacity for delivery; • Mainstreaming, Governance and Reporting our Progress Five immediate priorities are identified for further action: • Aligning the responses to the climate emergency with the biodiversity crisis • Addressing the post EU exit funding gap for agri-environment measures • Providing spatial direction for targeting action for biodiversity • Improving the condition of the Protected Sites Network • Exploring new and sustainable funding mechanisms for biodiversity action.	The SEA should have objectives/guide questions relating to maintaining and enhancing resilient ecological networks and protecting sites designated for their biodiversity value. The DWMP should support the aims of NRAP and ensure that they help towards maintaining and enhancing resilient ecological networks.
Welsh Government (2020) *Strategic Equality Plan 2020-2024*	
The Plan seeks to tackle inequality within Wales through improving the accessibility of services, seeking fairer outcomes for citizens and being pro-active in tackling all kinds of inequality.	The SEA should have objectives/guide questions relating to cohesion, accessibility, economic wellbeing and human health and well-being.
Welsh Government (2020) *Welcome to Wales: Priorities for the visitor economy 2020 – 2025*	
The strategy identifies the priorities to deliver a prosperous and competitive tourism industry in Wales. Sets out the Welsh Government/Visit Wales' ambition to grow tourism for the good of Wales: generating economic, environmental, cultural and health benefits that enrich the lives of visitors and local communities. The main goals of the plan are: • Economic growth that delivers benefits to people and places • Environmental sustainability • Social and cultural enrichment • Health benefits.	The DWMP could take account of the benefits that tourism can bring to Wales. The SEA should include assessment criteria relating the importance of tourism and/or recreation.
Welsh Government (2021) *Future Wales: The National Plan 2040*	
Future Wales – the National Plan 2040 is the Welsh national development framework, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing the economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of Welsh communities. The document contains development policies that all new developments within Wales are required to adhere to.	The SEA should have objectives relating to economic and social well-being, protection of the historic and natural environment, carbon emissions and climate change/resilience.
Welsh Government (2021) *Planning Policy Wales (Edition 11)*	
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	Measures recommended in the DWMP will need to confirm to

National 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**
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. 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.	LDPs and the policies of the PPW.. The SEA objectives should reflect the Welsh Government's commitments to sustainable development.
Welsh Government (2021) *Our Economic Resilience & Reconstruction Mission*	
Sets out how the Welsh Government plans to recover from the economic damage of the coronavirus (COVID-19) pandemic. The Mission document seeks three outcomes, centred around the vision of a '*well-being economy':* • Prosperous economy • Green economy • Equal economy	The DWMP should seek to support the outcomes of the plan. The SEA should include an objective relating to economic and social well-being.

Regional 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**
Water Company (various) Drought Plans	
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 neighbouring Drought Plans relevant to the Dŵr Cymru Welsh Water DWMP are: • Hafren Dyfrdwy Drought Plan; • Albion Water Draft Drought Plan; • Severn Trent Water Drought Plan; • United Utilities Drought Plan; and • Thames Water.	The DWMP should take account of emerging and adopted neighbouring plans where appropriate.
Water Company (various) Water Resources Management Plans	
Water companies in England and Wales, are required to prepare, maintain and publish a WRMP under the Water Industry Act 1991, updated by the provisions in section 37A-D of the Water Act 2003 and the Water Act 2014 and the Environment (Wales) Act 2016. The plan must set out how a water company intends to maintain the balance between supply and demand for water over a minimum of a 25 year period. This is complemented by a water company drought plan, which sets out the short-term operational steps a company will take as a drought progresses. Those neighbouring Water Resource Management Plans relevant to the Dŵr Cymru Welsh Water DWMP are • Hafren Dyfrdwy; • Severn Trent Water; • United Utilities; • Bristol Water; and, • Thames Water.	The DWMP will need to be in accordance with neighbouring WRMPs and take into account options which are relevant to the Welsh Water area. The SEA should include an objective/guide question relating to water resources.
Dŵr Cymru Welsh Water (2018) *Welsh Water 2050*	
Welsh Water 2050 identifies the significant trends that will face Welsh Water over the next 30 years and how it will impact the company and their customers. Opportunities and challenges related to the trends have been identified within the document and the company's strategic responses to respond to these challenges have been set out. The document is set within the policy context of the Welsh Government's Wellbeing of Future Generations Act (Wales) 2015 and Environment Act (Wales) 2015.	The DWMP should consider the challenges and strategic responses set out within Welsh Water 2050. The SEA objectives should consider the future trends and challenges.
Dŵr Cymru Welsh Water (2019) *Final Water Resources Management Plan 2019*	
As set out above, Water companies in England and Wales, are required to prepare, maintain and publish a WRMP under the Water Industry Act 1991, updated by the provisions in section 37A-D of the Water Act 2003 and the Water Act 2014 and the Environment (Wales) Act 2016. The plan must set out how a water company intends to maintain the balance between supply and demand for water over a minimum of a 25 year period. This is complemented by a water company drought plan, which sets out the short-term operational steps a company will take as a drought progresses. For operational purposes, Welsh Water divides its supply area into three regions (North Wales, South West Wales and South East Wales), however, for water resources planning purposes, Welsh Water divides its supply area into 24 WRZs. A WRZ is defined as the largest area in which all resources can be shared such that all customers, with some limitations, experience the same risk of supply failure. The Welsh Water WRMP forecasts that two WRZs will be in deficit during the plan period (Tywyn Aberdyfi and Pembrokeshire).	The DWMP will need to align with the WRMP and will need to take account of any WRMP measures which may interact with options/measures set out in the DWMP. The SEA should include an objective/guide question relating to water resources.

Regional 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**
Dŵr Cymru Welsh Water (2020) *Making time for nature 2020: Welsh Water's revised plan for maintaining and enhancing biodiversity*	
The plan highlights what Welsh Water is doing across its business to support nature and biodiversity. It also outlines additional actions Welsh Water intend to take up to 2025. The plan sets out a series of 30 commitments for supporting biodiversity and nature Some of these are short term which will be delivered by 2022. Others are medium to long term commitments which will aim to influence longer term positive changes to 2025 and beyond. It is a statutory plan published under section 6 of the Environment (Wales) Act 2016.	The DWMP should seek to protect and enhance biodiversity. SEA objectives should reflect the need to conserve and, where possible, enhance biodiversity.
Dŵr Cymru Welsh Water (Undated) *Our Plan PR19 Business Plan 2020-2025*	
This document summarises Welsh Water's business plan for 2020-25 and beyond. The PR19 business plan includes performance targets for all aspects of Dŵr Cymru Welsh Water's business across a suite of 47 'Measures of Success'. 14 of these measures were pre-defined by Ofwat. These measures of success cover 7 outcomes: • Safe, clean water for all • Safeguard our environment for future generations • Put things right if they go wrong • Personal service that's right for you • Fair bills for everyone • A better future for all our communities • Colleague promises The key performance improvements set out in the business plan include the following: • a 15% reduction in leakage levels (which have already been roughly halved in the last 20 years) • a reduction in the numbers of customers experiencing temporary discolouration or taste and odour issues with their water supply, from 2.8 to 2.0 (contacts per 1,000 customers) • a reduction in supply interruptions, which are particularly important for businesses as well as households, from 12 to eight minutes a year per customer • a 10% reduction in incidents of sewer flooding of customer premises each year, which would otherwise be on an upward trend due to climate change, from 300 to 273 a year • a 20% reduction in pollution incidents (which are predominantly minor 'category 3' incidents), from 112 to 90 a year and • an 18% reduction in the number of customers receiving a service below our defined minimum-threshold levels, from 1,500 to 1,230, meaning fewer "worst-served" customers suffering from repeated water supply outages, sewer flooding or low water pressure	The DWMP should seek to support the delivery of the business plan. The objectives and guide questions that comprise the SEA Framework should, where appropriate, reflect the priorities set out in this plan.
Natural England (Various) Site Improvement Plans	
The various plans provide a high-level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on sites (in both England and Wales) and outline the priority measures required to improve the condition of the features. The plans do not cover issues where remedial actions are already in place or ongoing management activities which are required for maintenance.	The DWMP should support the protection and enhancement of biodiversity, including helping to support addressing the issues that affect the features that contribute to the designation.

Regional 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 SEA assessment should include criteria relating to the protection of species and habitats.
Natural Resources Wales (2015) (Various) River Basin Management Plans	
Natural Resources Wales as the responsible authority for river basin planning in Wales. The plans are a requirement of the Water Framework Directive (WFD) (2000/60/EC). The plans describe the pressures facing the water environment and set objectives for rivers, lakes, estuaries, coastal and ground waters to cover the period 2015-2021. They outline the priority actions ('Measures') that are needed to improve the environment, the benefits those actions could achieve and who is best placed to deliver them. The measures seek to address the significant water management issues. Relevant River Basin Management Plans managed by Natural Resources Wales are set out below: • Dee River Basin Management Plan • Western Wales River Basin Management Plan In addition, the Severn River Basin Management plan also falls within part of the Welsh Water area however is managed by the Environment Agency.	The DWMP should consider how it can contribute to the priority actions set out in the river basin management plans. The SEA objectives should reflect the need to manage water resources in a sustainable manner.
Natural Resources Wales (Various) Area Statements	
Each Area Statement outlines the key challenges facing that particular locality, what can be done by people to meet those challenges, and how natural resources can be better managed for the benefit of future generations. The following Area Statements apply to areas located within the Welsh Water supply area: • South East Wales Area Statement • South Central Wales Areas Statement • South West Wales Area Statement • Mid Wales Area Statement • North East Wales Area Statement • North West Wales Area Statement • Marine Area Statement	The DWMP and the SEA should consider how the challenges facing each of the areas might be impacted by the implementation of the plan and how they can contribute to the addressing the challenges, where appropriate.
Regional Transport Plans (Various)	
Four Regional Transport Consortia were established in Wales following the additional powers conferred on the Welsh Assembly Government under the Transport Wales Act 2006 and the Railways Act 2005: • North Wales • Mid Wales • South west Wales • South east Wales The four Regional Transport Consortia, made up of local authorities, are responsible for delivering *One Wales: Connecting the nation* at a regional level. The Regional Transport Plans were developed to strengthen inter-authority co-operation, whilst helping to ensure local transport planning is consistent with Connecting the nation. The Regional Transport Plans elaborate details of transport policies, schemes and other interventions that the Consortia wish to develop in their respective regions, as well as contributing to transport planning at a wider level.	The DWMP should consider the regional plans, where relevant.

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 DWMP and the SEA**
AONB Management Units (various) AONB Management Plans	
The following AONBs are present in the Welsh Water area: • Anglesey; • Clwydian Range; • Gower; • Llyn; • Wye Valley. The management plans for AONBs contain actions to ensure the protection and enhancement of the landscape.	DWMP Measures within AONBs should be consistent with the management plan. The SEA assessment framework should consider the effects of options on landscapes, including designated landscapes.
Defra (Various) Eel Management Plans	
Eel management plans describe the current status of Eel populations across river basin districts and assesses compliance with targets set out in EU Council Regs 110/2207. Relevant Eel Management Plans are set out below: • Eel Management Plan for Western Wales River Basin District • Eel Management Plan for Severn River Basin District; • Eel Management Plan for Dee River Basin District.	The DWMP should take Eel management plans into account. The SEA assessment framework should include an objective and guide questions relating to the protection of biodiversity.
Natural Resources Wales (various) Catchment Flood Management Plans	
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. Those CFMPs present in the Welsh Water area are: • Wye and Usk; • Eastern Valleys; • Taff and Ely; • Ogmore to Tawe (including Thaw and Cadoxton); • Loughor to Taf; • Pembrokeshire and Ceredigion Rivers; • North West Wales; • Conwy and Clwyd; • River Dee.	The DWMP should take CFMPs into account. The SEA should include a guide question relating to flood risk.
Environment Agency (various) River Basin Management Plans	

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 DWMP and the SEA**
River Basin Management Plans (RBMPs) set out how the water environment will be managed and provide 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: • 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. RBMPs in the Welsh Water area are Severn, Western Wales and Dee.	The DWMP should reflect the broad objectives of these plans. The SEA objectives should reflect the need to manage water resources on a catchment basis in a sustainable manner.
Environment Agency, Natural Resources Wales and Natural Scotland (2016) River Basin District Flood Risk Management Plans	
Flood risk management plans (FRMP) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs, and set out how risk management authorities will work with communities to manage flood risk over the next six years.	The DWMP should take FRMPs into account. The SEA should include a guide question relating to flood risk.
Environment Agency (undated) Wye Waterway Plan 2017-2022	
The Wye waterway plan addresses the Environment Agency's responsibilities and aspirations (as the navigation authority responsible for the Rivers Wye and Lugg) for recreation and navigation on the Rivers Wye and Lugg. The plan's vision is to develop and promote appropriate navigation and recreational activities for all waterway users on the River Wye and Lugg, while protecting, maintaining and enhancing the unique conservation status of these waterways. The plans core objectives are to: • protect, maintain and enhance the unique conservation status of the waterway; • manage, improve and enhance navigation opportunities for the waterway; • protect the interests of those navigating and using the principal rivers; • encourage the appropriate use and enjoyment of the waterway by walkers, anglers and other recreational users; • promote better access and information for canoeists, rafters and users of small craft; • contribute to enhanced biodiversity, heritage and landscape values of the waterway; • develop the health, economic and social benefits of navigation, to the advantage of everyone • enable more people to enjoy the natural environment.	DWMP measures in the Wye catchment should be consistent with the aims of the Wye Waterway Plan. The SEA assessment should consider the effects of options on recreational use of waterways.
Environment Agency and Natural Resources Wales (various) Salmon Action Plans	

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 DWMP and the SEA**
Salmon action plans have been produced for the following river catchments in Wales; • Cleddau; • Clwyd; • Conwy; • Dee; • Dwyfor; • River Dyfi; • Dysynni; • Glaslyn and Dwyryd; • Mawddach; • Nevern; • Ogmore; • Ogwen; • Rheidol; • Taf; • Taff and Ely; • Tawe; • Teifi; • River Usk; • River Wye. 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. Individual targets are set out in each action plan	The DWMP should consider its effects on salmon populations. The SEA assessment framework should include a guide question relating to the effects of options on fish.
Local Biodiversity Action Plans (LBAPs), including Species and Habitats Action Plans (various)	
27 LBAPs in Wales and one for Herefordshire. 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. 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. 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.	The DWMP should take into account LBAP objectives. The SEA assessment should consider effects of options on biodiversity and outline enhancement and mitigation opportunities where these are identified
Local Geodiversity Action Plans (LGAPs) (Various)	
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 in a scientific, educational, recreational and cultural setting, • promote geological sites and make geo-conservation relevant to people,	Any DWMP measures that affect areas with Geodiversity Action Plans should be consistent with the respective plan. The DWMP should seek to

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 DWMP and the SEA**
• provide a local geodiversity audit (an audit of sites and skills) and influence local planning policy. The following areas are within the Welsh Water area and have Local Geodiversity Action Plans: • Anglesey • Clwydian Range AONB	conserve and enhance geodiversity. The SEA assessment should consider effects of options on geodiversity and outline enhancement and mitigation opportunities where these are identified.
Local Planning Authority (various) Land Use Plans	
The Welsh Water area covers a large number of Local Planning Authorities. These have been identified as: • Conwy; • Blaenau Gwent; • Brecon Beacons National Park; • Bridgend • Caerphilly; • Cardiff; • Carmarthenshire; • Ceredigion; • Denbighshire; • Flintshire; • Gwynedd; • Herefordshire; • Merthyr Tydfil; • Monmouthshire; • Neath Port Talbot; • Newport; • Pembrokeshire; • Pembrokeshire Coast National Park; • Powys; • Rhondda Cynon Taff; • Snowdonia National Park; • Swansea; • Torfaen; • Vale of Glamorgan; • Wrexham; • Ynys Mon.	Measures identified in the DWMP should be consistent with the Land Use Plans of those local authorities that will be affected by the plans.

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 DWMP and the SEA**
The main objectives of the existing and emerging Land Use Plans in these areas are related to the sustainable development of the area.	
National Park Management Plans (various)	
The following National Parks are present in the Welsh Water area: • Snowdonia; • Brecon Beacons; • Pembrokeshire Coast. The management plans for National Parks contain actions to ensure the protection and enhancement of the landscape and natural environment of these areas.	DWMP measures that affect National Parks should be consistent with the respective management plan. The SEA assessment framework should consider the effects of options on landscapes and the natural environment, including designated areas.
Natural Resources Wales (Various) Catchment Abstraction Management (Licencing) Strategies (CAMS)	
Catchment Abstraction Management Strategies (CAMS) to assess how much water is available for abstraction, and where. Therefore, highlighting where water abstraction licences can be granted. A water abstraction licence is required to remove more than 20 cubic metres (4,400 gallons) of water per day from a river or stream, reservoir, lake or pond, canal or spring. The strategies aim to meet the water needs of the environment and to allow water users to sustainably exploit any surplus. Within the Welsh Water area the following Catchment Abstraction Management Strategies (CAMS) are in place: • River Wye CAMS • Thaw and Cadoxton CAMS • The Teifi and North Ceredigion CAMS • The Cleddau and Pembrokeshire Coastal Rivers CAMS • The Carmarthen Bay CAMS • The Swansea Bay CAMS • Anglesey Catchment CAMS • Clwyd Catchment CAMS • Conwy Catchment CAMS • River Dee CAMS • Llŷn and Eryri CAMS • Meirionnydd CAMS • River Usk CAMS • South East Valleys CAMS	The DWMP should take the CAMS into account. The SEA assessment should consider the effects of options on the availability and sustainability of water supply.
Public Services Boards (PSBs) (Various) PSB Assessments and Local Well-being Plans	
The purpose of Public Services Boards (PSBs) is to improve the economic, social, environmental and cultural well-being in its area by strengthening joint working across all public services in Wales.	The DWMP should take into account the objectives of the PSBs and the Local Well-

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 DWMP and the SEA**
The Well-being of Future Generations (Wales) Act 2015 establishes statutory PSBs which will replace the voluntary Local Service Boards in each local authority area. Each board will: • assess the state of economic, social, environmental and cultural well-being in its area • set objectives that are designed to maximise the PSBs contribution to the well-being goals. Each PSB must prepare and publish a plan setting out its objectives and the steps it will take to meet them. This is called a Local Well-being Plan. It must say: • why the PSB feels their objectives will contribute within their local area to achieving the well being goals • how it has had regard to the assessment of Local Well-being in setting its objectives and steps to take. Each PSB will carry out an annual review of their plan showing their progress. When producing their assessments of local well-being and Local Well-being plan, PSBs must consult widely. The following PSB areas are within the Welsh Water area: • Anglesey and Gwynedd PSB • Bridgend PSB • Blaenau Gwent PSB • Caerphilly PSB • Cardiff PSB • Carmarthenshire PSB • Ceredigion PSB • Conwy and Denbighshire PSB • Cwm Taf PSB • Flintshire PSB • Powys PSB • Neath Port Talbot PSB • Monmouthshire PSB • Newport PSB • Pembrokeshire PSB • Swansea PSB • Torfaen PSB • Vale of Glamorgan PSB • Wrexham PSB	being Plans and seek to contribute to their achievement, where appropriate. The SEA should include objectives and guide questions relating to economic, social, environmental and cultural well-being.
Shoreline Management Plans (various)	
Shoreline Management Plans are prepared in England and Wales. They are developed by Coastal Groups with members drawn from local authorities and other stakeholders. They identify the most sustainable approach to managing the flood and coastal risks to the coastline in the short term (up to 20 years), medium term (20 to 50 years) and long term (50 to 100 years). Relevant plans include: • North West England and North Wales Shoreline Management Plan	The DWMP should take into account the policies and actions of the SMP. Where appropriate, the SEA should consider the cumulative effect of SMP

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 DWMP and the SEA**
• Severn Estuary Shoreline Management Plan Review • Lavernock Point to St Ann's Head Shoreline Management Plan • West of Wales Shoreline Management Plan	policies and actions and DWMP measures.
World Heritage Site Management Plans (Various)	
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 the plan period period, and what will be done to explain its significance to visitors. To be included on the World Heritage List, sites must have Outstanding Universal Value (OUV). The statement of OUV gives a clear, shared understanding of the reasons for the site's inscription and identifies what it is about the site that needs to be managed over the long-term Within the Welsh Water operational area there are three World Heritage Sites, each with their own management plan: • Blaenavon Industrial Landscape World Heritage Site Management Plan 2018 – 2023 • Castles and Town Walls of King Edward in Gwynedd World Heritage Site: World Heritage Site Management Plan 2018 -28 • Pontcysyllte Aqueduct and Canal World Heritage Site Management Plan 2019-2029	The SEA should ensure that there are no negative direct or indirect impacts, for example during construction, on the world heritage sites situated within the Welsh Water area.

Appendix D
Definitions and Thresholds of Significance

Proposed SEA Objectives	Proposed 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.	• 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 promote climate change resilience of both designated and non-designated sites? • 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	+++	Major/Significant Positive	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. 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. The option would lead to a major increase in natural capital/ecosystem resilience and enhancement. The option would result in a major reduction or management of INNS.
		++	Moderate Positive	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. 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. The option would lead to a moderate increase in natural capital/ecosystem resilience and enhancement. The option would result in a moderate reduction or management of INNS.
		+	Minor Positive	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. 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. The option would lead to a minor increase in natural capital/ecosystem resilience and enhancement. The option would result in a minor reduction or management of INNS.
		0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species), natural capital/ecosystem resilience or INNS.
		-	Minor Negative	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. 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. The option would lead to a minor decrease in natural capital/ecosystem resilience and enhancement.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
	• Will it prevent the spread/introduction of invasive non-native species?			The option would result in a minor increase or spread of INNS.
		--	Moderate Negative	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. The option would result in a moderate decrease in the population of, or habitats for, a priority species. 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. The option would lead to a moderate decrease in natural capital/ecosystem resilience and enhancement. The option would result in a moderate increase or spread of INNS.
		---	Major/Significant Negative	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. The option would result in a major decrease in the population of, or habitats for, a priority species. 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. The option would lead to a major decrease in natural capital/ecosystem resilience and enhancement. The option would result in a major increase or spread of INNS.
		?	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.	• Will additional land be required for the development or implementation of the option or will the option 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?	+++	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
		--	Moderate Negative	The option would result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option would result in land contamination.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
	• 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)? • Will it contribute towards a catchment-wide approach to land management?			The option would result in a moderate negative effect on a site designated for their geological interest The option would be partially overlying mineral resources leading to partial mineral sterilisation.
		---	Major/Significant Negative	The option would result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option would result in land contamination. The option would result in a major negative effect on a site designated for their geological interest The option would be directly overlying mineral resources leading to mineral sterilisation.
		?	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	<u>Quantity</u> • Will it minimise the 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? <u>Quality</u> • 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?	+++	Major/Significant Positive	The option would result in major reduction in the demand for water. The option would result in addressing failure of WFD Good Ecological Status / Good Ecological Potential.
		++	Moderate Positive	The option would result in moderate reduction in demand for water. The option would contribute to addressing failure of WFD Good Ecological Status / Good Ecological Potential.
		+	Minor Positive	The option would result in minor reduction in the demand for water. The option would contribute to a minor improvement in surface/coastal water quality or in groundwater quality.
		0	Neutral	The option would have no discernible effect on river flows or on groundwater levels or flows. The option would not lead to a change in WFD classification.
		-	Minor Negative	The option would result in minor short-term decreases in river flows, wetted width, depth, and velocity over small distances. The option would result in minor decreases in groundwater levels. The option would result in minor increases in demand for water. 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. The option would result in minor decreases in groundwater quality.
		--	Moderate Negative	The option would result in medium-term, moderate decreases in river flows, wetted width, depth, and velocity over moderate distances. The option would result in moderate decreases in groundwater levels. The option would result in moderate increases in demand for water. 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.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
	• 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?			The option would result in the likely deterioration of WFD classification. The option would result in moderate decreases in groundwater quality.
		---	Major/Significant Negative	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.
		?	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.	• 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 infrastructure which help alleviate flooding in the catchment.
		0	Neutral	The option would involve the construction of above-ground 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 infrastructure which would be wholly or partially located within Flood Zone 2.
		--	Moderate Negative	The option would involve the construction of above-ground 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 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	• Will it reduce or minimise pollutant emissions to air? • Will it maintain or enhance ambient air quality, keeping	+++	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

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
and enhance air quality.	pollution below Local Air Quality Management thresholds (e.g., in Air Quality Management Areas or sensitive habitats)?	+	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.	• 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? • Will the option affect carbon sequestration?	+++	Major/Significant Positive	The option would reduce operational 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 will reduce operational carbon emissions by between 100 and <1,000 tonnes CO2e/year. The option will result in a moderate increase in carbon sequestration
		+	Minor Positive	The option will reduce operational carbon emissions by less than 100 tonnes CO2e/year
		0	Neutral	The option would have no discernible effect on greenhouse gas emissions.
		-	Minor Negative	The construction of the option would use of materials with a minor amount of embodied carbon (100 to <1,000 tonnes CO2e). The option would result in a minor or temporary increase in operational carbon emissions (100 to <500 tonnes CO2e).
		--	Moderate Negative	The construction of the option would use of materials with a moderate amount of embodied carbon (1,000 to 7,500 tonnes CO2e). The option would result in a moderate increase in operational carbon emissions (500-2,000 tonnes CO2e). The option will result in a moderate release of previously sequestered carbon.
		---	Major/Significant Negative	The construction of the option would use of materials with a major amount of embodied carbon (>7,500 tonnes CO2e). The option would result in major or long term increases in operational carbon emissions (>2,000 tonnes CO2e). 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

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
7. To adapt and improve resilience to the threats of climate change.	• 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?	+++	Major/Significant Positive	The option would have a major positive effect on increasing the resilience/decreasing the vulnerability to climate change effects.
		++	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.	• 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 provide a major increase in treatment capacity of ≥10,000 Population Equivalent (PE) or a significant improvement in discharge quality The option would result in a significant increase in construction jobs (capital spend of ≥£25m).
		++	Moderate Positive	The option would provide a moderate increase in treatment capacity of 1,500 PE to <10,000 PE or a moderate improvement in discharge quality The option would result in a moderate increase in construction jobs (capital spend £5m to <£25m).
		+	Minor Positive	The option would provide a minor increase treatment capacity of 0 to 1,500 PE or a minor improvement in discharge quality. The option would result in a minor increase in construction jobs (capital spend £1m to <£5m).
		0	Neutral	No additional treatment capacity or Improvement to the discharge quality 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, design capacity or discharge quality. 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, design capacity or discharge quality. 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, design capacity or discharge quality.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
				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.	• 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?	+++	Major/Significant Positive	The option would lead to a major increase in wastewater treatment capacity (≥10,000 PE), 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.
		++	Moderate Positive	The option would lead to a moderate increase in wastewater treatment capacity (1,500pe to 10,000 PE), 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. The option would have a moderate positive effect on existing, recreational facilities and publicly accessible greenspace within the operational area.
		+	Minor Positive	The option would lead to a minor increase in wastewater treatment capacity (0 to 1500 PE), 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. The option would have a minor positive effect on existing, recreational facilities and publicly accessible greenspace within the operational area.
		0	Neutral	The option would not result in any effects on human health and/or existing recreational facilities.
		-	Minor Negative	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). The option would reduce the availability and quality of existing recreational facilities and publicly accessible greenspace within the operational area
		--	Moderate Negative	The option would have a moderate long-term negative effect on human health (e.g., noise or air quality). The option would result in the permanent removal of existing recreational facilities and publicly accessible greenspace within the operational area.
		---	Major/Significant Negative	The option would have a significant long-term effect on human health (e.g., noise or air quality). The option would result in the removal of existing recreational facilities and publicly accessible greenspace within the operational area.
		?	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	• Will it improve efficiency in water consumption?	+++	Major/Significant Positive	The option would involve a major reduction in infiltration from the supply network or is a water efficiency option with a design capacity of >100 M^3/day.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
and efficient use of resilient water resources.	• Will it increase the resilience of water resources, now and into the future? • Will it contribute towards improving the awareness of water sustainability?			The option would result in a major improvement in water efficiency and resilience.
		++	Moderate Positive	The option would involve a moderate reduction in infiltration from the supply network or is a water efficiency option with a design capacity of 50 to 100M^3/d. The option would result in a moderate improvement in water efficiency and resilience.
		+	Minor Positive	The option would involve reducing infiltration from the supply network or is a water efficiency option with a design capacity of <50 M^3/d. 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.	• 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.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
		---	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.	• 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? • Will it protect or enhance (where relevant) Welsh language and culture?	+++	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 Cadw Listed Buildings at Risk and Historic England Buildings/Monuments at Risk Register; 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	The option would diminish the significance of designated heritage assets and/or their setting such as: • Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Cadw Listed Buildings at Risk and Historic England Buildings/Monuments at Risk Register; • Loss of public access to important heritage assets and lack of appropriate interpretation. 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.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
13. To conserve, protect and	• Will it avoid adverse effects to, and enhance where	+++	Major/Significant Positive	The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.

Proposed SEA Objectives	Proposed Guide Questions	Score		Description
enhance landscape and townscape character and visual amenity.	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?	++	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

Generic Option Assessments

Option Assessment Information	
Option ID	N/A
Option Name	Sustainable
Option Description	Removal of Impermeable Area through the installation of SuDS technology.

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
	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, 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 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, 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, permiable 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 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 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: 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 practise 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, 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 seek to reduce the frequency and severity of CSO spills, by reducing the frequency of surface water flooding through increased infiltration and retention of water, that 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 CSO spills, by reducing the frequency of surface water flooding through increased infiltration and retention of water, 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 reduce the frequency and severity of flooding, through increased infiltration and retention of water, that 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 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.

8. Economic and Social Wellbeing: The operation of the option would seek to reduce the frequency and severity of flooding that may have positively affect communities so increasing economic and social wellbeing. Creation of additional green areas (e.g. rain gardens, wetlands) 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 CSO spills and would have a positive effect on the health of the community. Creation of additional green areas (e.g. rain gardens, wetlands) may also have a positive effect on health and wellbeing.

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 CSO spills 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: It is not anticipated that the operation of the option would have significant effects on any heritage assets; however, if the option involves permanent new above ground infrastructure, it may have minor effects on the settings of nearby assets and features, if present. If no features are present then then the effect against this objective would be neutral.

13. Landscape: The operation of the option may introduce new permanent above ground infrastructure (e.g. water butts) which may have adverse effects on any designated landscapes, if located within or in close proximity to such areas. More generally, any new permanent above ground infrastructure may have adverse effects on landscape/townscape character, which may have a minor negative on this objective. However, certain SuDS infrastructure, such as swales, wetlands, attenuation ponds, rain gardens, particularly where situated on PDL, may be perceived as an improvement to local landscape/townscape.

Option Assessment Information	
Option ID	N/A
Option Name	Traditional
Option Description	Increasing storage/capacity in the drainage and wastewater 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	-/?	-/?
	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 landtake (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 to increase the wastewater network capacity (e.g. storage tanks, pipelines, 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 noted that any soils displaced during the construction of below ground infrastructure (e.g. pipelines) 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. pipeline replacement/upsizing, pipe relining, pump replacement/upgrading 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 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 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 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: 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 practise 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, 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 seek to reduce the frequency and severity of CSO spills, by increasing the capacity of the drainage and wastewater network, that 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 CSO spills, by increasing the capacity of the drainage and wastewater network, 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 reduce the frequency and severity of flooding, by increasing the capacity of the drainage and wastewater network, that 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 energy input (e.g. pumping) may result in carbon emissions which may have a minor negative effect on this objective. If the option does not require any operational energy input, 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 against this objective.

8. Economic and Social Wellbeing: The operation of the option would seek to reduce the frequency and severity of flooding that may have 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 CSO spills and 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 potentially reducing the quantity of water entering the wastewater system or providing additional capacity in the system and subsequently reducing the frequency and severity of CSO spills.

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; however, if the option involves permanent new above ground infrastructure, it may have minor effects on the settings of nearby assets and features, if present. If no features are present, then then the effect against this objective would be neutral.

13. Landscape: The operation of the option may introduce new permanent above ground infrastructure (e.g. tanks, pumps) which may have adverse effects on any designated landscapes, if located within or in close proximity to such areas. More generally, any above ground infrastructure may have a minor negative effect on local landscape/townscape character.