Dŵr Cymru Welsh Water

Draft Drainage and Wastewater Management Plan

Habitats Regulations Assessment

Wood Group UK Limited – May 2022

Report for

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Document revisions

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2	Revised draft	16/05/22
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Contents

1. Introduction

1.1 Welsh Water's Drainage and Wastewater Management Plan

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

1.1.2 The DWMP will set out how Welsh Water intends to extend, improve and maintain a robust and resilient drainage and wastewater system. The plan will take a long-term view, setting out responses to challenges over a planning period of at least 25 years. The draft DWMP will be published in spring 2022 and then finalised following consultation to support business plans for the 2024 Price Review. DWMPs are not currently a statutory requirement, and so this issue of the plan is being treated as a 'dry-run' to refine the approaches used for the DWMP development and the associated environmental assessments.

1.2 Habitats Regulations Assessment

1.2.1 Regulations 63 and 64 of The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations')[4] 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.

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

[2] Section 78 (1) of the Environment Bill states that "Each sewerage undertaker must prepare, publish and maintain a drainage and sewerage management plan". The Bill is at report stage, with the third reading and royal assent awaited. Welsh Water also has a performance requirement to undertake a DWMP from Welsh Government and NRW.

[3] 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

[4] The 2017 Regulations have been amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 to reflect the UK's exit from the EU, although these largely carried forward the provisions and terminology of the 2017 Regulations and do not fundamentally alter their interpretation. The following sections therefore refer to the 2017 Regulations and (where appropriate for clarity) the relevant provisions of the Habitats Directive.

1.2.2 Regulation 63 states that if a plan or project is "(a) is likely to have a significant effect on a European site[5] or a European offshore marine site[6] (either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site" then the competent authority must "…make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives" before undertaking, consenting or permitting the plan or project. 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.

1.2.3 The process by which Regulation 63 is met is known as Habitats Regulations Assessment (HRA)[7]. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan or project's implementation (either on its own or 'in combination' with other plans or projects)[8] and, if so, whether there will be any 'adverse effects on site integrity'[9].

1.3 This Report

1.3.1 As noted, DWMPs are not currently a statutory requirement. DCWW has agreed to informally apply the principles of HRA (and Strategic Environmental Assessment, SEA) to this version of the plan to test suitable approaches for future DWMPs, and has therefore appointed Wood Group UK Limited (Wood) to assist with its assessment of the DWMP against the provisions of Regulations 63 and (if required) 64.

1.3.2 DWMPs are novel plans and there is currently no guidance or case-practice to suggest a suitable approach for their assessment against the Habitats Regulations. Whilst they will have some developmental similarities to Water Resource Management Plans (WRMPs)

[5] The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 largely carried forward the provisions and terminology of the 2017 Regulations, and so the term 'European site' is currently retained and for all practical purposes the definition is essentially unchanged. European sites are therefore: 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') are applied; and to possible SACs (pSACs) and listed Ramsar Sites, to which the provisions of the Habitats Regulations are applied a matter of Government policy (TAN 5 para. 5.1.3) when considering development proposals that may affect them. This also applies to areas identified, or required, as compensatory measures for adverse effects on any of the above sites. "European site" is therefore used in this document in its broadest sense, as an umbrella term for all of the above designated sites. Note, it is likely that this term will be supplanted at some point in the future although an appropriate UK-wide alternative has not yet been agreed (e.g. the NPPF in England has adopted the term 'Habitats sites' to refer collectively to those sites defined by Regulation 8; the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 has renamed the Natura 2000 network of sites as the 'National Site Network').

[6] '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.

[7] The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is more accurately termed 'Habitats Regulations Assessment' (HRA), with the term 'Appropriate Assessment' limited to the specific stage within the process.

[8] Also referred to as the 'test of significance'.

[9] Also referred to as the 'integrity test'.

there are several critical differences that will inhibit the direct application of established WRMP assessment practices. In particular, the 'options-led' iterative assessment approach that is common to WRMP HRAs is unlikely to be easily transferrable to DWMPs due to the number of catchments and options, and the absence of substantive detail on many options.

1.3.3 This report aims to apply the tests within Regulation 63 to the DWMP; the remainder of this report sets out:

- a brief summary of the Draft DWMP and options (Section 2);
- the approach to HRA of the Draft DWMP, including the key issues for these strategic plans (Section 3);
- a summary of the options screening (Section 4);
- a summary of the 'appropriate assessments' undertaken where significant effects could not be excluded (Sections 5);
- an 'in combination' assessment for the plan (Section 5); and
- the proposed conclusion of the HRA of Welsh Water's Draft DWMP (Section 6).

2. Summary of the DWMP

2.1 Drainage and Wastewater Management Plans

2.1.1 WaSCs are producing the first cycle of DWMPs and are drawing on the guidance of the Water UK Framework to support the preparation of the plans. 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.

2.1.2 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 planned for.
- 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.

2.2 Welsh Water's DWMP

Overview

2.2.1 Welsh Water provide drainage and wastewater services to 3.2 million customers living in Wales and adjoining parts of England. 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.[10]

2.2.2 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.

[10] [10] 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]

2.2.3 The DWMP will set out how Welsh Water intends to extend, improve and maintain robust and resilient drainage and wastewater systems. It will build on the long-term wastewater service planning that Welsh Water undertakes through the completion of Sustainable Drainage Plans (SDPs) as part of its five-yearly business plans. It will take a long-term view, setting out a planning period that is appropriate to the risks faced by Welsh Water, covering at least 25 years.

Strategic Framework

2.2.4 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. For 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.

2.2.5 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 our water quality, services and the environment; and
- Resilience & Maintenance: Adaptiveness to change while maintaining critical services and protecting the environment.

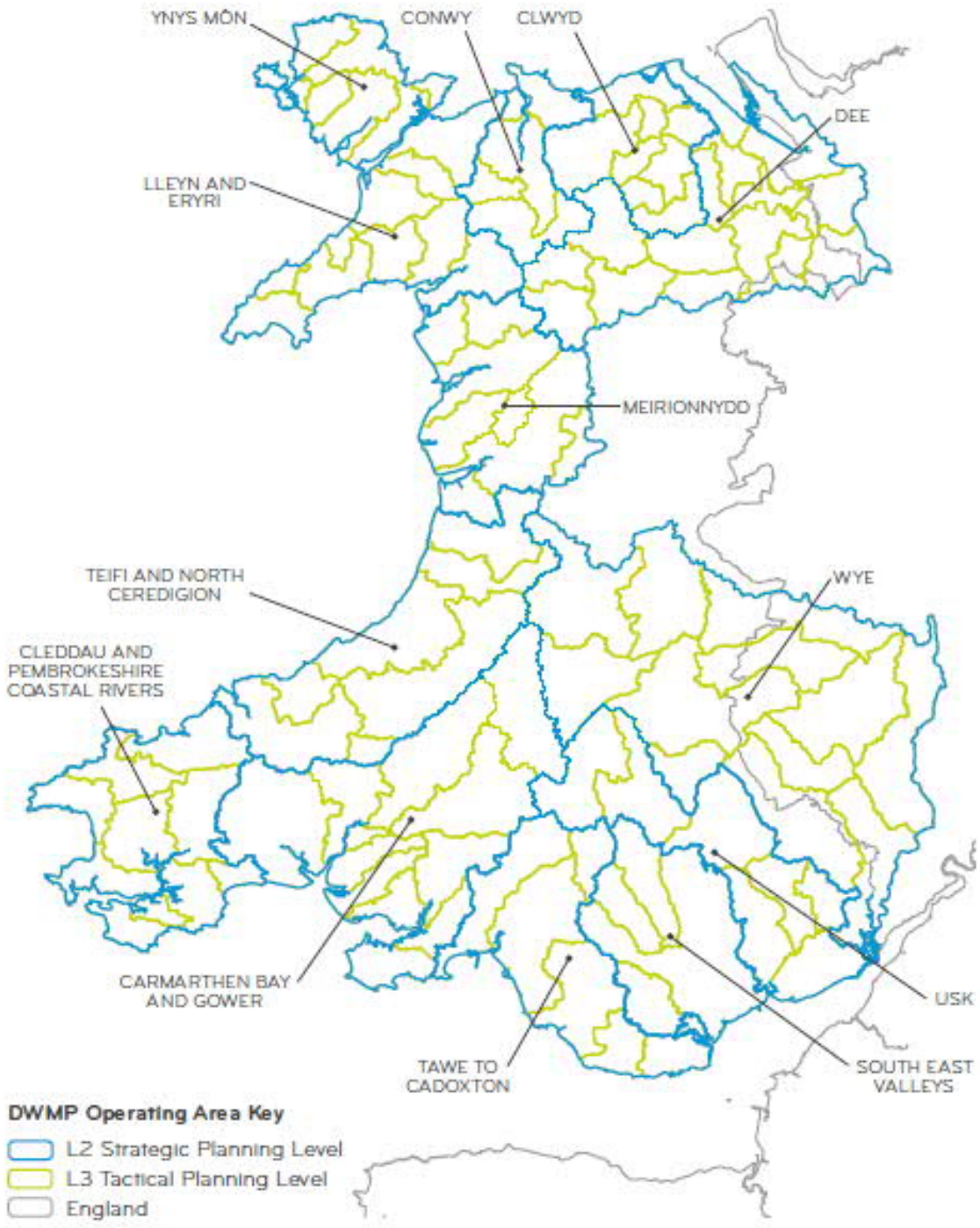
2.2.6 These high-level objectives are underpinned by the National Planning Objectives and by the initial DWMP action plan.

2.2.7 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.

2.2.8 Welsh Water has identified 13 Level 2 (L2) Strategic Planning Units and 106 Level 3 (L3) Tactical Planning Units. Levels 1 – 3 are illustrated in Figure 2.1.

Figure 2.1 DWMP Operating Areas Level 1 to 3



2.2.9 Where issues are identified, a range of intervention types to inform the strategic direction of the tactical planning unit and strategic planning unit are 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.

DWMP 2024 Options Development

2.2.10 Given the number of catchments, for this initial iteration of the DWMP Welsh Water has prioritised solutions for catchments with the highest 'levels of service' risk, reflecting catchments where there are multiple incidents of internal property flooding or significant spills to European sites.

2.2.11 The approach is reflected in Figure 2.2. Through this process, Welsh Water has identified 18 prioritised TPUs (covering 19 Level 4 (L4) drainage areas) which are the focus of the first iteration of the DWMP.

Figure 2.2 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; Priority 3 – Green

2.2.12 Within each L4 catchment the DWMP process identifies specific locations where internal property flooding or spills to European sites have triggered the development of an option to resolve this; these are the Level 7 (L7) risk areas. Consequently, the options developed for this iteration of the DWMP are fundamentally addressing relatively small-scale local flow-management issues, typically associated with pinch-points within the system.

2.2.13 The objectives of the options are therefore relatively narrow: to reduce spills or flooding at a particular location (the L7 risk area) through various interventions and ensure that these volumes can be passed to the relevant WwTW for treatment[11] in accordance with the WwTW's permits. They are not aiming to prevent all flooding and spills that may occur within an L4 catchment, nor solve wider drainage, wastewater and water quality issues issues within the L4 area or the associated surface water catchment.

2.2.14 Whilst a range of interventions (see above) are considered, in very broad terms all the options in this iteration of the plan aim to directly or indirectly increase the capacity of the network locally to pass flows for treatment[12]; this is typically achieved using measures that temporarily store or attenuate peak flows in the local sewerage network. The options are categorised as either 'sustainable options', which seek to redirect flows of water from the wastewater/sewer network by mimicking more natural drainage regimes (e.g. SuDS); 'traditional options', which involve established hard-engineering measures to increase the capacity of the drainage and wastewater network (e.g. sewer upsizing; provision of additional offline storage; separation of surface run-off from the foul system; reducing infiltration); or 'combination options', involving a mix of sustainable and traditional options.

2.2.15 However, whilst the DWMP development process identifies specific issues at relatively specific locations (i.e. the L7 catchments), and models potential solutions to resolve these, the options themselves are essentially indicative: they are used to generate metrics to help

[11] In some instances SuDS (e.g. with reedbeds) may be able to provide a suitable level of treatment for discharge without flows being passed forward to a WwTW.

[12] i.e. the proposed DWMP does not include locationally 'non-specific' options that necessarily work cumulatively at a catchment or greater scale, such as policy interventions or customer side management.

identify the most appropriate type of solution in a given area but are not intended to be definitive plans for schemes. In practice there will be several further stages of investigation, detailed design and assessment to determine the precise nature of an intervention at a given location, particularly as there is a substantial lead time for the delivery of some options and not all options will be implemented within this 5-year plan cycle.

2.2.16 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.

3. Approach to HRA

3.1 Overview

3.1.1 European Commission guidance[13] suggests a four-stage process for HRA, although not all stages will necessarily be required (see Box 1).

Box 1 – Stages of HRA

Stage 1 – Screening or 'Test of significance'

This stage identifies the likely effects of a project or plan on a European site, either alone or 'in combination' with other projects or plans, and considers whether these effects are likely to be significant. The 'screening' test or 'test of significance' is a low bar, intended as a trigger rather than a threshold test: a plan should be considered 'likely' to have an effect if the competent authority is unable (on the basis of objective information) to exclude the possibility that the plan or project could have significant effects on any European site, either alone or in combination with other plans or projects; an effect will be 'significant' simply if it could undermine the site's conservation objectives. Note that mitigation measures should not be taken into account at the 'screening' stage, in accordance with the People over Wind (Court of Justice of the European Union (ECJ) Case C-323/17); this reinforces the idea of screening as a 'low bar' and makes 'appropriate assessments' more common.

Stage 2 – Appropriate Assessment (including the 'Integrity test')

An 'appropriate assessment' (if required) involves a closer examination of the plan or project where the effects on relevant European sites are significant or uncertain, to determine whether any sites will be subject to 'adverse effects on integrity' if the plan or project is given effect. The scope of any 'appropriate assessment' stage is not set, and the assessments will not be extremely detailed in every case (particularly if mitigation is clearly available, achievable, and likely to be effective). The assessments must be 'appropriate' to the effects and proposal being considered, and sufficient to ensure that there is no reasonable doubt that adverse effects on site integrity will not occur (or sufficient for those effects to be appropriately quantified should Stages 3 and 4 be required).

Stage 3 – Assessment of Alternative Solutions

Where adverse effects remain after the inclusion of mitigation, Stage 3 examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of European sites. A plan or project that has adverse effects on the integrity of a European site cannot be permitted if alternative solutions are available, except for imperative reasons of overriding public interest (IROPI; see Stage 4).

Stage 4 – Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain

This stage assesses compensatory measures where it is deemed that there are no alternatives that have no or lesser adverse effects on European sites, and the project or plan should proceed for imperative reasons of overriding public interest (IROPI). The EC guidance does not deal with the assessment of IROPI, although the IROPI need to be sufficient to override the adverse effects on European site integrity, taking into account the compensatory measures that can be secured (which must ensure the overall coherence of the 'national site network'.

3.1.2 The stages in Box 1 (if required) are used to ensure compliance with the Regulations and principally reflect the legislative tests applied to the final, submitted project or plan; there is no statutory requirement for HRA to be completed for draft plans or similar developmental stages. However, it is generally best-practice for the HRAs of strategic to be run as an iterative process alongside plan development, helping to inform the selection of preferred options.

[13] Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC 2002).

3.1.3 The approach summarised in Box 1 works well at the project-level where the scheme design is usually established and possible effects on European sites can be assessed (usually quantitatively) using a stepwise process and detailed scheme-specific data. In contrast, the fundamental nature of the DWMP presents a number of distinct challenges for a 'strategic' HRA and it is therefore important to understand how the DWMP is developed, its objectives, and hence how it might consequently affect European sites.

3.1.4 In particular, there is a potential conflict between the locationally-specific nature of the options; the inevitable uncertainties over option design and delivery; the level of certainty that can be established at the strategic level; and the limits of what the DWMP can achieve in relation to wider pressures on the designated sites. In addition, the DWMP is developed using the best available data on the wastewater treatment network, but it is recognised that there are data gaps that can only be resolved with scheme-specific investigations.

3.2 HRA Approach and Key Assumptions

Geographical Scope

3.2.1 A key issue for the HRA is the level at which assessment can be reasonably and meaningfully undertaken.

3.2.2 As noted, for this iteration of the DWMP Welsh Water has prioritised solutions for 19 L4 drainage areas where there are multiple incidents of internal property flooding or significant spills to European sites. Solutions are then reported at the L3 level, which is relatively wide-ranging; an HRA undertaken at this level would necessarily be quite high-level also and would likely defer much of the assessment to a lower planning tier due to the absence of detail on the location of interventions.

3.2.3 However, the DWMP development process does generate more locationally specific information, as specific risk clusters (L7) and options for resolving issues in these locations are identified (albeit that the options are to some extent indicative, and dependent on investigations and detailed design that cannot be completed at the DWMP level).

3.2.4 As a result, the scope of the assessment is based on a review of the scale and characteristics of the specific options proposed. As the vast majority of the options are, of themselves, relatively small-scale construction schemes (e.g. sewer relining or replacement; SuDS construction; provision of additional storage capacity; etc.) that do not involve substantive permanent land-take, the HRA considers:

- All European sites that are within 1.5km of the relevant L7 risk cluster or new option infrastructure (if identified).
- All European sites that are downstream of the relevant L7 risk cluster and / or the L4 area (no distance threshold).
- All European sites upstream of the relevant L7 risk cluster or new option infrastructure (if identified) that support fish (i.e. potentially exposed on migration).
- Any other sites within 5km where evidence suggests a mobile feature might be exposed to significant effects due to the construction or operation of the option that

cannot be avoided through the normal project design and planning process (although note that these sites are not systematically documented in the screening).

3.2.5 The 1.5km buffer[14] is relatively small for a strategic plan. This reflects the reality of most small-scale construction schemes in terrestrial environments, where environmental changes (e.g. noise, light intrusion, dust, etc.) are very rarely measurable or otherwise notable over 1km[15] from a construction site boundary; and the temporary nature and small-scale of such works ensures there is very low likelihood of terrestrial mobile species being unavoidably affected by an option[16] (such that conservation objectives might be undermined).

3.2.6 Sites not included above are considered sufficiently remote that any environmental changes will be effectively nil, and so there will be 'no effects' on these sites (and so no possibility of 'in combination' effects). Wide-ranging marine / marine dependent species associated with marine sites that are downstream receptors are not typically considered to be both sensitive and exposed to the effects of the options.

3.2.7 The European sites and qualifying features considered potentially exposed to the outcomes of the DWMP are listed in Appendix A.

Data Collection

European site data collection and conservation objectives

3.2.8 The screening and appropriate assessment stages take account of the baseline condition of the European sites and their interest features[17], including (where reported) data on

- the site boundaries and the boundaries of the component SSSIs;
- the conservation objectives;

[14] 'Arbitrary' buffers are not generally appropriate for HRA. However, as distance is a strong determinant of the scale and likelihood of effects the considered use of a suitably precautionary search area as a starting point for the screening (based on a thorough understanding of both the options and European site interest features) has some important advantages. Using buffers allows the systematic identification of European sites using GIS, so minimising the risk of sites or features being overlooked, and also ensures that sites where there are no reasonable impact pathways can be quickly and transparently excluded from any further screening or assessment. When assessing multiple options it also has the significant advantage of providing a consistent point of reference for consultees following the assessment process, and the 'screening' can therefore focus on the assessment of effects, rather than on explaining why certain sites may or may not have been considered in relation to a particular option.

[15] The additional 0.5km caters for residual uncertainty over the precise location of some interventions (e.g. the locations of some SuDS are not necessarily specified, but will be in close proximity to the L7 risk cluster).

[16] Pathways for effects on mobile features associated with some sites (e.g. bats, wintering birds) are imaginable; for example, a construction area might be located adjacent to a maternity roost used by bats associated with an SAC that is designated for its hibernation roosts; however, in almost all instances assessing effects on 'functional habitat' such as this at the plan level is entirely speculative (as information on what habitat might be important to the functional integrity of a site is rarely available without scheme-specific studies, and the options are to some extent indicative at this stage in the delivery process so subject to future refinement), and in any case the small scale of the works associated with the DWMP options ensures that mitigation or avoidance measures are always likely to be achievable.

[17] The interest features are taken to be the qualifying features; and other site features that may be relevant to site integrity, particularly 'typical species' (for SACs) and within-site supporting habitats for SPAs.

- information on the attributes of the European sites that contribute to and define their integrity;
- the condition, vulnerabilities and sensitivities of the sites and their interest features, including known pressures and threats
- the approximate locations of the interest features within each site (if reported); and
- designated or non-designated 'functional habitats' (if identified).

3.2.9 These data were derived from:

- the most recent JNCC-hosted GIS datasets;
- the Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites;
- Article 12 and 17 reporting;
- the published site Conservation Objectives;
- Supplementary Advice to the conservation objectives (SACO) where available[18];
- Site Improvement Plans (SIPs);
- Core Management Plans (Wales); and
- the supporting Site of Special Scientific Interest's favourable condition tables where relevant and where no SACOs applicable to the features are available.

3.2.10 Note:

- For SPAs, the qualifying features are taken as those identified on the most recent JNCC datasets and citations where these post-date the 2nd SPA Review (i.e. it will be assumed that any amendments suggested by the SPA review have been made) unless otherwise identified to us by NE or NRW; any site-specific issues relating to the SPA Review can be addressed in the screening and appropriate assessment of the preferred options (see below).
- The conservation objectives for Ramsar sites are taken to be the same as for the corresponding SACs / SPAs (where sites overlap); SSSI Definition of Favourable Condition (FCTs) will be used for those features not covered by SAC/SPA designations.

3.2.11 Where possible the site data is used to identify other features that may be relevant to site integrity, particularly 'typical species' (for SACs), within-site supporting habitats, and designated or non-designated 'functional habitats'.

3.2.12 A 'typical species' is broadly described by EC guidance as being any species (or community of species) which is particularly characteristic of, confined to, and/or dependent upon the qualifying Annex I habitat feature at a particular site. This may include those species which:

[18] NE has published 'Supplementary advice on conserving and restoring site features' for most European sites in England which describe in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity, and the targets each qualifying feature needs to achieve in order for the site's conservation objectives to be met.

- are critical to the composition or structure of an Annex I habitat (e.g. constant species identified by the National Vegetation Classification (NVC) community classification);
- exert a critical positive influence on the Annex I habitat's structure or function (e.g. a bioturbator (mixer of soil/sediment), grazer, surface borer or predator);
- are consistently associated with, and dependent upon, the Annex I habitat feature for specific ecological needs (e.g. feeding, sheltering), completion of life-cycle stages (e.g. egg-laying) and/or during certain seasons/times; or
- are particularly distinctive or representative of the Annex I habitat feature at a particular site.

3.2.13 Within-site supporting habitats are those which support the population(s) of the qualifying species and which are therefore critical to the integrity of the feature.

3.2.14 'Functional habitats' are generally taken to be habitats or features outside a European site boundary that are important or critical to the functional integrity of the site habitats and / or its interest features. These might include, for example:

- 'buffer' areas around a site (e.g. dense scrub areas preventing public access; areas of land that reduce the effects of agricultural run-off; etc.);
- specific features or habitats relied on by mobile species during their lifecycle (e.g. high-tide roosts for waders; significant maternity colonies for bats known to hibernate within an SAC; areas that are critical for foraging or migration; etc).

3.2.15 The Regulation 37 advice and Core Management Plans for the SACs and SPAs set out Conservation Objectives that benchmark Favourable Conservation Status (FCS) for each feature. Guidance[19] from the UK Statutory Nature Conservation Bodies (SNCBs) provides a broad characterisation of FCS, stating that it "relates to the long-term distribution and abundance of the populations of species in their natural range, and for habitats to the long-term natural distribution, structure and functions as well as the long-term survival of its typical species in their natural range. It describes a situation in which individual habitats and species are maintaining themselves at all relevant geographical scales and with good prospects to continue to do so in the future".

3.2.16 For the Welsh European sites the Conservation Objectives comprise a 'vision' for the the feature (the key component of the objective) and (where relevant) performance indicators by which the objectives may be measured. These are used and referred to as necessary within the assessment but are not generally reproduced in this report.

DWMP Option Data

3.2.17 Information on the DWMP options is provided by Welsh Water; this includes summary information on the option objectives and how it would function, GIS data on the L7 risk clusters, and workbooks illustrating the likely scope of works in each location (although it should be recognised that these are not fixed proposals for delivery that cannot be

[19] JNCC (2018). Favourable Conservation Status: UK Statutory Nature Conservation Bodies Common Statement [online]. Available at: https://data.jncc.gov.uk/data/b9c7f55f-ed9d-4d3c-b484-c21758cec4fe/FCS18-InterAgency-Statement.pdf. [Accessed March 2022].

deviated from, and there numerous aspects that cannot be defined at the strategy level, ahead of scheme-specific investigations (e.g. the location of any temporary enabling works; precise locations for additional storage; etc.)).

Preferred Options assessment

3.2.18 For each option (or group of options, as appropriate), the assessment comprises:

- a 'screening' of European sites to identify those sites and features where there will self-evidently be 'no effect', 'no likely significant effects', or positive effects due to the option[20], and those where significant effects are likely or uncertain; and
- an 'appropriate assessment' of any options where significant effects cannot be excluded (this may include 'down-the-line' deferral in accordance with established HRA practice, where appropriate).

3.2.19 The conservation objectives are taken into account at the screening and appropriate assessment stages as necessary.

3.2.20 Note that the 'low-bar' principle is used for the screening of the preferred options; in general, unless the possibility of significant effects can be simply and self-evidently excluded then a more detailed 'appropriate assessment' is completed (rather than through a more detailed 'secondary screening' or similar).

3.2.21 The 'low bar' approach is consistent with the 'People Over Wind'[21] case law, which requires that mitigation not be considered at screening. Historically, HRAs of plans typically assumed that established best-practice avoidance and mitigation measures (see Appendix C) would be employed at the project level to safeguard environmental receptors, including European site interest features, and accounted for this at the screening stage. However, it is arguable that an assumption such as this, albeit in relation to a lower-tier project that would itself be subject to HRA, might constitute an 'avoidance measure' that the DWMP is effectively relying on to ensure that significant effects do not occur.

3.2.22 In this instance, therefore, mitigation measures (including the established best-practice avoidance and mitigation measures noted in Appendix C) are not taken into account at screening, but are instead introduced at the 'appropriate assessment' stage (if required).

3.2.23 Consequently, the appropriate assessments are 'appropriate' to the nature of the DWMP, the option under consideration, and the scale and likelihood of any effects; exhaustive examination of effect pathways is not undertaken if there is a high degree of confidence in the mitigation measures (and, from experience, virtually all potentially adverse effects for small-scale schemes can be avoided or mitigated).

[20] Note, for options with 'no effects' or positive effects there is no possibility of 'in combination' effects.

[21] Case C 323/17 Court of Justice of the European Union: People Over Wind

In combination effects

3.2.24 HRA requires that the effects of other projects, plans or programmes be considered for effects on European sites 'in combination' with the DWMP. There is limited guidance on the precise scope of 'in combination' assessments for strategies, particularly with respect to the levels within the planning hierarchy at which 'in combination' effects should be considered. The 'two-tier' nature of the DWMP (i.e. a plan with specific schemes) also complicates this assessment.

3.2.25 Broadly, it is considered that the DWMP could have the following in combination effects:

- within-plan effects - i.e. separate options or option-mixes within the DWMP affecting the same European site(s), although it should be noted that these effects should almost always be positive;
- between-plan water quality effects - i.e. effects in association with or driven by other plans (for example, other water company DWMPs);
- other between-plan effects - i.e. 'in combination' with activities promoted by other plans – for example, with flood risk management plans.
- between-project effects – i.e. effects of a specific option with other specific projects and developments.

3.2.26 In undertaking the 'in combination' assessment it is important to note the following:

- The DWMP explicitly accounts for land-use plans, growth forecasts and population projections when determining future treatment and water management requirements.
- The detailed examination of non-water company discharge consents for 'in combination' effects can only be undertaken by the EA or NRW through their permitting procedures.
- Known major projects are also taken into account during the development of the DWMPs.

3.2.27 Therefore:

- It is considered that (for the HRA) potential 'in combination' effects in respect of wastewater treatment associated with known plans or projects will not occur since the requirements for additional capacity are explicitly considered when developing the DWMP.
- With regard to other strategic plans, the list of plans included within the SEA is used as the basis for a high-level 'in combination' assessment. The SEA is used to provide information on the themes, policies and objectives of the 'in combination' plans, with the plans themselves examined in more detail as necessary. Plans are obtained from the SEA datasets or internet sources where possible.

Key Assumptions and Implications for HRA

3.2.28 The objectives of the DWMP options and the assumptions that are inherent to the option development and modelling have some relevance for the HRA, particularly in relation to operational effects.

3.2.29 As noted, the options within the current iteration of the DWMP are fundamentally addressing relatively small-scale local flow-management issues to reduce spills or flooding at a particular location and ensure that these volumes can be passed to the relevant WwTW for treatment in accordance with the WwTW's permits. They are not aiming to prevent all flooding and spills that may occur within an L4 catchment, nor solve wider drainage and wastewater issues within the L4 area or the associated surface water catchment.

3.2.30 The modelling underpinning the option selection incorporates a large number of assumptions; however, the following are particularly relevant to the HRA:

- The modelling takes account of predicted local and regional growth when identifying risk areas and potential solutions, based (inter alia) on Local Plans and population growth models. 'In combination' effects with respect to land-use plans and specific options are therefore inherently considered and accounted for as part of the DWMP option development process (i.e. an option that does not account for local growth is not a solution).
- Likewise, the modelling accounts for climate change when predicting future spills / flooding (etc.).
- With regard to CSO spills to European sites, the modelling identifies those CSOs where there are or are predicted to be over 40 spills per year and identifies solutions to reduce this to below 40; this accounts for population growth and climate change. An option will therefore always reduce CSO spills relative to the current baseline (which will be beneficial or at least neutral in terms of operational effects).
- The model assumes (based on best-available data on WwTW capacity, headroom and permitting) that flows passed to the WwTW by the 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 it would not be appropriate to assess the option whilst assuming it will be non-compliant); it should be noted that as all WwTWs have CSOs associated with them the modelling would identify those where spills to European sites would increase as the result of the intervention (i.e. a spill is not simply being displaced to another point lower in the system). There is inherent uncertainty around this, however, as it is likely that amendments to the pass-forward flows would require amendments to permits (etc.) at the WwTW and associated modelling, which cannot be completed at this stage of the DWMP process. However, based on the flow volumes likely to be passed forward it is reasonable to assume that existing permits can be met, and/or that any WwTW capacity improvements required are technically achievable; in addition, if detailed design demonstrates that an option cannot be completed without a WwTW upgrade then the option will not proceed until that upgrade has been completed.

- The DWMP modelling takes account of the existing permitting or consents regime, and any known (or reasonably anticipated) amendments that are likely to be required (e.g. following WINEP investigations or similar) since there has to be a starting point / basis for the assessment (i.e. the modelling / optioneering process cannot start with the assumption that no current consents are reliable). It is recognised that there are several challenges relating to water quality at the moment, particularly 'in combination' with agricultural inputs and nutrient neutrality, although the effect of the current DWMP on these will be either neutral (i.e. effectively no change from baseline) or minor positive.

3.2.31 The HRA therefore recognises that whilst there may be some atypical or unusual indirect effects (for example, transferring wastewater to a different treatment works might conflict with flow targets within the original receiving watercourse), the overall and intended operational effect of most options will be neutral or positive on the receiving watercourses, and options are assessed with this in mind.

3.2.32 The DWMP aims resolve specific identified local issues, and so the HRA necessarily focuses on the additional effects introduced by the options selected to resolve these issues, taking into account the assumptions noted above that are inherent to the modelling process. The HRA is therefore downstream of the DWMP modelling process: as with the modelling, the HRA requires a point of reference baseline and cannot assume that all existing permits (etc.) affecting a watercourse (discharges and abstractions, consented and unconsented) are entirely unsound and attempt to quantify the effects of these before considering the additional effects of the DWMP.

3.2.33 The examination of existing individual consents was undertaken by the EA and NRW through the Review of Consents (RoC) process and subsequently through a range of other past and ongoing reviews (e.g. WFD, WINEP), and whilst the DWMP may in future form part of this review process it does not at the moment. This is not to say that a historical (and potentially out-of-date) baseline is relied on; rather that there are existing established processes for updating this baseline and making required amendments to permits or licences (e.g. WINEP), and the DWMP modelling and the HRA of the DWMP necessarily reflects this. The existing process for reviewing and amending licences and permits are the primary mechanism by which DCWW meets its obligation to 'have regard' to the Habitats Regulations in its operations.

3.2.34 Note, the assessment also assumes that all normal licensing, consenting and management procedures will be employed at option delivery and throughout operation, and that established best-practice avoidance and mitigation measures will be employed throughout scheme design and construction to safeguard environmental receptors, including European site interest features. The HRA does not therefore assess speculative or hypothetical effects based on assumptions of non-compliance (e.g. accidental spillages of treatment chemicals from a new WwTW).

3.2.35 It should also be noted that the DWMP does not specify or constrain exactly how or where measures are implemented, and there will always be flexibility over delivery at the scheme stage. To some extent, therefore, the assessment may aim to determine whether there are any reasons to suggest that effects might be unavoidable at the scheme level (i.e. identify substantive uncertainties), rather than attempt to quantify effects that cannot be meaningfully assessed at the plan level with the option data available.

Uncertainty and plan-level mitigation

3.2.36 HRAs of plans and strategies typically have to deal with a degree of uncertainty; very often, it is not possible to provide a detailed assessment of the effects of a proposal as many aspects of the proposal simply cannot be fully defined at the strategy-level in the planning hierarchy.

3.2.37 Where the available information is fundamentally insufficient to complete a meaningful appropriate assessment, then this assessment may be deferred 'down the line' to a lower planning tier provided that certain criteria are met. This is usually only appropriate where there is sufficient certainty that the proposal can (with the implementation of established scheme-level measures that are known to be effective) avoid adverse effects on the integrity of European sites; and/or if appropriate investigation schemes are identified to resolve the uncertainty and commitments are made within the plan to not pursue an option if adverse effects are identified through these.

3.2.38 Note, this is not intended to provide a mechanism for the inclusion of options where there appears to be no reasonable way of avoiding adverse effects. However, it is important to note that some uncertainties will remain (particularly with regard to 'in combination' effects) and for some options it will only be possible to fully assess any potential effects at the pre-project planning stage, when certain specific details are known; for example: construction techniques; site specific survey information; the precise timing of implementation; or the status of other projects that may operate 'in combination'. In addition, it may be several years before an option is employed, during which time other factors may alter the baseline or the likely effects of the option.

4. Screening

4.1 Screening

4.1.1 As noted, the scope of the screening is based on a review of the options and takes account of their scale and the likely area within with environmental changes might be identifiable.

4.1.2 For each L4 area Table 4.1 identifies the European sites that are:

- within 1.5km of the relevant L7 risk cluster or new option infrastructure (if identified);
- downstream of the L4 catchment areas (and so theoretically vulnerable to in combination effects between options);
- upstream of the relevant L7 risk cluster or new option infrastructure (if identified) that that support fish (i.e. potentially exposed on migration);
- other sites within 5km where evidence suggests a mobile feature might be exposed to significant effects due to the construction or operation of the option that cannot be avoided through the normal project design and planning process[22] (note, none have been identified).

4.1.3 The screening assessments for each L4 area are set out in Appendix B, and summarised in Table 4.2.

[22] Note, in this instance 'avoidance' is considered literally (e.g. avoiding structures that may be used by bats, hence no impacts) and not as 'mitigation' in the context of People over Wind (i.e. measures intended to reduce an effect that cannot be avoided).

Table 4.1 European sites included in the screening

L4 / L5 Area†	No. L7 areas	No. options	European Sites downstream of L4 area	European sites within 1.5km / upstream** of an L7 area
Aberporth	1	1	• Cardigan Bay/ Bae Ceredigion SAC • West Wales Marine / Gorllewin Cymru Forol SAC	• Cardigan Bay/ Bae Ceredigion SAC • West Wales Marine / Gorllewin Cymru Forol SAC
Afan	7	7	• Kenfig/ Cynffig SAC	-
Amlwch WwTW	1	3	• Anglesey Terns / Morwenoliaid Ynys Môn SPA • North Anglesey Marine / Gogledd Môn Forol SAC	-
Bangor Treborth	6	9	• Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC • Traeth Lafan/ Lavan Sands, Conway Bay SPA	• Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC* • Traeth Lafan/ Lavan Sands, Conway Bay SPA
Cardiff Bay	19	19	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC
Cilfynydd	1	1	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	-
Cwmgwrach	2	2	• -	• Coedydd Nedd a Mellte SAC
Five Fords (Wrexham)	8	15	• Dee Estuary/ Aber Dyfrdwy SAC • The Dee Estuary Ramsar • The Dee Estuary SPA	• Johnstown Newt Sites SAC* • Berwyn a Mynyddoedd de Clwyd/ Berwyn and South Clwyd Mountains SAC • River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC
Ganol STW	7	13	• Liverpool Bay / Bae Lerpwl SPA • Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC	• Great Orme`s Head/ Pen y Gogarth SAC* • Coedwigoedd Penrhyn Creuddyn/ Creuddyn Peninsula Woods SAC • Liverpool Bay / Bae Lerpwl SPA • Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC

L4 / L5 Area†	No. L7 areas	No. options	European Sites downstream of L4 area	European sites within 1.5km / upstream** of an L7 area
Gowerton	8	8	• Burry Inlet Ramsar • Burry Inlet SPA • Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC	• Gower Commons/ Tiroedd Comin Gwyr SAC* • Burry Inlet Ramsar • Burry Inlet SPA • Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC
Kinmel Bay	5	8	• Liverpool Bay / Bae Lerpwl SPA	• Liverpool Bay / Bae Lerpwl SPA
Llanasa (Nr Prestatyn)	7	11	• The Dee Estuary Ramsar • The Dee Estuary SPA • Dee Estuary/ Aber Dyfrdwy SAC • Liverpool Bay / Bae Lerpwl SPA	• The Dee Estuary Ramsar* • The Dee Estuary SPA* • Dee Estuary/ Aber Dyfrdwy SAC • Liverpool Bay / Bae Lerpwl SPA
Llanelli Coastal	1	1	• Burry Inlet Ramsar • Burry Inlet SPA • Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC	• Burry Inlet Ramsar • Burry Inlet SPA • Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC
Llanfaglan	2	3	• Afon Gwyrfai a Llyn Cwellyn SAC • Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC	• Afon Gwyrfai a Llyn Cwellyn SAC* • Glynllifon SAC
Newport Nash – Cae Brinton	1	1	• River Usk/ Afon Wysg SAC • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	-
Newport Nash – Malpas	1	1	• River Usk/ Afon Wysg SAC • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• River Usk/ Afon Wysg SAC*

L4 / L5 Area†	No. L7 areas	No. options	European Sites downstream of L4 area	European sites within 1.5km / upstream** of an L7 area
Newport Nash – Newport East	3	3	• River Usk/ Afon Wysg SAC • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• River Usk/ Afon Wysg SAC
Newport Nash – Newport West	5	8	• River Usk/ Afon Wysg SAC • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• River Usk/ Afon Wysg SAC*
Newport Nash – Caerleon	3	4	• River Usk/ Afon Wysg SAC • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• River Usk/ Afon Wysg SAC*
Newport Nash – Magor Pill	2	2	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC • River Usk/ Afon Wysg SAC
Newport Nash – Caldicott	1	1	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC • River Usk/ Afon Wysg SAC
Newport Nash – Chepstow	8	13	• River Wye/ Afon Gwy SAC • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC	• River Wye/ Afon Gwy SAC* • Severn Estuary Ramsar • Severn Estuary SPA • Severn Estuary/ Môr Hafren SAC • Wye Valley Woodlands/ Coetiroedd Dyffryn Gwy SAC • River Usk/ Afon Wysg SAC
Pen-Y-Bont (Merthyr Mawr)	14	14	• Kenfig/ Cynffig SAC	• Kenfig/ Cynffig SAC

L4 / L5 Area†	No. L7 areas	No. options	European Sites downstream of L4 area	European sites within 1.5km / upstream** of an L7 area
Porthmadog	2	4	• Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC	• Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC* • Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC*
Swansea Bay	5	5	-	• Crymlyn Bog Ramsar • Crymlyn Bog/ Cors Crymlyn SAC
Tywyn	1	3	• Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC • West Wales Marine / Gorllewin Cymru Forol SAC	• Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC • West Wales Marine / Gorllewin Cymru Forol SAC

† For Newport Nash the L5 sub-catchments are identified; all other areas are L4 catchments.
**Hydrologically-linked sites supporting fish qualifying features only.
* Sites that overlap with the risk cluster.

Table 4.2 Summary of L4 screening

L4 Area	LSE?	Rationale
Aberporth	No	This L4 area has 3 options relating to the same location; whilst this is within 1.5km of two European sites the works are minor (sewer relining to reduce CSO spills) and will clearly be achievable at the scheme level without significant effects (irrespective of mitigation).
Afan	No	Kenfig/ Cynffig SAC is downstream of some parts of the L4 area, although this is not hydrologically linked to any of the option locations; there are therefore no pathways for effects on any European sites.
Amlwch WwTW	No	No options for this L4 area are within 1.5km of any European sites. Options are proposed for one L7 area to manage flooding; depending on the planning horizon these comprise provision of small amounts of additional stoarge / attenuation (SuDS) or impermeable area removal. The Anglesey Terns / Morwenoliaid Ynys Môn SPA and North Anglesey Marine / Gogledd Môn Forol SAC are downstream receptors from the L4 area (and hence the three options proposed), although these sites will not be signficantly affected by construction effects due to the small scale of the works and location (irrespective of any mitigtaion measures); operation of the scheme will not negatively affect these sites.
Bangor Treborth	Uncertain	This L4 area covers much of Bangor and Menai Bridge either side of the Menai Strait. There are 5 L7 areas with 12 options between them; these L7 areas are all close to, or overlapping with, Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC. The options are all intended to reduce predicted CSO spills to the SAC, and so there will be no operational effects. Whilst some of the options are relatively minor interventions (e.g. sewer upsizing, additional storage) options associated with one L7 area (coinciding with Bangor) involve substantial and extensive works to remove impermeable areas and provide attenuation (swales, SuDS etc.). These interventions would arguably be a series of 'minor' works but options are likely to rely on project-level mitigation to ensure no adverse effects.
Cardiff Bay	No	This L4 area covers a large area around Cardiff and Caerphilly. There are 19 options within the L4 area, all of which are relatively small-scale works (sewer upsizing, provision of SuDS, additional storage tanks, etc.) located within urban areas. The scale / location of the options are such that signficant effects would not be expected at the project level, irrespective of any mitigation measures; the options will resolve floding issues and will not negatively affect the downstream receptors (the sites associated with the Severn Estuary).
Cilfynydd	No	The options associated with this L4 area address flooding; the L4 area is a susbtantial distance upstream from the Severn Estuary sites and there will be no effects on these sites as a result of the options.
Cwmgwrach	No	The closest site (Coedydd Nedd a Mellte SAC) is upstream of the L4 area; the options involve minor works (sewer upsizing, reductions in impermablea areas and so the site and features are not exposed to any effects associated with the options.

L4 Area	LSE?	Rationale
Five Fords (Wrexham)	Uncertain	The Five Fords L4 area covers much of Wrexham and the surrounding area. Most of the L7 areas are over 1.5km from the nearest European site although one L7 area (DFL.001426, two options) overlaps with the Johnstown Newt Sites SAC; the works required in this area will be in close proximity to the SAC and there is a likelihood that they will affect functional land associated with the site/features even if they do not directly affect the site itself (although the nature of some options (SuDS provision) suggests that nearby greenspace may be utilised, which may coincide with the SAC or functional land). The options are designed to reduce flooding, and will have no negative operational effects on the downstream receptors (River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC, hence the Dee Estuary/ Aber Dyfrdwy SAC, The Dee Estuary SPA or The Dee Estuary Ramsar). Options are likely to rely on project-level mitigation to ensure no adverse effects.
Ganol STW	Uncertain	The Ganol STW L4 area covers much of Llandudno, Conwy and Colwyn Bay, and so discharges are ultimately made to the Liverpool Bay / Bae Lerpwl SPA and Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC. One of the L7 areas overlaps with the Great Orme`s Head/ Pen y Gogarth SAC, although this is a minor digitisation artefact and the options for this catchment will not directly affect this site (which is largely up-catchment in any case). Options are likely to rely on project-level mitigation to ensure no adverse effects.
Gowerton	No	The L4 area covers a zone around the Burry Inlet. The L7 area associated with one option (DFL.003065_4a) overlaps marginally with the Gower Commons/ Tiroedd Comin Gwyr SAC, although this is where the L7 area coincides with a road adjacent to the European site, and the overlap is likely to be a digitisation artefact; in any case, the SAC is several hundred metres up-catchment from the areas likely to be affected by the works associated with this option (removal of impermeable area and installation of a small amount of additional storage volume) and there will be no LSE on this site (irrespective of mitigation). Four of the remaining L7 areas are located in the surface water catchment of the Burry Inlet SPA/Ramsar and the Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC, within 1.5km of these sites, although the works required for the options associated with these L7 areas are small-scale (additional storage and removal of impermeable areas) that will not affect these sites. Construction of the options will not affect any sites; operation will reduce CSO spills to the Burry Inlet SPA/Ramsar and the Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC.
Kinmel Bay	No	The Kinmel Bay L4 area covers much of Rhyl and Prestatyn and so discharges are ultimately made to the Liverpool Bay / Bae Lerpwl SPA. The L7 are all over 300m from this site, and the options involve relatively minor works (SuDS provision, impermeable area removal, localised provision of additional storage) intended to reduce flooding. Construction effects on other sites locally (particularly the Liverpool Bay / Bae Lerpwl SPA) are considered unlikely due to the scale and location of the options, irrespective of mitigation (hence no LSE). The options are designed to reduce flooding and CSO spills and so there will be no negative operational effects on any sites.

L4 Area	LSE?	Rationale
Llanasa (Nr Prestatyn)	Uncertain	The Llanasa L4 area covers parts of Prestatyn and the coastal areas to the east of this town, and so discharges are ultimately made to the Liverpool Bay / Bae Lerpwl SPA, The Dee Estuary SPA / Ramsar and the Dee Estuary/ Aber Dyfrdwy SAC. Of the seven L7 areas, two are immediately adjacent to terrestrial units of the The Dee Estuary SPA / Ramsar; whilst the options require small scale minor works, the options in these L7 areas include small-scale works (provision of additional storage including SuDS provision) that may impinge on these designated sites. Construction effects on other sites locally (particularly the Liverpool Bay / Bae Lerpwl SPA and Dee Estuary/ Aber Dyfrdwy SAC) are considered unlikely due to the scale and location of the options, irrespective of mitigation (hence no LSE). The options are designed to reduce flooding and CSO spills and so there will be no negative operational effects on any sites. Options are likely to rely on project-level mitigation to ensure no adverse effects.
Llanelli Coastal	No	The L4 area covers a zone around the Burry Inlet. The L7 areas associated with the options is located in the surface water catchment of the Burry Inlet SPA/Ramsar and the Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC, within 1.5km of these sites, although the works required for the options associated with this L7 areas are small-scale (additional storage and removal of impermeable areas) that will not affect these sites. Construction of the options will not affect any sites; operation will reduce flooding and will have no effect on the Burry Inlet SPA/Ramsar and the Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC.
Llanfaglan	No	The options associated with this L4 area are minor schemes (impermeable area removal, small-volume storage, minor WwTW upgrades to treatment capacity) that are intended to reduce CSO spills to the Afon Gwyrfai a Llyn Cwellyn SAC. Works associated with the WwTW will be close to the SAC but for all options adverse effects from construction are clearly avoidable with normal measures given the scale of the works. There will be no negative operational effects.
Newport Nash – Cae Brinton	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Malpas	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Newport East	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Newport West	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Caerleon	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Magor Pill	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Caldicott	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.
Newport Nash – Chepstow	Uncertain	Options are likely to rely on project-level mitigation to ensure no adverse effects.

L4 Area	LSE?	Rationale
Pen-Y-Bont (Merthyr Mawr)	No	There are no European sites in close proximity to the L7 areas for the options associated with this L4 area, except for two options; both of these are within 1.5km of Kenfig/ Cynffig SAC but outside the surface water catchment for this site, and there are no pathways for effects; no other options will affect any European sites through construction or operation.
Porthmadog	Uncertain	The L4 area covers a zone around Porthmadog. The L7 areas associated with the options are located in the surface water catchment of the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC, and overlap with this site and the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC (although in both instances this is a digitisation artefact and no works will be required within the SACs to deliver the options). Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods SAC is up-catchment from the L7 area in any case and would not be affected (mobile species included). The options will reduce CSO discharges to the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC, and so no negative operational effects would be anticipated. However, options are likely to rely on project-level mitigation to ensure no adverse effects.
Swansea Bay	No	There are no hydrologically connected (downstream etc.) sites that could be affected by the options in this L4 area. The majority of the options are relatively minor schemes in the Swansea urban area; one L7 area (with two options involving removal of impermeable areas) is located within 1.5km of Crymlyn Bog Ramsar and Crymlyn Bog/ Cors Crymlyn SAC, although in a separate surface water catchment, and there are no pathways by which these option could affect these sites.
Tywyn	Uncertain	The works required in this L4 area will reduce flooding through provision of small amounts of additional storage and introduction of a small new storm network to prevent surface water entering the FC system; the proformas suggest that this new network would require an outfall to sea (it is not clear if this is existing) and whilst the storm network would be expected to receive 'clean' run-off only this aspect may need to be explored as the outfall brings the area of impact substantially closer to the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC (which may then be vulnerable to operational effects depending on the nature of the storm discharge).

4.1.4 In most instances the environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so some options and L4 areas are ‘screened in’ for appropriate assessment (to avoid potential conflict with ‘People over Wind’). The following L4 areas and European sites are therefore considered in an ‘appropriate assessment’.

Table 4.3 L4 areas and European sites screened in

L4 Areas	Sites
Bangor Treborth	Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC Traeth Lafan/ Lavan Sands, Conway Bay SPA

L4 Areas	Sites
Five Fords	Johnstown Newt Sites SAC River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC
Ganol STW	Liverpool Bay / Bae Lerpwl SPA Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC
Llanasa	The Dee Estuary Ramsar The Dee Estuary SPA
Llanfaglan	Afon Gwyrfai a Llyn Cwellyn SAC Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC
Newport Nash	River Usk/ Afon Wysg SAC River Wye/ Afon Gwy SAC
Portmadog	Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC
Tywyn	Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC

5. Appropriate Assessments

5.1 Overview

5.1.1 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.1.2 The following sections provide short appropriate assessments of the options within these L4 areas.

5.2 Appropriate Assessment - Bangor Treborth

Screening Summary and Potential Effect Pathways

5.2.1 There are nine options within the Bangor Treborth L4 catchment, associated with five L7 areas located in Bangor, Menai Bridge and Llandegfan. All of the options are intended to reduce CSO spills to Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC and the Traeth Lafan/ Lavan Sands, Conway Bay SPA. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc), supported by traditional interventions including provision of offline storage tanks, pipe upsizing, pumping station improvements and raising CSO weir heights. The L7 areas cover much of Bangor, Menai Bridge and Llandegfan although the specific areas of intervention are much smaller and in practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2027 and 2030).

5.2.2 Some of the works required to deliver these options are likely to be located close, or immediately adjacent, to the SAC and SPA and so the features of these sites may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).
- Noise or vibration disturbance: the works will result in noise and vibration which can affect several faunal interest feature groups through various mechanisms (for example breeding or wintering birds may suffer reduced fitness due to an increase in energy expenditure from a flight response and / or a reduction in food intake; noise and vibration can displace some fish species, or have a barrier effect).

- Visual impact disturbance: some species can be disturbed by construction activities (e.g. through movement of people or plant, or introduction of light); this has similar negative effects to noise disturbance (above).

5.2.3 With regard to operation, the schemes are intended to reduce the number of spills from six CSOs to fewer than 40 per year. The overall effect of this on water quality within the European sites should be positive (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. However, the reduction in spills will reduce rainwater inputs to the sites associated with overflows during storm events, which may affect habitats and foreshore morphology local to the discharge.

5.2.4 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European site summaries

Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC

5.2.5 Detailed information on this SAC is provided in the Regulation 37 advice documentation, which is available online[23]. In summary, this SAC is a mostly sub-tidal site with a wide range of physical and environmental conditions, including notable variations in rock and sediment type, aspect, water clarity, and exposure to tidal currents and wave action; this makes it an unusual and diverse site.

5.2.6 The area of the site closest to Bangor Treborth is the north-eastern half of the Menai Strait and the mudflats east of Bangor Pier. The Menai Strait has a complex tidal cycle, with flood tides entering the strait from both ends and meeting at Bangor Pier and Menai Bridge; the ebb tides generally flow towards the south-west end, although the direction reverses north-east of Menai Bridge late in the tidal cycle and water flows towards Beaumaris. During a spring tide flows are relatively fast and suspended material can pass through the strait quickly, within a single tidal cycle; at other times water and suspended material can take up to a week to pass through.

5.2.7 The SAC has the following qualifying features:

- Sandbanks which are slightly covered by sea water all the time
- Mudflats and sandflats not covered by seawater at low tide
- Large shallow inlets and bays
- Reefs
- Submerged or partially submerged sea caves

[23] NRW (2018). Menai Strait & Conwy Bay / Y Fenai a Bae Conwy Special Area of Conservation: Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulations 2017 [online]. Available at: https://naturalresources.wales/media/688114/sac_uk0030202_enreg_37.pdf. Accessed Feb 2022.

5.2.8 The Sandbanks which are slightly covered by sea water all the time, Mudflats and sandflats not covered by seawater at low tide and Reefs features are the primary reason for the selection of the site.

5.2.9 The Regulation 37 advice also details the 'typical species' considered to be associated with the qualifying features of the site; these are not detailed here for clarity. No specific areas of 'functional land' are identified in relation to the SAC; however, Regulation 37 advice notes that "when the SAC boundary was drawn up, the biological survey and assessment of most of the foreshores within North Wales had not been completed and therefore many ecologically important intertidal areas are not included [within the SAC]. Of particular note are the intertidal parts of the sea caves and reefs around the Great and Little Ormes, intertidal mudflats and sandflats, and much of the foreshore on the north and south side of the Menai Strait."

5.2.10 The condition and current pressures on the features are summarised in Table 5.1:

Table 5.1 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Sandbanks which are slightly covered by sea water all the time	Favourable	• None identified (but considered vulnerable to commercial fishing and aggregates dredging)
Mudflats and sandflats not covered by seawater at low tide	Not stated; likely 'unfavourable'	• Use of vehicles on foreshore • Bait digging • INNS introductions
Large shallow inlets and bays	Unfavourable	• Use of vehicles on foreshore • Bait digging • Commercial / recreational collection of marine species • INNS introductions
Reefs	Not stated; likely 'unfavourable'	• Commercial / recreational collection of marine species • INNS introductions
Submerged or partially submerged sea caves	Favourable	• None identified

* Feature condition as reported in the Regulation 37 advice; where not explicitly stated the likely condition is based on the feature description within the Reg. 37 advice and the condition assessments for co-located features.

5.2.11 It should be noted that the Regulation 37 advice does not identify water quality as a pressure on the site, noting that "water quality has generally been improving within the SAC since the 1980s, following tighter controls over land and sea-based discharges and an ongoing programme of upgrading and improving discharge quality within the area"; the advice also notes that "eelgrass plants [a key typical species of the Mudflats and sandflats not covered by seawater at low tide feature] can be prone to disease and do not appear able to survive in areas of poor water quality. Monitoring work undertaken by CCW and the University of Hull did not find any evidence of disease in the plants within the SAC".

5.2.12 With regard to feature sensitivity to the expected environmental changes associated with the options:

- the typical species associated with all of the qualifying features will be sensitive to:
  - changes in water quality associated with construction;
  - changes in flow volumes associated with altered operational spill regimes.

5.2.13 The features will not be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.2.14 With regard to feature exposure, the precise location of particular features relative to outfall locations cannot be determined at the plan level. The Regulation 37 advice suggests that all features, with the possible exception of the Sandbanks which are slightly covered by sea water all the time feature, are likely to be present in the Menai Strait or intertidal flats near Bangor; all of the features are therefore potentially exposed to the environmental changes associated with the options.

5.2.15 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Regulation 37 advice for the SAC.

Traeth Lafan/ Lavan Sands, Conway Bay SPA

5.2.16 Detailed information on this SPA is provided in the Core Management Plan documentation, which is available online[24]. In summary, this SPA is a large area of intertidal mud- and sand-flat at the eastern end of the Menai Strait, used by several species of waterbird over the winter period and when moulting.

5.2.17 The SPA has the following qualifying features:

- Qualifying individual species not listed in Annex I of the Wild Birds Directive (Article 4.2):
  - Great crested grebe Podiceps cristatus (on passage)
  - Red-breasted merganser Mergus serrator (over winter)
  - Eurasian oystercatcher Haematopus ostralegus (over winter)
  - Eurasian curlew Numenius arquata (over winter)
  - Common redshank Tringa totanus (over winter)

5.2.18 The site coincides with Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC, and the 'supporting habitats' for the qualifying features are therefore the Mudflats and sandflats not covered by seawater at low tide and Large shallow inlets and bays features.

5.2.19 No specific areas of 'functional land' are identified in relation to the SPA although the Core Management Plan notes that "grazed fields adjacent to the shore used as high tide roosts should be maintained and sightlines for the oystercatchers retained".

5.2.20 The condition and current pressures on the features are summarised in Table 5.2:

[24] CCW (2008). Core Management Plan Including Conservation Objectives For Traeth Lafan/Lavan Sands, Conway Bay SPA [online]. Available at: https://naturalresources.wales/media/674184/Traeth%20Lafan%20SAC%20Plan%2021[1].4.08%20English.pdf. Accessed Feb 2022.

Table 5.2 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Great crested grebe	Not stated; likely 'favourable'	• Use of vehicles on foreshore • Bait digging
Red-breasted merganser	Not stated; likely 'favourable'	• Use of vehicles on foreshore • Bait digging
Eurasian oystercatcher	Favourable	• Use of vehicles on foreshore • Bait digging
Eurasian curlew	Not stated; likely 'favourable'	• Use of vehicles on foreshore • Bait digging
Common redshank	Not stated; likely 'favourable'	• Use of vehicles on foreshore • Bait digging

* Feature condition as reported in the Core Management Plan; where not explicitly stated the likely condition is based on the most recent WeBS count data and the citation.

5.2.21 It should be noted that the Core Management Plan does not identify water quality as a pressure on the site, and the general improvement in water quality noted for the SAC is relevant for this site also.

5.2.22 With regard to feature sensitivity to the expected environmental changes associated with the options, the qualifying features and/or their supporting habitats will be sensitive to:

- disturbance / displacement due to noise, vibration or visual intrusion associated with construction near the SPA or functionally-linked land;
- changes in water quality associated with construction;
- changes in flow volumes associated with altered operational spill regimes (although note exposure to this will be limited).

5.2.23 With regard to feature exposure, the precise location of particular features relative to outfall locations or potential construction areas (particularly with regard to the location and importance of functionally-linked land) cannot be determined at the plan level. However, this site is extensive and it is self-evident that the vast majority will not be exposed to environmental changes associated with with the option delivery (e.g. construction noise will typically be indistinguishable from background within 600 – 700m of the source due to natural attenuation alone).

5.2.24 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Core Management Plan for the SPA.

Mitigation

5.2.25 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- if required, scheduling works for the summer period will ensure that SPA qualifying features are not exposed to noise / visual disturbance;
- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects (All Sites)

5.2.26 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.2.27 Although there is residual uncertainty over some aspects of option delivery (including timing, precise location, and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the Bangor Treborth options can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level. It is worth noting that the Core Management Plan observes that "short-term or small-scale changes in turbidity within the SAC may result, or have resulted, from various anthropogenic activities…[including]…agitation dredging and the building of the tunnel beneath the Conwy Estuary. However, there is no evidence to suggest that anthropogenic modifications to turbidity is having a significant impact on the species and communities associated with the habitat features of the SAC."

5.2.28 With regard to operation, the schemes are intended to reduce the number of spills from six CSOs to fewer than 40 per year. The overall effect of this on water quality within the European sites should be positive (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.

5.2.29 However, the reduction in spills will reduce flow inputs to the sites associated with overflows during storm events, which may theoretically affect the habitats and foreshore morphology around some discharge locations; this may in turn affect the distribution of typical species (for the SAC) and the qualifying features (for the SPA; there is evidence of an association between wintering waterbirds and freshwater channels across intertidal mudflats).

5.2.30 The effects of altering spill frequency on foreshore morphology cannot be quantified at the plan level (as it would require detailed information on the location and characteristics of the foreshore near the CSO outflows) although as the contribution of CSO spills to any flows at these locations will (by their nature) be highly intermittent it is reasonable to assume that effects of reducing spill frequency will be very small-scale and very local.

5.2.31 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Bangor Treborth area are expected to have no adverse effects on site integrity, alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.3 Appropriate Assessment – Five Fords (Wrexham)

Screening Summary and Potential Effect Pathways

5.3.1 There are fifteen options within the Five Fords L4 catchment, associated with eight L7 areas located in Wrexham, Ruabon and Chirk. All of the options are intended to reduce property flooding events. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc), supported by traditional interventions including provision of offline storage tanks and pipe upsizing. Some of the SuDS will be designed as wetlands that can treat sewage flows and so not return these volumes to the system. The specific areas of intervention are much smaller than the L7 areas and in practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2033).

5.3.2 The downstream receptors for the L4 area are the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC (approximately 1.5km from the nearest L4 area), and hence the Dee Estuary/ Aber Dyfrdwy SAC, The Dee Estuary SPA or The Dee Estuary Ramsar (although these are a significant distance downstream). Lake Bala Ramsar is an upstream site although this site does not include any diadramous fish as interest features and so is not considered further.

5.3.3 The options are designed to reduce flooding, and will have no negative operational effects on the downstream receptors (spills that would otherwise flood to properties are passed to the downstream WwTW for treatment in accordance with the WwTW's consents).

5.3.4 However, one L7 area overlaps with the Johnstown Newt Sites SAC; the works required in this area will be in close proximity to the SAC and there is a likelihood that they will affect functional land associated with the site/features even if they do not directly affect the site itself (although the nature of some options (SuDS provision) suggests that nearby greenspace may be utilised, which may coincide with the SAC or functional land).

5.3.5 Some of the works required to deliver these options are likely to be located close, or immediately adjacent, to the Johnstown Newt Sites SAC and within the 1.5km of the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC and so the features of these sites may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).

- Direct impacts on the Johnstown Newt Sites SAC or (more likely) areas that may be 'functionally linked' to this site associated with construction.

5.3.6 With regard to operation, the schemes are intended to reduce the number of flooding events. The overall effect of this on water quality within downstream European sites should be positive or neutral (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. However, poorly-designed SuDS or traditional drainage systems can affect amphibian populations by increasing mortality risk or (theoretically) act as a sink for some amphibian populations by providing low-quality breeding habitat).

5.3.7 Potential effects on the Dee Estuary/ Aber Dyfrdwy SAC, The Dee Estuary SPA or The Dee Estuary Ramsar are therefore screened out due the distance downstream (and associated attenuation of any construction stage physio-chemical changes) and the absence of pathways for operational effects.

5.3.8 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind'). Potential effects on the Johnstown Newt Sites SAC (construction and operation) and the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC (construction) are therefore considered through appropriate assessment.

European site summaries

Johnstown Newt Sites SAC

5.3.9 Detailed information on this SAC is provided in the Core Management Plan documentation, which is available online[25]. In summary, this SAC predominantly comprises a series of former minerals extraction sites (coal and clay) that now support significant great crested newt populations in waterbodies associated with the former workings (or specifically created) and areas of restored woodland. The site unit closest to the L7 areas is Stryt Las a'r Hafod SSSI.

5.3.10 The SAC has the following qualifying features:

- Great crested newt Triturus cristatus

5.3.11 The Core Management Plan does not identify any 'typical species' considered to be associated with the qualifying features of the site, although macrophyte plant cover is a performance indicator for the site and it is reasonable to assume that the aquatic plant species typically favoured for egg laying by great crested newts would constitute 'typical species'.

[25] CCW (2008). Core Management Plan Including Conservation Objectives for Johnstown Newt Sites Special Area Of Conservation (SAC) [online]. Available at: https://naturalresources.wales/media/672594/Johnstown%20Newt%20Site%20Management%20Plan%20April%202008%20_English_.pdf. Accessed Feb 2022.

5.3.12 Likewise, no specific areas of 'functional land' are identified in relation to the SAC; however, the Core Management Plan notes that:

- "Surrounding areas of land support a mosaic of scrub and planted trees, grassland, and tall ruderal vegetation. These form important foraging and over wintering areas for adult and juvenile amphibians"; and
- "Connectivity between compartments is considered to be a material component of the conservation objectives for the site".

5.3.13 The condition and current pressures on the features are summarised in Table 5.3:

Table 5.3 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Great crested newts	Likely 'favourable'**	• Pond management • Water quality • Terrestrial habitat management • INNS • Local development pressure • Recreational use

* Feature condition as reported in the Core Management Plan or based on more recent data (where available); where not explicitly stated the likely condition is based on the feature description within the Core Management Plan and the condition assessments for co-located features.
**Based on 2018 survey data reported in Haysom K, Driver D, Cartwright M, Wilkinson J and Foster J. (2018). Great Crested Newt in Wales, with specific references to its long-term prospects and within its stronghold in North-East Wales. NRW Science Report Series. Report No: 259. pp 113, Natural Resources Wales, Bangor

5.3.14 It should be noted that the ponds and habitats of the site itself are well-managed and the pressures identified are not currently preventing the achievement of FCS.

5.3.15 With regard to feature sensitivity to the expected environmental changes associated with the options, the qualifying features and their supporting habitats will be sensitive to:

- temporary or permanent loss of habitat within the SAC or functionally associated with it;
- changes in water quality associated with construction;
- increases in mortality risk during construction;
- increases in mortality risk associated with drainage system design and operation.

5.3.16 The features will not be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.) or operation.

5.3.17 With regard to feature exposure, the precise location of particular construction works cannot be determined at the plan level. The vast majority will be within existing developed areas, although it is possible that some existing greenspace will be utilised for SuDS or similar. The Core Management Plan notes that "Great crested newts disperse between the ponds using a network of corridors, formed by hedgerows and rough grasslands, together with habitats, such as ponds or scrub, that function as stepping-stones" and so it is

likely that great crested newts will be exposed to the environmental changes associated with the options during construction and operation.

5.3.18 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Core Management Plan for the SAC.

River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC

5.3.19 Detailed information on this SAC is provided in the Core Management Plan documentation, which is available online[26]. In summary, this SAC covers Llyn Tegid / Lake Bala in Snowdonia and the River Dee from here to the estuary. The river is heavily regulated by is an important fishery. The river reaches / site units closest to Five Fords are Units 7, 8 and 9 (essentially, from Wrexham Council boundary to Worthenbury, including Ebistock Weir).

5.3.20 The SAC has the following qualifying features:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
- Sea lamprey Petromyzon marinus
- Brook lamprey Lampetra planeri
- River lamprey Lampetra fluviatilis
- Atlantic salmon Salmo salar
- Bullhead Cottus gobio
- Otter Lutra lutra
- Floating water-plantain Luronium natans

5.3.21 All of the features are primary reasons for the selection of the site.

5.3.22 The Core Management Plan does not identify specific 'typical species' for the Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation feature but notes that the community should conform to the species composition and abundance targets in Table 1a of the current version of JNCC's Common Standards Monitoring Guidance for Rivers. Typical species are alluded to in NE's 'Supplementary Advice' documentation[27], but not specified.

5.3.23 No specific areas of 'functional habitat' are identified in relation to the SAC; however, the Core Management Plan notes that "off site habitats likely to function as 'stepping stones' within the catchment for members of the SAC otter population will be maintained for migration, dispersal, foraging and genetic exchange purposes" and in practice most

[26] CCW (2008). Core Management Plan Including Conservation Objectives For River Dee And Bala Lake/Afon Dyfrdwy A Llyn Tegid SAC [online]. Available at: https://naturalresources.wales/media/673374/River_Dee__Bala_Lake_32_Plan.pdf. Accessed Feb 2022.

[27] NE (2019). European Site Conservation Objectives: Supplementary advice on conserving and restoring site features River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid Special Area of Conservation (SAC) [online]. Available at: http://publications.naturalengland.org.uk/file/6256441325518848. Accessed Feb 2022.

tributaries within the catchment of an SAC designated for mobile species (particularly fish species) are considered as potential functional habitat.

5.3.24 The condition and current pressures on the features are summarised in Table 5.4:

Table 5.4 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Not stated; likely unfavourable	• Water quality • Flow / water volumes • INNS
Sea lamprey Petromyzon marinus	Not stated; likely 'unfavourable'**	• Water quality • Flow / water volumes • INNS • Changes to river morphology
Brook lamprey Lampetra planeri	Not stated; likely 'unfavourable'**	• Water quality • Flow / water volumes • INNS • Changes to river morphology
River lamprey Lampetra fluviatilis	Not stated; likely 'unfavourable'**	• Water quality • Flow / water volumes • INNS • Changes to river morphology
Atlantic salmon Salmo salar	Not stated; likely 'unfavourable'	• Water quality • Flow / water volumes • INNS • Changes to river morphology
Bullhead Cottus gobio	Not stated; likely 'unfavourable'	• Water quality • Flow / water volumes • INNS • Changes to river morphology
Otter Lutra lutra	Not stated; likely 'unfavourable recovering'	• Anthropogenic mortality • Disturbance
Floating water-plantain Luronium natans	Not stated; likely 'unfavourable'	• Dredging • Motor boats • Water quality

* Feature condition as reported in the Core Management Plan or NE Supplementary Advice (where available); where not explicitly stated the likely condition is based on the feature description within the Core Management Plan or NE Supplementary Advice and the condition assessments for co-located features.
**Based on survey data reported in Garrett, HM. 2015. River Dee & Bala lake SAC population condition attribute condition assessment for brook, river and sea lamprey population 2014. NRW Evidence Report No: 40 31pp, NRW, Dolgellau.

5.3.25 It should be noted that the river is highly regulated (in terms of flows and discharges).

5.3.26 With regard to feature sensitivity to the expected environmental changes associated with construction:

- all of the qualifying features will be sensitive to changes in water quality;
- the mobile species will be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.3.27 With regard to feature exposure, the Floating water-plantain Luronium natans feature will not be exposed to any environmental changes due to its location in the site (essentially limited to Lake Bala). The other features are thought to be present in one or all of the SAC units closest to the L7 areas, although the closest works are likely to be over 1km from the river and so the fish species will not be exposed to noise / vibration (etc.) associated with construction. Effects are therefore only possible through contaminated construction run-off.

5.3.28 precise location of particular features relative to outfall locations cannot be determined at the plan level. The Regulation 37 advice suggests that all features, with the possible exception of the Sandbanks which are slightly covered by sea water all the time feature, are likely to be present in the Menai Strait or intertidal flats near Bangor; all of the features are therefore potentially exposed to the environmental changes associated with the options.

5.3.29 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Core Management Plan for the SAC and the NE Conservation Objectives and Supplementary Advice documentation.

Mitigation

5.3.30 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will clearly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction or operation; in particular:

- designing all surface water management systems to be 'amphibian friendly' will ensure no adverse effects on populations locally and can potentially have a positive effect through provision of additional habitat (note, the Core Management Plan indicates that "...new surface water management systems will be amphibian friendly and will therefore not hinder newt dispersal");
- standard measures to protect GCN populations during construction (e.g. fencing, translocation);
- standard pollution control measures will safeguard aquatic habitats.

Assessment of Effects (All Sites)

5.3.31 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.3.32 Although there is residual uncertainty over some aspects of option delivery (including timing, precise location, and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the Five Fords options can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level as a result of construction. This applies to both the Johnstown Newt Sites SAC and the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC.

5.3.33 With regard to operation, poorly-designed drainage systems can increase mortality risk and hence downward pressure on GCN populations; for example:

- GCN frequently get washed into drainage networks and become trapped;
- Water levels in some SuDS lagoons often fluctuate significantly over short periods of time by design, which can reduce reproductive success in populations if these waterbodies are used (preferentially or not) by GCN attempting to lay eggs.

5.3.34 However, a range of measures and designs for drainage systems have been developed to minimise these risks (e.g. sumpless gullies) and the works are likely to present an opportunity to improve the overall performance of the existing network (in respect of GCN mortality) and (potentially) provide incidental enhancements that may benefit populations (e.g. provision of additional habitat opportunities). Therefore, there is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse operational effects on the Johnstown Newt Sites SAC would not be avoidable at the project level. There will be no operational effects on the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC.

5.3.35 Therefore, although some aspects of the assessment are necessarily deferred ‘down the line’ the delivery of the options in the Five Fords area are expected to have no adverse effects on site integrity, alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as ‘de minimis’ such that in combination effects with other plans and projects would not occur.

5.4 Appropriate Assessment – Ganol STW

Screening Summary and Potential Effect Pathways

5.4.1 There are 13 options within the Ganol L4 catchment, associated with seven L7 areas located in Llandudno, Conwy and Colwyn Bay, and so discharges from this L4 area are ultimately made to the Liverpool Bay / Bae Lerpwl SPA and Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC. One of the L7 areas overlaps with the Great Orme`s Head/ Pen y Gogarth SAC, although this is a minor digitisation artefact and the options for this catchment will not directly affect this site (which is entirely up-catchment in any case).

5.4.2 The options are designed to reduce property flooding and CSO spills to the Liverpool Bay / Bae Lerpwl SPA and Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc), supported by traditional interventions including provision of offline storage tanks, pipe upsizing and relining (to reduce infiltration), and pumping station improvements.

5.4.3 The L7 areas cover much of Llandudno, Conwy and Colwyn Bay although the specific areas of intervention are much smaller and in practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2035).

5.4.4 Some of the works required to deliver these options are likely to be located close, or immediately adjacent, to the SAC and SPA and so the features of these sites may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).
- Noise or vibration disturbance: the works will result in noise and vibration which can affect several faunal interest feature groups through various mechanisms (for example breeding or wintering birds may suffer reduced fitness due to an increase in energy expenditure from a flight response and / or a reduction in food intake; noise and vibration can displace some reptile species, or have a barrier effect).
- Visual impact disturbance: some species can be disturbed by construction activities (e.g. through movement of people or plant, or introduction of light); this has similar negative effects to noise disturbance (above).

5.4.5 With regard to operation, the schemes are intended to reduce the number of spills from one CSO to fewer than 40 per year, and prevent property flooding. The overall effect of this on water quality within the European sites should be positive (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. The reduction in spills will reduce rainwater inputs to the sites associated with overflows during storm events, which may affect habitats and foreshore morphology local to the discharge, although the qualifying features of the site are not associated with such features (unlike some wintering waders).

5.4.6 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European site summaries

Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC

5.4.7 Information on this SAC is in the Bangor Treborth section, above.

5.4.8 The area of the SAC closest to the Ganol STW L4 area are the offshore sectors around Conwy Sands (although the sands do not form part of the SAC) and the Great Orme. Therefore, with regard to feature exposure, the precise location of particular features relative to outfall locations cannot be determined at the plan level but the Regulation 37 advice suggests that all features, are likely to be present adjacent to Conwy Sands or the Great Orme; all of the features are therefore potentially exposed to the environmental changes associated with the options.

Liverpool Bay / Bae Lerpwl SPA

5.4.9 Detailed information on this SPA is provided in the Regulation 37 advice documentation, which is available online[28]. In summary, this SPA is a large relatively shallow bay bordering north-west England and north Wales with subtidal sandbanks that provide important nursery areas for several fish and shellfish species; these in turn support seabird populations over the winter period and when breeding.

5.4.10 The SPA has the following qualifying features:

- Qualifying individual species listed in Annex I of the Wild Birds Directive (Article 4.1):
  - Little tern Sterna albifrons (breeding)
  - Common tern Sterna hirundo (breeding)
- Qualifying individual species not listed in Annex I of the Wild Birds Directive (Article 4.2):
  - Red-throated diver Gavia stellata (over winter)
  - Black (common) scoter Melanitta nigra (over winter)
  - Little gull Larus minutus (over winter)
  - Waterbird assemblage

5.4.11 The site overlaps partly with Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC, and the 'supporting habitats' for the qualifying features are therefore taken to be the Sandbanks which are slightly covered by sea water all the time, Mudflats and sandflats not covered by seawater at low tide and Large shallow inlets and bays features.

5.4.12 No specific areas of 'functional land' are identified in relation to the SPA and in practice no non-designated terrestrial areas will be critical for the qualifying features (the wintering

[28] CCW (2012). Liverpool Bay / Bae Lerpwl Special Protection Area Advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 (as amended) [online]. Available at: https://naturalresources.wales/media/678824/liverpool-bay-bae-lerpwl-spa-conservation-advice.pdf. Accessed Feb 2022.
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species do not rely on terrestrial habitats, and the breeding areas for the tern species are predominantly within the Dee Estuary SPA to the east).

5.4.13 The condition and current pressures on the features are summarised in Table 5.5:

Table 5.5 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Little tern	Not stated; likely 'unfavourable'	• Not stated
Common tern	Not stated; likely 'favourable'	• Not stated
Red-throated diver	Not stated; likely 'favourable'	• Not stated
Black (common) scoter	Not stated; likely 'favourable'	• Not stated
Little gull	Not stated; likely 'unfavourable'	• Not stated
Waterbird assemblage	Not stated; likely 'favourable'	• Not stated

* Feature condition as reported in the Core Management Plan; where not explicitly stated the likely condition is based on the most recent WeBS count data and the citation.

5.4.14 It should be noted that the Regulation 37 advice indicates that the features are exposed and sensitive to non-toxic contamination (including changes associated with water quality, such as changes in nutrient loading (e.g. agricultural run-off, outfalls) changes in organic loading (e.g. mariculture, outfalls) and changes in turbidity (e.g. run-off, dredging) but the vulnerability to these is categorised as 'low'.

5.4.15 With regard to feature sensitivity to the expected environmental changes associated with the options, the qualifying features and/or their supporting habitats will be sensitive to:

- disturbance / displacement due to noise, vibration or visual intrusion associated with construction near the SPA;
- changes in water quality associated with construction;

5.4.16 With regard to feature exposure, the precise location of particular features relative to outfall locations or potential construction areas (particularly with regard to the location and importance of functionally-linked land) cannot be determined at the plan level. However the site is extensive and it is self-evident that the vast majority of it will not be exposed to environmental changes associated with with the option delivery (e.g. construction noise will typically be indistinguishable from background within 600 – 700m of the source due to natural attenuation alone).

5.4.17 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Regulation 37 advice for the SPA.

Mitigation

5.4.18 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- if required, scheduling works for the summer period will ensure that SPA qualifying features are not exposed to noise / visual disturbance;
- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects (All Sites)

5.4.19 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.4.20 Although there is residual uncertainty over some aspects of option delivery (including timing, precise location, and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the Ganol STW options can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.4.21 It is worth noting that the Core Management Plan for Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC observes that "short-term or small-scale changes in turbidity within the SAC may result, or have resulted, from various anthropogenic activities [including] agitation dredging and the building of the tunnel beneath the Conwy Estuary. However, there is no evidence to suggest that anthropogenic modifications to turbidity is having a significant impact on the species and communities associated with the habitat features of the SAC."

5.4.22 With regard to operation, the schemes are intended to reduce the number of spills from one CSO to fewer than 40 per year, and reduce property flooding. The overall effect of this on water quality within the European sites should be positive (compared to not implementing the options) or neutral, as flows that would otherwise spill are passed to the downstream WwTW for treatment in accordance with the WwTW's consents.

5.4.23 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Ganol STW area are expected to have no adverse effects on site integrity, alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although

it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.5 Appropriate Assessment - Llanasa

Screening Summary and Potential Effect Pathways

5.5.1 There are seven options within the Llanasa L4 catchment, associated with eleven L7 areas located in Prestatyn and the coastal areas to the east of this town. All of the options are intended to reduce property flooding. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc), supported by traditional interventions including provision of offline storage tanks and pipe upsizing, and construction of bew storm networks to separate storm run-off from the sewer system. Some of the SuDS will be designed as wetlands that can treat sewage flows and so not return these volumes to the system. The specific areas of intervention are much smaller than the L7 areas and in practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2027 and 2033).

5.5.2 Discharges from this L4 area are ultimately made to the Liverpool Bay / Bae Lerpwl SPA, The Dee Estuary SPA / Ramsar and the Dee Estuary/ Aber Dyfrdwy SAC. Of the seven L7 areas, two are immediately adjacent to terrestrial units of the The Dee Estuary SPA / Ramsar; whilst the options require small scale minor works, the options in these L7 areas include small-scale works (provision of additional storage including SuDS provision; sewer repairs or upsizing) that may impinge on these designated sites. The features of these sites may be exposed to construction stage environmental changes including:

- Direct loss or damage to the supporting habitats for the SPA / Ramsar qualifying features;
- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).
- Noise or vibration disturbance: the works will result in noise and vibration which can affect several faunal interest feature groups through various mechanisms (for example breeding or wintering birds may suffer reduced fitness due to an increase in energy expenditure from a flight response and / or a reduction in food intake; noise and vibration can displace some reptile species, or have a barrier effect).
- Visual impact disturbance: some species can be disturbed by construction activities (e.g. through movement of people or plant, or introduction of light); this has similar negative effects to noise disturbance (above).

5.5.3 Construction effects on other sites locally (particularly the Liverpool Bay / Bae Lerpwl SPA and Dee Estuary/ Aber Dyfrdwy SAC) are considered unlikely due to the scale and location of the options (several hundred metres from the Liverpool Bay / Bae Lerpwl

SPA and Dee Estuary/ Aber Dyfrdwy SAC boundaries) irrespective of mitigation (hence no LSE).

5.5.4 With regard to operation, the schemes are intended to reduce the number of property flooding events spills from six CSOs to fewer than 40 per year. The overall effect of this on water quality within downstream European sites should be positive or neutral (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. No operational effects are therefore anticipated.

5.5.5 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European site summaries

The Dee Estuary SPA / Ramsar

5.5.6 Information on both these sites is provided in this section due to the overlap in interest features likely to be exposed to the effects of the options in this L4 area[29], although the sites are not entirely coincident. Detailed information on the SPA and Ramsar site is provided in the Regulation 37 advice documentation, which is available online[30]. In summary, the sites comprise a large funnel-shaped sheltered estuary that supports notable populations of wintering and passage waterfowl that use the extensive intertidal mudflats and sandflats, and associated areas of saltmarsh and grazing marsh.

5.5.7 The area of the sites closest to the Llanasa L4 area are series of grazing marsh areas between the A55 and the Chester – Bangor rail line.

5.5.8 The SPA has the following qualifying features:

- Qualifying individual species listed in Annex I of the Wild Birds Directive (Article 4.1):
  - Little tern Sterna albifrons (breeding)
  - Common tern Sterna hirundo (breeding)
- Qualifying individual species not listed in Annex I of the Wild Birds Directive (Article 4.2):
  - Common redshank Tringa totanus (on passage / over winter)
  - Red knot Calidris canutus (over winter)
  - Northern pintail Anas acuta (over winter)

[29] Note, the Ramsar site shares some features with the Dee Estuary/ Aber Dyfrdwy SAC, although these are unlikely to be exposed to the effects of the options due to their location within the site.
[30] CCW (2010). The Dee Estuary European Marine Site: Natural England & the Countryside Council for Wales' advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994 [online]. Available at: https://naturalresources.wales/media/673576/dee-estuary-reg33-volume-1-english-091209_1.pdf. Accessed Feb 2022.

- Dunlin Calidris alpina alpina (over winter)
- Eurasian teal Anas crecca (over winter)
- Eurasian oystercatcher Haematopus ostralegus (over winter)
- Grey plover Pluvialis squatarola (over winter)
- Common shelduck Tadorna tadorna (over winter)
- Black-tailed godwit Limosa limosa islandica (over winter)
- Sandwich tern Sterna sandvicensis (on passage)
- Eurasian curlew Numenius arquata (over winter)
- Bar-tailed godwit Limosa lapponica (over winter)
- Waterbird assemblage (over winter)

5.5.9 These are also the Criteria 5 and 6 features of the Ramsar site, with the exception of the tern species.

5.5.10 The Ramsar site is also designated:

- under Criteria 1, for habitat features it shares with the Dee Estuary/ Aber Dyfrdwy SAC (Estuaries, Mudflats and sandflats not covered by seawater at low tide, Annual vegetation of drift lines, Vegetated sea cliffs of the Atlantic and Baltic Coasts, Salicornia and other annuals colonizing mud and sand, Atlantic salt meadows (Glauco-Puccinellietalia maritimae), Embryonic shifting dunes, Shifting dunes along the shoreline with Ammophila arenaria ("white dunes"), Fixed coastal dunes with herbaceous vegetation ("grey dunes"), Humid dune slacks); and
- under Criteria 2, for its population of Natterjack toad Epidalea calamita.

5.5.11 As the sites partly coincide with the Dee Estuary/ Aber Dyfrdwy SAC the 'supporting habitats' for the SPA qualifying features are therefore taken to be the following SAC features:

- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Salicornia and other annuals colonizing mud and sand
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

5.5.12 Non-SAC features such as coastal grazing marsh are also supporting habitats.

5.5.13 Some areas of 'functional land' are identified in relation to the SPA; these are typically high-tide roost sites on the coastal plain.

5.5.14 The condition and current pressures on the features are summarised in Table 5.6:

Table 5.6 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Breeding terns and supporting habitats	Not stated	• Public Access/Disturbance • Water pollution • Fisheries • Climate change
Overwintering / passage wader and supporting habitats	Not stated	• Public Access/Disturbance • Invasive species • Coastal squeeze • Water pollution • Fisheries / harvesting • Climate change • Overgrazing / land management
Ramsar Criteria 1 Habitats	Not stated	• Public Access/Disturbance • Invasive species • Coastal squeeze • Water pollution • Fisheries / harvesting • Climate change • Overgrazing / land management • Marine litter

* Feature condition as reported in the Regulation 37 advice; where not explicitly stated the likely condition is based on the feature description within the Reg. 37 advice and the condition assessments for co-located features.

5.5.15 It should be noted that the Regulation 37 advice indicates that the features are exposed and sensitive to non-toxic contamination (including changes associated with water quality, such as changes in nutrient loading (e.g. agricultural run-off, outfalls) changes in organic loading (e.g. mariculture, outfalls) and changes in turbidity (e.g. run-off, dredging).

5.5.16 With regard to feature sensitivity to the expected environmental changes associated with the options, the qualifying features and/or their supporting habitats will be sensitive to:

- disturbance / displacement due to noise, vibration or visual intrusion associated with construction near the SPA;
- changes in water quality associated with construction.

5.5.17 With regard to feature exposure, the only areas of the SPA / Ramsar where features may be exposed to environmental changes associated with the options are the series of coastal grazing fields between the A55 and the Chester – Bangor rail line, east of Prestatyn. Data from the Regulation 37 documentation indicates that these areas are primarily used by Curlew, Oystercatcher, Redshank, Black-tailed godwit and Lapwing (an assemblage species).

5.5.18 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Regulation 37 advice for the SPA.

Mitigation

5.5.19 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- if required, scheduling works for the summer period will ensure that SPA qualifying features are not exposed to noise / visual disturbance;
- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects (All Sites)

5.5.20 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.5.21 Although there is residual uncertainty over some aspects of option delivery (including timing, precise location, and the precise components that will ultimately be used) most effects typically associated with the scale and type of construction required for the Llanasa options can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective.

5.5.22 However, there is some residual uncertainty over the precise nature of the works that may be required within the SPA / Ramsar at Tanlan; here, existing drainage networks are present beneath the SPA/Ramsar designated fields and SuDS waterbodies may need to be located in this area also, potentially within the SPA (depending on availability of alternative sites). This may involve temporary damage to SPA / Ramsar supporting habitats (e.g. to access existing pipes or provide additional subsurface storage), or permanent change to different habitats (e.g. for some types of SuDS), and associated displacement of bird species.

5.5.23 With regard to temporary damage, the supporting habitats in this location (grazed fields with few field boundaries and hence long sightlines) have little or no intrinsic botanical value (their value is primarily functional – i.e. foraging, particularly at high tide) and can be easily reinstated as required; small-scale temporary effects of this type would not be considered an 'adverse effect on integrity'. Similarly, any displacement associated with such works would be temporary and very local (a few hundred metres only), and could in any case be avoided through seasonal working if required.

5.5.24 With regard to possible change of habitat (e.g. improved grassland to SuDS waterbodies), this cannot be meaningfully assessed at this level (it is not certain that any land will be required within the SPA/Ramsar to deliver the options, and the precise location (hence species exposure and effects) cannot be determined). However, it is clear that:

- any land take will be small-scale (square metres rather than hectares) and located in areas that will be relatively less attractive to the bird species (i.e. close to the existing drainage networks and developed areas around the SPA/Ramsar margin);
- SuDS features can be designed to complement or even enhance the value of the SPA/Ramsar habitats at this location;
- The small-scale of the works are likely to ensure that locations outside the SPA/Ramsar are achievable.

5.5.25 Therefore, there is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse construction or operational effects on the The Dee Estuary SPA / Ramsar would not be avoidable at the project level.

5.5.26 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Llanasa area are expected to have no adverse effects on site integrity, alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.11, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.6 Appropriate Assessment - Llanfaglan

Screening Summary and Potential Effect Pathways

5.6.1 There are three options within the Llanfaglan L4 catchment, associated with two L7 areas located in Llanfaglan and Bethesda Bach. The options are intended to prevent property flooding and reduce CSO spills to the Afon Gwyrfai a Llyn Cwellyn SAC and hence Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of small-scale sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc); and upgrades to Llanfaglan WwTW. The L7 areas are fairly localised and the specific areas of intervention are much smaller and in practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2027 and 2032).

5.6.2 The works associated with the L7 area at Bethesda Bach are very minor and located within existing developed areas, and although within 1.5km of Glynllifon SAC there will be no effects (so no in combination effects) on this site or its qualifying features, and this is not considered further.

5.6.3 The works required at Llangadfan WwTW will be adjacent to Afon Gwyrfai a Llyn Cwellyn SAC and hence upstream of Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC and so the features of these sites may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).
- Noise or vibration disturbance: the works will result in noise and vibration which can affect several faunal interest feature groups through various mechanisms (for example noise and vibration can displace some fish species, or have a barrier effect).

5.6.4 With regard to operation, the schemes are intended to reduce the number of spills from CSOs within the SAC catchment to fewer than 40 per year. The overall effect of this on water quality within the European sites should be positive (compared to not implementing the options), as flows that would otherwise spill are passed to the downstream WwTW for upgraded treatment in accordance with the WwTW's consents.

5.6.5 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European site summaries

Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC

5.6.6 Information on this SAC is in the Bangor Treborth section, above.

5.6.7 The area of the SAC closest to the Llandegfa WwTW L4 area is Foryd Bay. Therefore, with regard to feature exposure, the Regulation 37 advice suggests that only the Mudflats and sandflats not covered by seawater at low tide and Reefs features are present at this location.

Afon Gwyrfai a Llyn Cwellyn SAC

5.6.8 Detailed information on this SAC is provided in the Core Management Plan documentation, which is available online[31]. In summary, this SAC covers the Afon Gwyrfai from its headwaters above Llyn Cwellyn in Snowdonia, and the lake itself. The river is noted for its salmon population, and Llyn Cwellyn is an excellent example of a deep ice-age oligotrophic lake. The low nutrient status of the river and lake is partly a function of the catchment characteristics and relatively quick passage of flows.

5.6.9 The SAC has the following qualifying features:

- Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

[31] CCW (2008). Core Management Plan Including Conservation Objectives For Afon Gwyrfai a Llyn Cwellyn SAC [online]. Available at: https://naturalresources.wales/media/670697/Afon%20Gwyrfai%20a%20Llyn%20Cwellyn%20Management%20%20Plan%20_English_.pdf. Accessed Feb 2022.

- Atlantic salmon Salmo salar
- Otter Lutra lutra
- Floating water-plantain Luronium natans

5.6.10 All of the features are primary reasons for the selection of the site.

5.6.11 The Core Management Plan does not identify specific 'typical species' for the Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation feature but notes that the community should conform to the species composition and abundance targets in Table 1a of the current version of JNCC's Common Standards Monitoring Guidance for Rivers.

5.6.12 No specific areas of 'functional habitat' are identified in relation to the SAC; however, otters will use non-SAC areas and in practice most tributaries within the catchment of an SAC designated for mobile species (particularly fish species) are considered as potential functional habitat.

5.6.13 The condition and current pressures on the features are summarised in Table 5.7:

Table 5.7 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	Unfavourable recovering	• Historic acidification • Localised sedimentation / eutrophication • Water abstraction
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Favourable	• Water quality (diffuse pollution and siltation) • INNS • Flow / water volumes
Atlantic salmon Salmo salar	Unfavourable	• Water quality (diffuse pollution and siltation) • Flow / water volumes • INNS • Changes to river morphology
Otter Lutra lutra	Unfavourable	• Limited breeding sites
Floating water-plantain Luronium natans	Favourable	• Historic acidification • Localised sedimentation / eutrophication • Water abstraction INNS • Changes to river morphology

* Feature condition as reported in the Core Management Plan; where not explicitly stated the likely condition is based on the feature description within the Core Management Plan and the condition assessments for co-located features.

5.6.14 With regard to feature sensitivity to the expected environmental changes associated with construction:

- all of the qualifying features will be sensitive to changes in water quality;

- the mobile species will be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.6.15 With regard to feature exposure, the Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea and Floating water-plantain Luronium natans features will not be exposed to any environmental changes due to their location in the site (essentially limited to Llyn Cwellyn); these features are not considered further. The other features are thought to be present in one or all of the SAC units closest to the L7 areas.

5.6.16 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Core Management Plan for the SAC and the NE Conservation Objectives and Supplementary Advice documentation.

Mitigation

5.6.17 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- if required, scheduling works to avoid key salmon migration periods will ensure this feature is not exposed to noise / visual disturbance;
- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects (All Sites)

5.6.18 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.6.19 Although there is residual uncertainty over some aspects of option delivery (including timing and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required at the Llandegfan WwTW can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.6.20 With regard to operation, the schemes are intended to reduce the number of spills from CSOs within the catchment to fewer than 40 per year. The overall effect of this on water quality within the European sites should be positive (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.

5.6.21 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Llandegfan L4 area are expected to have no adverse effects on the integrity of any European sites, alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.7 Appropriate Assessment - Newport Nash

Screening Summary and Potential Effect Pathways

5.7.1 Newport Nash is a large and relatively complex L4 area. In broad terms, Newport Nash WwTW (located at Uskmouth and discharging to the estuary approximately 1km upstream of the boundary of the River Usk SAC and the Severn Estuary SAC) receives flows from a drainage catchment that includes most of Newport and settlements east to Chepstow including Magor and Caldicot; options in Chepstow will therefore pass flows that would otherwise spill in the River Wye catchment for treatment at Nash and discharge into the Usk estuary.

5.7.2 With regard to the options:

- There are 17 options in 5 L5 catchments around Newport; these are all within the catchment of the River Usk/ Afon Wysg SAC (hence upstream of the Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC). These options The options are intended to reduce CSO spills to the River Usk/ Afon Wysg SAC and prevent property flooding within Newport. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of predominantly traditional interventions including provision of offline storage tanks, some of which may be close to the River Usk/ Afon Wysg SAC. In practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2033). The options will pass-forward flows to the Newport Nash WwTW.
- There are 2 options in Magor and Caldicot. These options are intended to reduce CSO spills to the Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC and prevent property flooding within Newport. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of predominantly traditional interventions including provision of offline storage tanks. In practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2033). The options will pass-forward flows to the Newport Nash WwTW.
- There are 13 options in the Chepstow area. These options are intended to reduce CSO spills to the River Wye/ Afon Gwy SAC (and hence the Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC) and prevent property flooding within Chepstow. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery

of predominantly traditional interventions including provision of offline storage tanks, some of which may be close to the River Usk/ Afon Wysg SAC. In practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2033). The options will pass-forward flows to the Newport Nash WwTW.

5.7.3 Some of the works required to deliver these options are likely to be located close, or immediately adjacent, to the River Wye/ Afon Gwy SAC, the Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC, and the River Usk/ Afon Wysg SAC and so the features of these sites may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).

5.7.4 With regard to operation, the schemes are intended to reduce the number of spills from X CSOs to fewer than 40 per year. The overall effect of this on water quality within the European sites should be positive (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.

5.7.5 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European Site Summaries

River Wye/ Afon Gwy SAC

5.7.6 Detailed information on this SAC is provided in the Core Management Plan documentation, which is available online[32]. In summary, this SAC is a large river site running from mid-Wales to the Severn Estuary. The areas closest to the proposed options are the tidal reaches at Chepstow.

5.7.7 The SAC has the following qualifying features:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
- Transition mires and quaking bogs
- White-clawed (or Atlantic stream) crayfish Austropotamobius pallipes
- Sea lamprey Petromyzon marinus
- Brook lamprey Lampetra planeri

[32] NRW (2017). Core Management Plan Including Conservation Objectives For River Wye / Afon Gwy Special Area Of Conservation (SAC) [online]. Available at: https://naturalresources.wales/media/682835/river-wye-sac-core-management-plan-approved.pdf. Accessed Feb 2022.

- River lamprey Lampetra fluviatilis
- Allis shad Alosa alosa
- Twaite shad Alosa fallax
- Atlantic salmon Salmo salar
- Bullhead Cottus gobio
- Otter Lutra lutra

5.7.8 The Transition mires and quaking bogs feature is a qualifying feature only; all other features are primary reasons for the selection of the site.

5.7.9 The Core Management Plan also details the 'typical species' considered to be associated with particular reaches of the site; these are not detailed here for clarity. No specific areas of 'functional land' are identified in relation to the SAC.

5.7.10 Chepstow is below the tidal limit of the Wye, and so several features are not exposed to the effects of the options due to their distribution in the site (Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation, Transition mires and quaking bogs, White-clawed (or Atlantic stream) crayfish Austropotamobius pallipes, Brook lamprey Lampetra planeri, Bullhead Cottus gobio).

5.7.11 The condition and current pressures on the remaining features are summarised in Table 5.8:

Table 5.8 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Sea lamprey Petromyzon marinus	Favourable	• Entrainment in abstractions • Water quality
River lamprey Lampetra fluviatilis	Unfavourable	• Entrainment in abstractions • Water quality
Allis shad Alosa alosa	Unfavourable	• Entrainment in abstractions • Water quality
Twaite shad Alosa fallax	Unfavourable	• Entrainment in abstractions • Water quality
Atlantic salmon Salmo salar	Unfavourable	• Flow depletion • Localised water quality issues
Otter Lutra lutra	Unfavourable	• Pressures on breeding sites / resting places • Food availability (eels)

* Feature condition as reported in the Core Management Plan; where not explicitly stated the likely condition is based on the feature description within the CMP advice and the condition assessments for co-located features.

5.7.12 With regard to feature sensitivity to the expected environmental changes associated with construction:

- all of the qualifying features will be sensitive to changes in water quality;
- the mobile species will be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.7.13 The features will not be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.7.14 Operation of the options will pass-forward spills to Newport Nash WwTW and therefore water quality in the River Wye will improve as a result of the options.

5.7.15 With regard to feature exposure, as noted Chepstow is below the tidal limit of the Wye, and so only the fish species and otter are likely to be exposed to the effects of the options.

5.7.16 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Core Management Plan for the SAC.

River Usk/ Afon Wysg SAC

5.7.17 Detailed information on this SAC is provided in the Core Management Plan documentation, which is available online[33]. In summary, this SAC is a large river site running from mid-Wales to the Severn Estuary. The areas closest to the proposed options are the tidal reaches at Newport.

5.7.18 The SAC has the following qualifying features:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
- Sea lamprey Petromyzon marinus
- Brook lamprey Lampetra planeri
- River lamprey Lampetra fluviatilis
- Allis shad Alosa alosa
- Twaite shad Alosa fallax
- Atlantic salmon Salmo salar
- Bullhead Cottus gobio
- Otter Lutra lutra

5.7.19 All features are primary reasons for the selection of the site.

5.7.20 The Core Management Plan also details the 'typical species' considered to be associated with particular reaches of the site; these are not detailed here for clarity. No specific areas of 'functional land' are identified in relation to the SAC.

[33] NRW (2008). Core Management Plan Including Conservation Objectives For River Usk / Afon Wysg Special Area Of Conservation (SAC) [online]. Available at: https://naturalresources.wales/media/673384/River_Usk%20SAC%20core%20plan.pdf. Accessed Feb 2022.

5.7.21 Newport is below the tidal limit of the Wye, and so several features are not exposed to the effects of the options due to their distribution in the site (Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation, Brook lamprey Lampetra planeri, Bullhead Cottus gobio).

5.7.22 The condition and current pressures on the remaining features are summarised in Table 5.9:

Table 5.9 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Sea lamprey Petromyzon marinus	Favourable	• Entrainment in abstractions • Water quality
River lamprey Lampetra fluviatilis	Unfavourable	• Entrainment in abstractions • Water quality
Allis shad Alosa alosa	Unfavourable	• Entrainment in abstractions • Water quality
Twaite shad Alosa fallax	Unfavourable	• Entrainment in abstractions • Water quality
Atlantic salmon Salmo salar	Unfavourable	• Flow depletion • Localised water quality issues
Otter Lutra lutra	Unfavourable	• Pressures on breeding sites / resting places • Food availability (eels)

* Feature condition as reported in the Core Management Plan; where not explicitly stated the likely condition is based on the feature description within the CMP advice and the condition assessments for co-located features.

5.7.23 With regard to feature sensitivity to the expected environmental changes associated with construction:

- all of the qualifying features will be sensitive to changes in water quality;
- the mobile species will be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.7.24 The features will not be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.7.25 Operation of the options will pass-forward spills to Newport Nash WwTW and therefore water quality in the River Usk upstream of the WwTW outflow at Uskmouth will improve as a result of the options.

5.7.26 With regard to feature exposure, as noted Newport below the tidal limit of the Usk, and so only the fish species and otter are likely to be exposed to the effects of the options.

5.7.27 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Core Management Plan for the SAC.

Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC

5.7.28 Detailed information on these sites is provided in the Regulation 37 advice documentation, which is available online[34]. In summary, this SAC encompasses areas of sea, coast and estuary that support a wide range of different marine habitats and wildlife; much of the SAC is subtidal. The area of the site closest to Portmadog is the Glaslyn/Dwyryd estuaries, which form a large area of intertidal sand flats.

5.7.29 The SAC has the following qualifying features:

- Sandbanks which are slightly covered by sea water all the time
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Reefs
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
- Sea lamprey Petromyzon marinus
- River lamprey Lampetra fluviatilis
- Twaite shad Alosa fallax

5.7.30 The Sandbanks which are slightly covered by sea water all the time and Reefs features are qualifying features only; all other features are primary reasons for the selection of the site.

5.7.31 The Regulation 37 advice also details the 'typical species' considered to be associated with the qualifying features of the site; these are not detailed here for clarity. No specific areas of 'functional land' are identified in relation to the SAC.

5.7.32 The SPA has the following qualifying features:

- Tundra swan Cygnus columbianus bewickii
- Dunlin Calidris alpina alpina
- Gadwall Anas strepera
- Common redshank Tringa totanus
- Common shelduck Tadorna tadorna
- Greater white-fronted goose Anser albifrons albifrons
- Waterbird assemblage

[34] NRW (2018). The Severn Estuary / Môr Hafren European Marine Site comprising: The Severn Estuary / Môr Hafren Special Area of Conservation (SAC), The Severn Estuary Special Protection Area (SPA), The Severn Estuary / Môr Hafren Ramsar Site. Natural England & the Countryside Council for Wales' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended [online]. Available at: https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-june-09.pd. Accessed Feb 2022.

5.7.33 The Ramsar meets the following designation criteria:

- Crit. 1 - sites containing representative, rare or unique wetland types
- Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity
- Crit. 4 - supports plant/animal species at a critical stage in their life cycles, or provides refuge
- Crit. 5 - regularly supports 20,000 or more waterbirds
- Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
- Crit. 8 - important source of food for fishes, spawning ground, nursery and/or migration path

5.7.34 The condition of the qualifying species are not explicitly stated in the Regulation 37 advice; the pressures on the features are highly variable, but typically include:

- substratum loss
- smothering
- changes in suspended sediment
- changes in water flow rate
- changes in wave exposure
- abrasion and physical disturbance
- noise and visual disturbance
- toxic contamination (introduction of synthetic & non synthetic compounds)
- changes in nutrient loading
- changes in thermal regime
- changes in turbidity
- changes in salinity
- changes in oxygenation
- introduction of microbial pathogens
- introduction of non-native species
- selective extraction of species
- changes in oxygenation
- introduction of microbial pathogens and INNS
- changes in grazing management
- noise and visual disturbance

- desiccation and changes in emergence regime

5.7.35 It should be noted that the Regulation 37 advice is equivocal regarding water quality as a pressure on the site, noting for the fish species that "...due to the natural high turbidity of the system and the volumes of water involved, it is thought that any effects would be minimal".

5.7.36 With regard to feature sensitivity to the expected environmental changes associated with construction:

- all of the qualifying features will be sensitive to changes in water quality;
- the mobile species will be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.) if using habitats close to the construction areas.

5.7.37 With regard to feature exposure, the fish species may be exposed to construction-stage effects when using the River Usk during migration periods; exposure within the Severn Estuary will be low due to the tidal flux. Note, only the options in Magor will be potentially in close proximity to the Severn Estuary sites; all other options are a substantial distance from the European sites, located within urban areas.

5.7.38 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Regulation 37 advice for the SAC.

Mitigation

5.7.39 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects – River Wye/ Afon Gwy SAC

5.7.40 Several options within Chepstow are likely to require construction close to this SAC. The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.7.41 Although there is residual uncertainty over some aspects of option delivery (including timing and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the options within Chepstow can clearly be avoided or mitigated in their entirety using established measures

that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.7.42 With regard to operation, the schemes are intended to reduce the number of spills from CSOs within the catchment to fewer than 40 per year and reduce flooding of properties. Flows that currently spill in the Wye catchment will be passed-forward to Newport Nash WwTW and the overall effect of this on water quality within the Wye will be positive (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. In theory there will be a reduction in inputs of water during high rainfall events (as flows are prevented from spilling to the Wye) although this reduction will be very small relative to flows within the river (particularly during storm events) and the tidal flows around Chepstow.

5.7.43 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Chepstow area of this L4 area are expected to have no adverse effects on the integrity of the River Wye/ Afon Gwy SAC alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

Assessment of Effects – River Usk/ Afon Wysg SAC

5.7.44 Several options within Newport are likely to require construction close to this SAC. As with the Wye, the appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.7.45 Although there is residual uncertainty over some aspects of option delivery (including timing and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the options within Newport can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.7.46 With regard to operation, the schemes are intended to reduce the number of spills from CSOs within the catchment to fewer than 40 per year and reduce flooding of properties. Flows that currently spill in the Usk catchment will be passed-forward to Newport Nash WwTW and the overall effect of this on water quality within the Usk in Newport will be positive (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. In theory there will be a reduction in inputs of water during high rainfall events (as flows are prevented from spilling to the Usk) although this reduction will be very small relative to flows within the river (particularly during storm events) and the tidal flows around Newport. The effect of passing on flows for treatment at Newport Nash should be positive or neutral, particularly given the relatively small volumes passed forward compared to flows within the Usk and the tidal flux of the Usk and Severn estuaries

5.7.47 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Newport area of this L4 area are expected to have no adverse effects on the integrity of the River Usk/Afon Wysg SAC alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

Assessment of Effects – Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC

5.7.48 The Severn Estuary sites are the ultimate downstream receptors for all of the Newport Nash options. None of the construction required for the options (with the potential exception of CSO works at Magor) will be in close proximity to the European sites and so exposure to construction effects would be low irrespective of any mitigation (note, the options are in urban areas and so effects on 'functional habitat' associated with the European sites, other than the Usk and Wye rivers, will be negligible.

5.7.49 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, as the estuary sites are downstream receptors, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.7.50 Although there is residual uncertainty over some aspects of option delivery (including timing and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the options within the catchment of the Severn Estuary sites can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.7.51 With regard to operation, the schemes are intended to reduce the number of spills from CSOs within the catchment to fewer than 40 per year and reduce flooding of properties. Flows that currently spill in the Wye and Usk catchment will be passed-forward to Newport Nash WwTW which discharges to the Usk estuary approximately 1km upstream of the Severn estuary sites. Flows that would otherwise spill are passed to the downstream WwTW for treatment in accordance with the WwTW's consents. The effect of

this on the interest features of the Severn estuary sites will be negligible due to the treatment applied and the relatively small volumes compared to flows within the Usk and the tidal flux of the Severn estuary; the Severn estuary is also a high turbidity environment that is not thought to be highly sensitive to water quality changes.

5.7.52 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in this L4 area are expected to have no adverse effects on the integrity of the Severn Estuary Ramsar, Severn Estuary SPA and Severn Estuary/ Môr Hafren SAC alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.8 Appropriate Assessment - Porthmadog

Screening Summary and Potential Effect Pathways

5.8.1 There are four options within the Porthmadog L4 catchment, associated with two L7 areas located in Tremadog and Borth y Gest. angor, Menai Bridge and Llandegfan. The options are intended to reduce CSO spills to Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC at Borth y Gest and prevent property flooding at Tremadog. The options essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc), supported by traditional interventions including provision of offline storage tanks. The L7 areas cover much of Tremadog and Borth y Gest although the specific areas of intervention are much smaller and in practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2033).

5.8.2 The L7 areas associated with the options are located in the surface water catchment of the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC, and overlap with this site and the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC, although in both instances this overlap is a digitisation artefact and no works will be required within the SACs to deliver the options. As the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC is effectively 'up-catchment' of the closest option works, and these works will take place within existing developed areas it is considered that there will be no significant effects in this site irrespective of mitigation, and so this SAC is not considered further.

5.8.3 Some of the works required to deliver these options are likely to be located close, or immediately adjacent, to the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC and so the features of these sites may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).

5.8.4 With regard to operation, the schemes are intended to reduce the number of spills from one CSO to fewer than 40 per year. The overall effect of this on water quality within the European site should be positive (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. However, the reduction in spills will reduce rainwater inputs to the sites associated with overflows during storm events, which may affect habitats and foreshore morphology local to the discharge.

5.8.5 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European site summaries

Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC

5.8.6 Detailed information on this SAC is provided in the Regulation 37 advice documentation, which is available online[35]. In summary, this SAC encompasses areas of sea, coast and estuary that support a wide range of different marine habitats and wildlife; much of the SAC is subtidal. The area of the site closest to Portmadog is the Glaslyn/Dwyryd estuaries, which form a large area of intertidal sand flats.

5.8.7 The SAC has the following qualifying features:

- Sandbanks which are slightly covered by sea water all the time
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Coastal lagoons
- Large shallow inlets and bays
- Reefs
- Salicornia and other annuals colonizing mud and sand
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
- Submerged or partially submerged sea caves
- Bottlenose dolphin Tursiops truncatus
- Otter Lutra lutra
- Grey seal Halichoerus grypus

[35] NRW (2018). Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau Special Area of Conservation: Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulations 2017 [online]. Available at: https://cdn.naturalresources.wales/media/688001/eng-pen-llyn-ar-sarnau-reg-37-report-2018.pdf?mode=pad. Accessed Feb 2022.

5.8.8 The Mudflats and sandflats not covered by seawater at low tide, Coastal lagoons, Salicornia and other annuals colonizing mud and sand, and Submerged or partially submerged sea caves features are qualifying features only; all other features are primary reasons for the selection of the site.

5.8.9 The Regulation 37 advice also details the 'typical species' considered to be associated with the qualifying features of the site; these are not detailed here for clarity. No specific areas of 'functional land' are identified in relation to the SAC.

5.8.10 The condition and current pressures on the features are summarised in Table 5.10:

Table 5.10 Condition and current pressures

Feature	Condition*	Current Human Activity Pressures
Sandbanks which are slightly covered by sea water all the time	Not stated	• None identified (but considered vulnerable to commercial fishing and aggregates dredging)
Estuaries	Unfavourable	• Use of vehicles on foreshore • Coastal activities • Commercial / recreational collection of marine species • INNS introductions
Mudflats and sandflats not covered by seawater at low tide	Not stated	• Use of vehicles on foreshore • Coastal activities
Coastal lagoons	Unfavourable	• Damage by motorbikes • Dog walking / associated eutrophication
Large shallow inlets and bays	Not stated	• Commercial / recreational collection of marine species • INNS introductions
Reefs	Not stated	• Coastal activities
Salicornia and other annuals colonizing mud and sand	Not stated	• Coastal squeeze • Grazing pressure • Damage by vehicles
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Not stated	• Coastal squeeze • Grazing pressure • Damage by vehicles
Submerged or partially submerged sea caves	Not stated	• Localised damage to intertidal caves
Bottlenose dolphin Tursiops truncatus	Not stated	• Inert or toxic materials (e.g. plastics, synthetic fibres, hydrocarbons) causing entanglement, smothering or ill-health; • Competition with human activities for space causing displacement, collision, noise and visual disturbance; • Contamination of prey.
Otter Lutra lutra	Not stated	• As for bottlenose dolphin
Grey seal Halichoerus grypus	Not stated	• As for bottlenose dolphin

* Feature condition as reported in the Regulation 37 advice; where not explicitly stated the likely condition is based on the feature description within the Reg. 37 advice and the condition assessments for co-located features.

5.8.11 It should be noted that the Regulation 37 advice does not identify water quality as a pressure on the site, noting that "The concentrations of major nutrients and contaminants within the coastal and open sea areas of the SAC are not believed to be above levels that would be of concern for the [qualifying features] at present".

5.8.12 With regard to feature sensitivity to the expected environmental changes associated with construction:

- all of the qualifying features will be sensitive to changes in water quality;
- the mobile species will be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.8.13 The features will not be sensitive to other environmental changes typically associated with construction (e.g. noise, visual disturbance, etc.).

5.8.14 With regard to feature exposure, the Glaslyn / Dyrfyrd Estuary near Pothmadog is understood to support the Estuaries, Mudflats and sandflats not covered by seawater at low tide, Large shallow inlets and bays, Reefs, Salicornia and other annuals colonizing mud and sand and Atlantic salt meadows (Glauco-Puccinellietalia maritimae) features. The area may occasionally be used by Otter or Grey Seal, although is unlikely to be fundamental to these features. The remaining features are not considered exposed to the likely environmental changes associated with the scheme.

5.8.15 The Conservation Objectives that benchmark FCS are not reproduced here but are available in the Regulation 37 advice for the SAC.

Mitigation

5.8.16 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects (All Sites)

5.8.17 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.8.18 Although there is residual uncertainty over some aspects of option delivery (including timing, precise location, and the precise components that will ultimately be used) the

effects typically associated with the scale and type of construction required for the Portmadog options can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.8.19 With regard to operation, the schemes are intended to reduce property flooding and the number of spills from one CSO. The overall effect of this on water quality within the European site should be positive (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.

5.8.20 However, the reduction in spills will reduce flow inputs to the sites associated with overflows during storm events, which may theoretically affect the habitats and foreshore morphology around some discharge locations; this may in turn affect the distribution of typical species; the effects of altering spill frequency on foreshore morphology cannot be quantified at the plan level (as it would require detailed information on the location and characteristics of the foreshore near the CSO outflows) although as the contribution of CSO spills to any flows at these locations will (by their nature) be highly intermittent it is reasonable to assume that effects of reducing spill frequency will be very small-scale and very local.

5.8.21 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Porthmadog area are expected to have no adverse effects on site integrity, alone or in combination with other DWMP options. In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.9 Appropriate Assessment - Tywyn

Screening Summary and Potential Effect Pathways

5.9.1 There are three options within the Tywyn L4 catchment, associated with one L7 area. The options are intended to reduce property flooding and essentially comprise the removal of impermeable areas (roofs, roads and paved areas) from the network through delivery of sustainable interventions (e.g. SuDS (swales, attenuation ponds; etc), supported by traditional interventions including provision of upsized pipework and storage tanks; one option involves the installation of a new network to separate storm run-off from the sewer system, which may require a new outfall to the sea. In practice the options will involve the delivery of a number of small-scale construction schemes over a period of 3 – 5 years (intended start date for most is between 2028 and 2032).

5.9.2 The L7 areas associated with the options are located in the surface water catchment of the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC, and some of the works required to deliver these options are likely to be located close, or immediately adjacent, to

this site. The features of this site may be exposed to construction stage environmental changes including:

- Generation of site-derived materials or pollutants: this may include toxic and non-toxic contaminants associated directly with construction (e.g. alkali concrete leachate; silts; emissions to air; etc.).

5.9.3 With regard to operation, the schemes are intended to reduce property flooding and the overall effect of this on water quality within the European site should be positive or neutral (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. However, one option may divert surface water run-off during storms away from the sewer system and potentially discharge this to the marine environment; whilst this will not be contaminated with material from the foul system, it will nevertheless be run-off from roads and other built areas that may contain contaminants (although these would enter the marine environment in any case)..

5.9.4 The environmental changes associated with the options will almost certainly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so the options are 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind').

European site summaries

Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC

5.9.5 Information on this SAC is provided in the Portmadog section, above.

5.9.6 The area of the SAC closest to the Tywyn L4 area is directly offshore, below MLW (i.e. the beach at Tywyn is not within the SAC). Therefore, with regard to feature exposure, the Regulation 37 advice suggests that only the Sandbanks which are slightly covered by sea water all the time and Reefs features are likely to be present near this location (although the mobile features may periodically use offshore areas).

Mitigation

5.9.7 Option-specific mitigation and avoidance measures can only be identified at the project stage. However, the standard measures outlined in Appendix C will almost certainly be sufficient to ensure that the adverse effects on site integrity do not occur as a result of construction; in particular:

- standard and established pollution control measures will safeguard nearby and hydrologically-linked receptors.

Assessment of Effects (All Sites)

5.9.8 The appropriate assessment is driven by the identification of potential pathways for effects at the plan level, due to the proximity of works to the designated sites, and hence the need to rely on project-level avoidance or mitigation measures to be confident that adverse effects will not occur; and the inherent uncertainties within the option scopes that

mean that some aspects of the assessment must necessarily be deferred 'down the line' to the project stage (it is generally accepted that assessment deferral 'down the line' should be undertaken at the appropriate assessment stage, rather than at screening).

5.9.9 Although there is residual uncertainty over some aspects of option delivery (including timing, precise location, and the precise components that will ultimately be used) the effects typically associated with the scale and type of construction required for the Tywyn options can clearly be avoided or mitigated in their entirety using established measures that are known to be available, achievable and likely to be effective. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.9.10 With regard to operation, the schemes are intended to reduce property flooding and the overall effect of this on water quality within the European site should be positive (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.

5.9.11 However, one option involves the installation of a network to reduce storm run-off entering the foul system; this run off is likely to be directed towards the foreshore and may require a new outfall. The run-off will not contain contaminants associated with the sewerage network but will arise from rainfall on built areas, which may contain other contaminants (e.g. hydrocarbons etc.); it is likely that these would enter the marine environment in any case either at this location, or at the relevant WwTW (and so effects are arguably neutral) although a new outfall would be a new point source. The potential effects of this cannot be determined at the plan level as it will require survey of the local area and detail on likely storm-flow volumes and characteristics; however, there will be a number of mechanisms for avoiding or mitigating any effects that may potentially be adverse, including partial treatment or diversion to alternative discharge locations (essentially, this becomes an engineering problem rather than something fundamental to the operation of the system). Furthermore, the discharges would be intermittent only.

5.9.12 Therefore, although some aspects of the assessment are necessarily deferred 'down the line' the delivery of the options in the Porthmadog area are expected to have no adverse effects on site integrity, alone or in combination with other DWMP options. There is no reason (either due to the scale / type / location of the proposed works, or the sensitivity and exposure of the site interest features) why adverse effects would be unavoidable at the project level.

5.9.13 In combination effects with other plans and projects are considered in Section 5.X, although it is certain that avoidance and mitigation measures will effectively render any effects from the DWMP options as 'de minimis' such that in combination effects with other plans and projects would not occur.

5.10 Plan-level In Combination Assessment

Overview

5.10.1 The extent to which the Drought Plan options can act 'in combination' is dependent on a number of variables. These include nature, location and timing of implementation of options, the number of options that are ultimately implemented, and the interaction of these options with other plans or programmes. The effects are also dependent on the sensitivity of receptors to the effects of the options acting alone and in combination.

Intra-plan effects

5.10.2 The effects of options operating 'in combination' have been explored through the screening and appropriate assessment phases. These assessments have concluded that adverse effects 'alone' are not likely to occur for any European sites or features as any such effects can clearly be avoided or mitigated at the project level; this also applies to 'in combination' effects between options as

- the environmental changes and zones of influence of options in different L4 areas will be negligible and will not overlap spatially or temporally; nor will the result in complex synergistic or temporally dispersed effects; and
- mitigation can be relied on to reduce the effects due to any individual option such that there will effectively be 'no effects' due to construction or operation.

5.10.3 The options will not therefore have adverse effects 'in combination' that are likely to be unavoidable at the project level.

5.11 In combination effects with other plans and programmes

Effects between options

5.11.1 Potential effects between options are considered in the section above (so far as is achievable at this level in the planning hierarchy and with limited information available on option delivery); in summary, the operation of the options will collectively have a neutral or positive effect on the receiving waterbodies within the relevant catchments; in terms of construction, the schemes individually are sufficiently small-scale that in combination effects are unlikely.

Effects with major projects

5.11.2 The Planning Inspectorate website has been examined to identify known major projects that might interact with options within the relevant L4 areas. This exercise did not identify any schemes within or near the relevant L4 areas that are likely to operate 'in combination' with the DWMP options, although any assessment at this stage (in the absence of detail on the options) is somewhat speculative and it must be noted that many of these projects will have been delivered by the time that specific options are implemented (due to the long-term and phased nature of the DWMP), and so this assessment is necessarily limited

and would require repeating for project-level assessments as the options come forward. In reality the effects of the DWMP options are likely to be too minor for significant 'in combination' effects to be likely.

Minor projects

5.11.3 It has not been possible to produce a definitive list of existing (minor) planning applications near the DWMPs zone of influence and, in reality given the uncertainty over the option implementation, generating a list at this stage would be of little value. It is possible that there will be 'in combination' scheme-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application.

Effects with other strategic plans and development pressure

5.11.4 Regional and local plans have been reviewed at a high level to determine whether there are any likely significant 'in combination' effects, with allocation sites identified where possible. This review has not indicated any potential or likely 'in combination' effects that could occur as a result of cumulative development pressure, and in reality the timescales involved in the implementation of the DWMP options and the absence of detail on allocation proposals makes any 'in combination' assessment difficult and potentially meaningless. However, the DWMP options account for anticipated local and regional growth and so are inherently unlikely to operate 'in combination'.

6. Conclusion

6.1.1 For this iteration of the DWMP Welsh Water has prioritised solutions for 19 L4 drainage areas where there are multiple incidents of internal property flooding or significant spills to European sites. Within each L4 catchment the DWMP process identifies specific locations where internal property flooding or spills to European sites have triggered the development of an option to resolve this; these are the L7 risk areas.

6.1.2 For each option (or group of options, as appropriate), the HRA comprises:

- a 'screening' of European sites to identify those sites and features where there will self-evidently be 'no effect', 'no likely significant effects', or positive effects due to the option[36], and those where significant effects are likely or uncertain; and
- an 'appropriate assessment' of any options where significant effects cannot be excluded (this may include 'down-the-line' deferral in accordance with established HRA practice, where appropriate).

6.1.3 The conservation objectives are taken into account at the screening and appropriate assessment stages as necessary.

6.1.4 In most instances the environmental changes associated with the options will clearly be manageable or avoidable at the scheme level, although this relies on mitigation assumptions and so some options and L4 areas have been 'screened in' for appropriate assessment (to avoid potential conflict with 'People over Wind'). The following L4 areas and European sites were therefore considered in an 'appropriate assessment'.

Table 6.1 L4 areas and European sites screened in

L4 Areas	Sites
Bangor Treborth	Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC Traeth Lafan/ Lavan Sands, Conway Bay SPA
Five Fords	Johnstown Newt Sites SAC River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC
Ganol STW	Liverpool Bay / Bae Lerpwl SPA Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC
Llanasa	The Dee Estuary Ramsar The Dee Estuary SPA
Llanfaglan	Afon Gwyrfai a Llyn Cwellyn SAC Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC

[36] Note, for options with 'no effects' or positive effects there is no possibility of 'in combination' effects.

L4 Areas	Sites
Newport Nash	River Usk/ Afon Wysg SAC River Wye/ Afon Gwy SAC Severn Estuary Ramsar Severn Estuary SPA Severn Estuary/ Môr Hafren SAC
Portmadog	Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC
Tywyn	Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC

6.1.5 'Appropriate assessments' of the options in these L4 areas were undertaken based on the information available at the plan-level. In summary:

- Whilst options are identified, the proposals are not intended to be definitive plans for schemes that cannot be deviated from; in practice, none of the options are of a scale or type where adverse effects (through construction or operation) are likely to be an unavoidable consequence of their delivery.
- For all options the majority of the environmental changes associated with construction will be manageable or avoidable at the scheme level using standard project-level avoidance and mitigation measures that known to be available, achievable and effective.
- There is sufficient flexibility within the terms of the plan to ensure adverse effects can be avoided at the project level (i.e. the plan identifies preferred options but does not define options in detail; this would be subject to detailed design at a lower tier in the planning hierarchy).
- With regard to operation, the options within the current iteration of the DWMP are fundamentally addressing relatively small-scale local flow-management issues to reduce spills or flooding at a particular location and ensure that these volumes can be passed to the relevant WwTW for treatment in accordance with the WwTW's permits. Their operational effect on receiving waters is therefore likely to be positive (or at least neutral) compared to the status quo.

6.1.6 Options in three L4 areas have the potential to interact negatively with European sites:

- Options in Five Fords may require SuDS features close to Johnstown Newt Sites SAC; these features would need to be designed and located to ensure they do not adversely affect great crested newt populations, although this is evidently achievable with appropriate designs.
- Options in Llansasa may require construction within terrestrial grazing pastures that are part of the Dee Estuary SPA / Ramsar (e.g. to access existing pipework or construct small SuDS); the habitats of the areas potentially affected are not intrinsically high-value (primarily being grazing pasture designated for its functional value to wintering birds) and construction effects are likely to be small-scale and localised; adverse effects are not inevitable or unavoidable (e.g. worsk could be timed to avoid the winter period; construction effects would be short-term and temporary; land-take

requirements could be reduced or removed if the scheme-level investigations indicated that provision of SuDS would adversely affect the European sites.

- An option in Tywyn would separate surface run-off from the foul system and discharge this directly to the marine environment close to the Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC; whilst this would be predominantly clean storm run-off (and volumes would be small and intermittent) it may contain contaminants from roads (etc.). However, measures for avoiding effects are available (for example, passing flows through a SuDS to reduce contaminant levels) should detailed design demonstrate that these are required to avoid adverse effects.

6.1.7 Therefore the HRA can conclude that the DWMP (if adopted as proposed) will have no adverse effects on the integrity of any European sites, subject to appropriate consideration of residual uncertainties 'down the line' at the project level.

Appendix A
European sites and features

Dee Estuary/ Aber Dyfrdwy SAC
Estuaries
Mudflats and sandflats not covered by seawater at low tide
Annual vegetation of drift lines
Vegetated sea cliffs of the Atlantic and Baltic Coasts
Salicornia and other annuals colonizing mud and sand
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Embryonic shifting dunes
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")
Fixed coastal dunes with herbaceous vegetation ("grey dunes")
Humid dune slacks
Sea lamprey Petromyzon marinus
River lamprey Lampetra fluviatilis
Petalwort Petalophyllum ralfsii
River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Sea lamprey Petromyzon marinus
Brook lamprey Lampetra planeri
River lamprey Lampetra fluviatilis
Atlantic salmon Salmo salar
Bullhead Cottus gobio
Otter Lutra lutra
Floating water-plantain Luronium natans
River Wye/ Afon Gwy SAC
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Transition mires and quaking bogs
Sea lamprey Petromyzon marinus
Brook lamprey Lampetra planeri
River lamprey Lampetra fluviatilis
Allis shad Alosa alosa
Twaite shad Alosa fallax
Atlantic salmon Salmo salar
Bullhead Cottus gobio
White-clawed (or Atlantic stream) crayfish Austropotamobius pallipes
Otter Lutra lutra
Severn Estuary/ Môr Hafren SAC
Sandbanks which are slightly covered by sea water all the time
Estuaries
Mudflats and sandflats not covered by seawater at low tide
Reefs
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Sea lamprey Petromyzon marinus
River lamprey Lampetra fluviatilis
Twaite shad Alosa fallax
Wye Valley Woodlands/ Coetiroedd Dyffryn Gwy SAC

Asperulo-Fagetum beech forests
Tilio-Acerion forests of slopes, screes and ravines
Taxus baccata woods of the British Isles
Lesser horseshoe bat Rhinolophus hipposideros

Afon Gwyrfai a Llyn Cwellyn SAC

Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Atlantic salmon Salmo salar
Otter Lutra lutra
Floating water-plantain Luronium natans

Berwyn a Mynyddoedd de Clwyd/ Berwyn and South Clwyd Mountains SAC

European dry heaths
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
Blanket bogs (* if active bog)
Transition mires and quaking bogs
Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)
Calcareous rocky slopes with chasmophytic vegetation

Cardigan Bay/ Bae Ceredigion SAC

Sandbanks which are slightly covered by sea water all the time
Reefs
Submerged or partially submerged sea caves
Sea lamprey Petromyzon marinus
River lamprey Lampetra fluviatilis
Bottlenose dolphin Tursiops truncatus
Grey seal Halichoerus grypus

Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC

Sandbanks which are slightly covered by sea water all the time
Estuaries
Mudflats and sandflats not covered by seawater at low tide
Large shallow inlets and bays
Salicornia and other annuals colonizing mud and sand
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Sea lamprey Petromyzon marinus
River lamprey Lampetra fluviatilis
Allis shad Alosa alosa
Twaite shad Alosa fallax
Otter Lutra lutra

Coedwigoedd Penrhyn Creuddyn/ Creuddyn Peninsula Woods SAC

Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
Tilio-Acerion forests of slopes, screes and ravines
Taxus baccata woods of the British Isles

Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Northern Atlantic wet heaths with Erica tetralix
European dry heaths
Tilio-Acerion forests of slopes, screes and ravines
Old sessile oak woods with Ilex and Blechnum in the British Isles
Bog woodland
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
Lesser horseshoe bat Rhinolophus hipposideros

Coedydd Nedd a Mellte SAC

Tilio-Acerion forests of slopes, screes and ravines
Old sessile oak woods with Ilex and Blechnum in the British Isles

Crymlyn Bog/ Cors Crymlyn SAC

Transition mires and quaking bogs
Calcareous fens with Cladium mariscus and species of the Caricion davallianae
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

Glynllifon SAC

Lesser horseshoe bat Rhinolophus hipposideros

Gower Commons/ Tiroedd Comin Gwyr SAC

Northern Atlantic wet heaths with Erica tetralix
European dry heaths
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
Southern damselfly Coenagrion mercuriale
Marsh fritillary butterfly Euphydryas (Eurodryas, Hypodryas) aurinia

Great Orme`s Head/ Pen y Gogarth SAC

Vegetated sea cliffs of the Atlantic and Baltic Coasts
European dry heaths
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)

Johnstown Newt Sites SAC

Great crested newt Triturus cristatus

Kenfig/ Cynffig SAC

Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Fixed coastal dunes with herbaceous vegetation ("grey dunes")
Dunes with Salix repens ssp. argentea (Salicion arenariae)
Humid dune slacks
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
Petalwort Petalophyllum ralfsii
Fen orchid Liparis loeselii

Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC

Sandbanks which are slightly covered by sea water all the time
Estuaries
Mudflats and sandflats not covered by seawater at low tide
Coastal lagoons
Large shallow inlets and bays
Reefs
Salicornia and other annuals colonizing mud and sand
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Submerged or partially submerged sea caves
Bottlenose dolphin Tursiops truncatus
Otter Lutra lutra
Grey seal Halichoerus grypus

River Usk/ Afon Wysg SAC

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Sea lamprey Petromyzon marinus
Brook lamprey Lampetra planeri
River lamprey Lampetra fluviatilis
Allis shad Alosa alosa
Twaite shad Alosa fallax
Atlantic salmon Salmo salar
Bullhead Cottus gobio
Otter Lutra lutra

Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC
Sandbanks which are slightly covered by sea water all the time
Mudflats and sandflats not covered by seawater at low tide
Large shallow inlets and bays
Reefs
Submerged or partially submerged sea caves
Anglesey Terns / Morwenoliaid Ynys Môn SPA
Roseate tern Sterna dougallii
Common tern Sterna hirundo
Arctic tern Sterna paradisaea
Sandwich tern Sterna sandvicensis
Burry Inlet SPA
Eurasian oystercatcher Haematopus ostralegus
Eurasian wigeon Anas penelope
Eurasian curlew Numenius arquata
Northern pintail Anas acuta
Grey plover Pluvialis squatarola
Common shelduck Tadorna tadorna
Red knot Calidris canutus
Northern shoveler Anas clypeata
Common redshank Tringa totanus
Dunlin Calidris alpina alpina
Eurasian teal Anas crecca
Ruddy turnstone Arenaria interpres
Waterbird assemblage
Liverpool Bay / Bae Lerpwl SPA
Red-throated diver Gavia stellata
Black (common) scoter Melanitta nigra
Little tern Sterna albifrons
Common tern Sterna hirundo
Little gull Larus minutus
Waterbird assemblage
Severn Estuary SPA
Tundra swan Cygnus columbianus bewickii
Dunlin Calidris alpina alpina
Gadwall Anas strepera
Common redshank Tringa totanus
Common shelduck Tadorna tadorna
Greater white-fronted goose Anser albifrons albifrons
Waterbird assemblage
The Dee Estuary SPA
Common redshank Tringa totanus
Red knot Calidris canutus
Common tern Sterna hirundo
Northern pintail Anas acuta
Common redshank Tringa totanus
Dunlin Calidris alpina alpina
Little tern Sterna albifrons
Eurasian teal Anas crecca
Eurasian oystercatcher Haematopus ostralegus
Grey plover Pluvialis squatarola

Common shelduck Tadorna tadorna
Black-tailed godwit Limosa limosa islandica
Sandwich tern Sterna sandvicensis
Eurasian curlew Numenius arquata
Bar-tailed godwit Limosa lapponica
Waterbird assemblage
Traeth Lafan/ Lavan Sands, Conway Bay SPA
Great crested grebe Podiceps cristatus
Eurasian curlew Numenius arquata
Eurasian oystercatcher Haematopus ostralegus
Common redshank Tringa totanus
Red-breasted merganser Mergus serrator
Burry Inlet Ramsar
Crit. 5 - regularly supports 20,000 or more waterbirds
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
Crymlyn Bog Ramsar
Crit. 1 - sites containing representative, rare or unique wetland types
Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity
Severn Estuary Ramsar
Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity
Crit. 5 - regularly supports 20,000 or more waterbirds
Crit. 1 - sites containing representative, rare or unique wetland types
Crit. 4 - supports plant/animal species at a critical stage in their life cycles, or provides refuge
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
Crit. 8 - important source of food for fishes, spawning ground, nursery and/or migration path
The Dee Estuary Ramsar
Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
Crit. 5 - regularly supports 20,000 or more waterbirds
Crit. 1 - sites containing representative, rare or unique wetland types
North Anglesey Marine / Gogledd Môn Forol SAC
Harbour porpoise Phocoena phocoena
West Wales Marine / Gorllewin Cymru Forol SAC
Harbour porpoise Phocoena phocoena

Appendix B
Screening proformas

Appendix C
Standard Avoidance and Best-Practice Measures

Overview

The 'avoidance measures' that may be applied to the options are detailed below, and are grouped as follows:

- General Measures (established construction best-practice, etc.) which will be applied to all options;
- Option-specific Measures (established and reliable measures identified to avoid specific potential effects on European sites, such as in relation to mobile species from the sites).

These measures will be applied unless project-level HRAs or scheme-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

Note that these measures are not exhaustive or exclusive and must be reviewed at the project stage, taking into account any changes in best-practice as well as scheme-specific survey information or studies.

General Measures and Principles

Scheme Design and Planning

All options will be subject to project-level environmental assessment as they are brought forward, 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 working area is available for pollution prevention measures to be installed, such as sediment traps;
- operational designs required to ensure no adverse effects occur (e.g. screening, additional treatment, etc.) – although note that these measures can only be identified through detailed investigation schemes and agreed through the project-level HRA process.

Pollution Prevention

The habitats of European sites are most likely to be affected indirectly, through site-derived pollutants, rather than through direct encroachment. There is a substantial body of general construction good-practice which is likely to be applicable to all of the proposed options 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 industry best-practices in construction that are likely to be relevant to the proposed schemes:

- Environment Agency Pollution Prevention Guidance Notes[37], including:
  - PPG1: General guide to the prevention of pollution (May 2001);
  - PPG5: Works and maintenance in or near water (October 2007);
  - PPG6: Pollution prevention guidance for working at construction and demolition sites (April 2010);
  - PPG21: Pollution incident response planning (March 2009);
  - PPG22: Dealing with spillages on highways (June 2002);
- Environment Agency (2001) Preventing pollution from major pipelines [online]. Available at www.environment-agency.gov.uk/static/documents/Business/pipes.pdf. [Accessed 1 March 2011];
- Venables R. et al. (2000) Environmental Handbook for Building and Civil Engineering Projects. 2nd Edition. Construction Industry Research and Information Association (CIRIA), London.

The best-practice procedures and measures detailed in these documents will be followed for all construction works derived from the 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.

General measures for species

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 the strategic (DP) level. 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). However, the following general measures will be followed 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:

[37] Note, the Environment Agency Pollution Prevention Guidance Notes have been withdrawn by the Government, although the principles within them are sound and form a reasonable basis for pollution prevention measures.

- 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 option 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/NE.
- 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 (notably otters) 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.
- Pipe-caps must be installed overnight to prevent species entering and becoming trapped in any laid pipe-work.

Option-specific measures

No option-specific measures are identified at this stage.