Uisce Éireann
Irish Water

Report: May 2026

# Draft Galway Wastewater Strategy

## Natura Impact Statement

Tionscadal Éireann
Project Ireland
2040

6 CLEAN WATER AND SANITATION

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# 1. Introduction

## 1.1 Introduction

On January 1, 2014, UÉ (previously known as Irish Water) took statutory responsibility for public water services under the Water Services Act (No. 1) 2013. As the national water utility provider, Uisce Éireann (UÉ) is entrusted with delivering safe, reliable water services to households and businesses while ensuring wastewater is collected, treated efficiently, and safely returned to the environment. Its mission extends beyond operational management to include strategic investment in water and wastewater infrastructure to support Ireland's growth and environmental commitments.

## 1.2 Galway Wastewater Strategy

Recognising the importance of a structured approach to wastewater management for the Greater Galway area, UÉ identified the need to develop and deliver a comprehensive drainage strategy for the region. The Greater Galway area encompasses Galway Metropolitan Area (GMA) (Ireland's third largest wastewater agglomeration which includes Claregalway, Oranmore and Bearna) and extends to Athenry and Moycullen. This initiative, titled the Galway Wastewater Strategy (GWS), addresses the region's pressing need for sustainable wastewater management and infrastructure development. Greater Galway is not only a major regional metropolitan hub but is also identified as a key driver of Ireland's economic, environmental, and social development under the National Planning Framework[1] and the Regional Spatial and Economic Strategy (RSES) 2020-2032[2]. These frameworks emphasise the region's role in enabling sustainable progress and fostering long-term resilience.

Since the introduction of the National Spatial Strategy in 2002, Greater Galway has experienced remarkable economic success, fuelling significant population growth and urban expansion, particularly in settlements surrounding Galway City. While Galway City's population has grown in line with the national average over this period (2002-2022) of 1.38% per annum (1.34%), adjacent towns such as Oranmore (6.37%), Clarinbridge (8.63%), and Claregalway (5.47%) have significantly outpaced this rate. Although some of this growth reflects changes to Combined Sewer Overflow (CSO) agglomeration boundaries, the sustained pressure on land and services is clear. The burgeoning demand for serviced land to support housing, commercial growth, and industrial activity underscores the urgency of upgrading and expanding the region's drainage systems.

A holistic drainage assessment for Greater Galway is essential, given the anticipated growth rates for the area and risks from current and emerging legislation to ensure protection of receiving waters. The strategy must also consider the region's environmental challenges, including climate change, which poses additional stress on water resources.

The GWS aims to identify projects that will serve the Greater Galway area through to 2080. Its scope includes a thorough evaluation of potential interactions between existing plans and proposed projects, identification of challenges and disbenefits, and assessment of growth

[1] https://cdn.npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf

[2] https://www.nwra.ie/pdfs/NWRA-RSES-2020-2032.pdf

tolerances. The strategy will also outline actionable recommendations to address these findings, ensuring the delivery of integrated wastewater infrastructure.

The success of the Galway Wastewater Strategy (GWS) depends on adopting a forward-thinking, multidisciplinary approach that aligns with stakeholder priorities. It must accommodate the demands of a growing population, foster economic development, mitigate climate impacts, and adhere to Ireland's statutory obligations. Key regulatory drivers include national and international environmental objectives such as the Water Framework Directive (2000/60/EC) (WFD) and the Recast Urban Wastewater Treatment Directive 2024/3019 (rUWWTD), both of which emphasise sustainable water management practices and ecological protection.

## 1.3 GWS Study Area

The GWS Study Area is shown in Figure 1-1 and includes the Galway Metropolitan Area GMA (including Claregalway, Oranmore and Bearna), Athenry and Moycullen. Additionally, impacts from a number of settlements (i.e. Furbo, Clarinbridge, Kilcolgan and Craughwell) which are not currently served by UÉ assets are included in the GWS Study Area and have been assessed should loadings arrive from these in the future.

The GWS Study Area is covered by three catchments namely Galway Bay North (Environmental Protection Agency (EPA) code 31), Corrib (EPA code 30) and Galway Bay South East (EPA code 29) and includes four UÉ Wastewater Treatment Plants (WWTPs) – namely Mutton Island WWTP (serving Galway City and environs), Athenry WWTP, Moycullen WWTP and Claregalway WWTP. The remaining settlements, such as Clarinbridge, Kilcolgan, Craughwell and Furbo, are not connected to UÉ WWTPs or assets.

Wastewater collection networks in the region include a mix of separate foul and stormwater systems as well as combined sewers, with treatment processes varying by location. This strategy assesses existing infrastructure, identifies deficiencies, and proposes feasible interventions to ensure future capacity and compliance.


**Figure 1-1: Galway Wastewater Strategy Study Area**

## 1.4 Reporting Framework

This report also forms part of a wider framework of technical documentation supporting the development of the overall Galway Wastewater Strategy Report. It should be read in conjunction with several other key supporting assessments and environmental reports (Figure 1-2).


**Figure 1-2: Supporting assessment references and reports.**

Future service needs are addressed through *Appendix 1 - Managing Growth*, incorporating population projections and design loadings. The modelling approach underlying network analysis and strategic climate change drivers is detailed in *Appendix 2 – Our Approach to Modelling* and *Climate Change*. The status and performance of existing infrastructure are detailed in *Appendix 3 - Status and Performance of Wastewater System*, which provide essential baseline data for the optioneering process. Baseline water quality and modelled impacts to water quality are detailed in *Appendix 4 – Impact on Water Quality*. *Appendix 5 –Our Approach to Optioneering and Feasible Option Development* sets out the methodology and structured process used to develop, assess and refine the range of options for wastewater treatment and network interventions. The outcomes of this process directly informed the preferred options presented in *Appendix 5*.

For matters relating to environmental assessment and policy compliance, refer to *Strategic Environmental Assessment* (*SEA) Report* and *SEA Non-Technical Report*. Foundational assessments on biodiversity, ecosystems, and the surrounding environments are included in this *NIS*. The GWS is aligned with similar management frameworks such as National Water Resource Plan (NWRP).

## 1.5 Terminology

For the avoidance of doubt, the following terminology will be used throughout the report:

- The Plan: the works associated with the implementation and operation of GWS; and

- European Sites: Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

## 1.6 Scope of this Report

The EU Habitats Directive 92/43/EEC (the Habitats Directive) and the Birds Directive (Council Directive 2009/147/EC) provide legal protection to habitats and species of European importance. The Habitats Directive protects habitats and species of community interest through establishment and conservation of a network of sites across Europe, which are referred to as the Natura 2000 network (hereafter referred to as European Sites). European Sites comprise SACs and SPAs.

This report provides information in support of Appropriate Assessment (AA) of the GWS in line with the requirements of Article 6(3) of the EU Habitats Directive. It assesses the potential for "Adverse Effects on Site Integrity" (AESI) to arise at European Site(s) within the Zone of Influence of the GWS strategy.

## 1.7 Legislative Context for AA

The Habitats Directive (92/43/EEC) has been transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (S.I. 477/2011) (hereafter referred to as the "Habitats Regulations 2011"). Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European Sites.

Article 6(3) establishes the requirement for AA:

*"Any plan or project not directly connected with or necessary to the management of a European Site, but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

Article 6(4) states:

*"If, in spite of a negative assessment of the implications for the European Site, and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 network is protected. It shall inform the Commission of the compensatory measures adopted."*

Section 177U (1) of the Act states that:

*"A screening for appropriate assessment of a draft Land use plan or application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site."*

Section 177U (4) of the Act states that:

*"The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site."*

Section 177V (1) of the Act states that:

"*An appropriate assessment carried out under this Part shall include a determination by the competent authority under Article 6.3 of the Habitats Directive as to whether or not a draft Land use plan or proposed development would adversely affect the integrity of a European site and an appropriate assessment shall be carried out by the competent authority, in each case where it has made a determination under section 177U(4) that an appropriate assessment is required, before:*

*a) the draft Land use plan is made including, where appropriate, before a decision on appeal in relation to a draft strategic development zone is made, or*

b) *consent is given for the proposed developmen*t."

Section 177V (2) of the Act states that:

"*In carrying out an appropriate assessment under subsection (1) the competent authority shall take into account each of the following matters:*

*a) the Natura impact report or Natura impact statement, as appropriate.*

*b) any supplemental information furnished in relation to any such report or statement.*

*c) if appropriate, any additional information sought by the authority and furnished by the applicant in relation to a Natura impact statement.*

*d) any additional information furnished to the competent authority at its request in relation to a Natura impact report.*

*e) any information or advice obtained by the competent authority.*

*f) if appropriate, any written submissions or observations made to the competent authority in relation to the application for consent for proposed development.*

*g) any other relevant information.*"

Where likely significant effects upon a European Site(s) are anticipated, or cannot be excluded, it is the responsibility of the Competent Authority to undertake an AA under Article 6(3) of the Habitats Directive, informed though a Natura Impact Statement (NIS) to determine whether or not the proposed plan or project would adversely affect the integrity of a European Site in light of its Conservation Objectives (COs).

The duties of public authorities in relation to nature conservation are laid out principally in Article 27 of the Habitats Regulations 2011. UÉ is defined as a 'public authority' for the purposes of the 2011 Regulations.

The first step of the AA process is to carry out a screening to establish whether, in relation to a particular plan or project, there is potential for Likely Significant Effects (LSEs) to any European Site(s). Specifically, Regulation 42(1) states:

*"Subject to Regulation 42A, a Screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site."*

Regulation 42A applies to situations where the Minister for Housing, Local Government and Heritage is the person responsible for making or adopting the relevant plan or project, so is not applicable in respect of the GWS.

Regulation 42(6) states that:

*"The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site."*

In carrying out the full AA, the Habitats Regulations 2011 require UÉ to take into account:

- The NIS.
- Any other plans or projects that may, in combination with the plan or project under consideration, adversely affect the integrity of a European Site.
- Any supplemental information furnished in relation to any such report or statement.
- If appropriate, any additional information furnished in relation to the NIS.
- Any information or advice obtained by UÉ.
- If appropriate, any written submissions or observations made to UÉ in relation to the application for consent for the GWS; and
- Any other relevant information.

Following the AA process, UÉ must then only adopt the GWS after having determined that the GWS shall not adversely affect the integrity of any European Site(s).

## 1.8 Overlap with Strategic Environmental Assessment

A SEA of the GWS is being carried out concurrently with the AA process. SEA is required under the EU Council Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programs on the Environment (the SEA Directive) and is transposed into national legislation via regulations. The purpose of SEA is to enable plan-making authorities to incorporate environmental considerations into decision-making at an early stage and in an integrated way throughout the plan making process. Specifically, SEA aims to:

- Identify, evaluate, and describe the potential significant environmental effects of implementing the GWS.
- Ensure that identified significant effects are communicated, mitigated and that the effectiveness of mitigation is monitored.
- Identify beneficial (and neutral) effects, and to ensure these are communicated; and
- Provide opportunity for stakeholder and public involvement.

There is a degree of overlap between the requirements of the SEA and AA and, in accordance with best practice, an integrated process has been, and will be, carried out between the development of the GWS, the SEA and the AA, such as sharing of baseline data where relevant, cohesive assessment of the potential ecological effects of the GWS on European Sites, their qualifying interests, and clarification on more technical aspects of the GWS. These processes together have informed and shaped the development of the GWS, as illustrated in Figure 1-3.

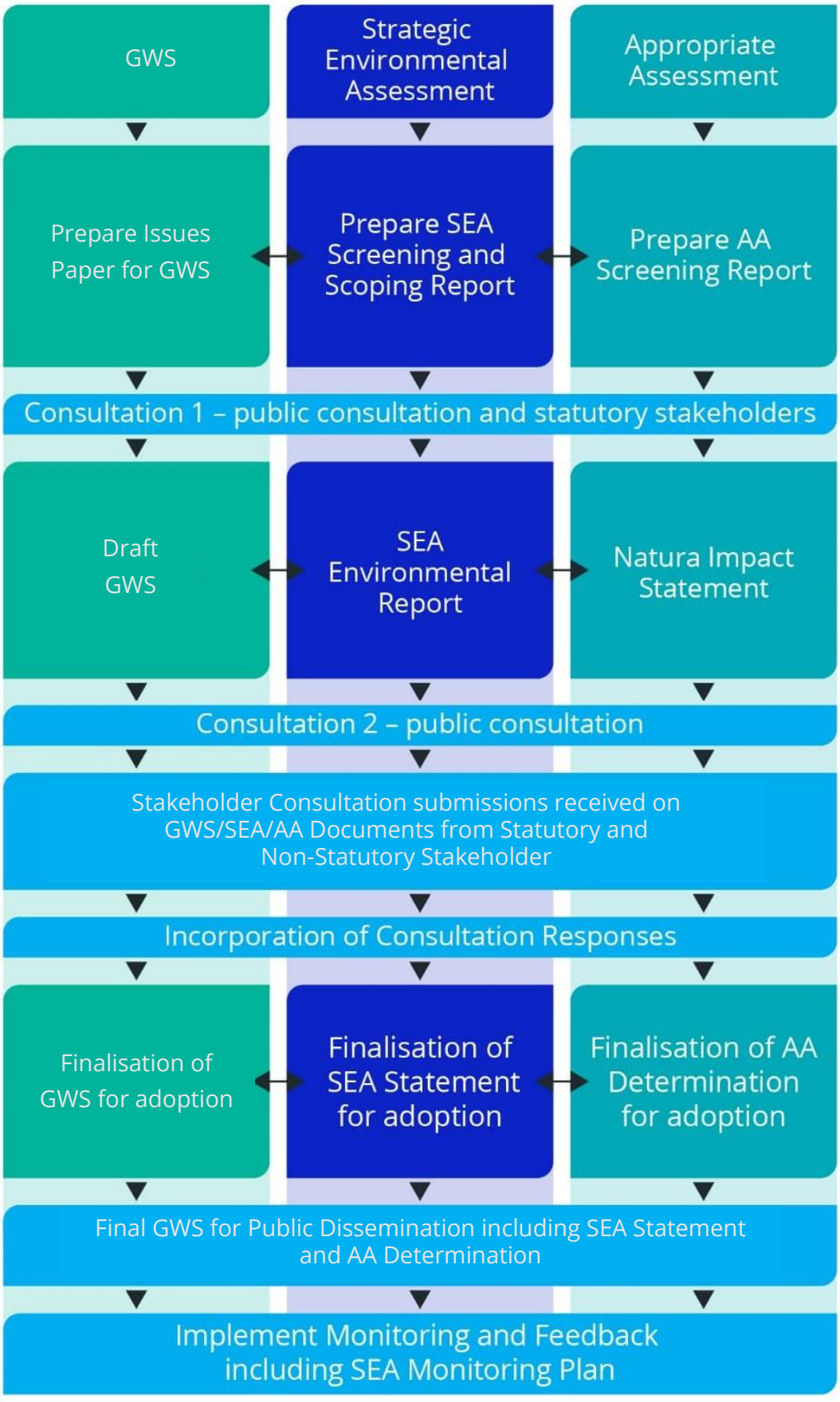


**Figure 1-3. GWS and environmental assessment process**

## 1.9 Consultation

Consultation is a mandatory requirement in the SEA process, and responses often make specific reference to the AA process. The GWS will be developed following two phases of consultation. In line with Article 9 (5) of the SEA Regulations (S.I. 435/2004 as amended by S.I. 200/2011), the first consultation included the SEA Scoping Report and AA Screening Report being issued to the following statutory Environmental Authorities:

- The Environmental Protection Agency (EPA).
- Department of housing, Local Government and Heritage (DHLGH).
- Department of Climate, Energy, and the Environment (DCEE); and
- Department of Agriculture, Food, and the Marine (DAFM).

Feedback received on the AA Screening Report and the SEA Scoping Report was reviewed and considered as the GWS, SEA Environmental Report and NIS herein. Refer to the *Public Consultation 1 Responses* document for details of queries and the responses provided by UÉ.

As part of the second phase of consultation, UÉ will carry out a public consultation on the GWS together with the SEA Environmental Report and NIS in 2026. Feedback received on the NIS and the SEA Report during the second phase of public consultation will be reviewed and considered as the projects arising from the GWS are developed.

## 1.10 Quality Assurance

This NIS was completed, reviewed and authorised by experienced ecologists, who are affiliated with the Chartered Institute of Ecology and Environmental Management (CIEEM).

# 2. Assessment Methodology

## 2.1 Stages of AA

The methodology for undertaking assessment in relation to AA has evolved from European Commission (2001) guidance and Irish guidance from the Office of the Planning Regulator (OPR) (2021). The relevant national guidance is detailed in Section 2.4. The guidance sets out a four-stage approach to AA (as illustrated in Figure 2-1 below). An AA can be carried out for either Plans or Projects, with Plans defined as "all statutory and non-statutory land use, framework and sectoral plans and strategies" and Projects defined as "the execution of construction works or of other installations or schemes – other interventions in the natural surroundings and landscape including those involving the extraction of minerals" (Directive 2011/92/EU). If at any stage in the process it is determined that there will be no implications for the European Site in view of the site's COs, the process is effectively completed.

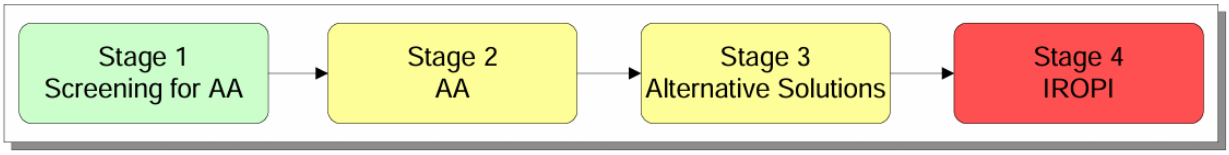


**Figure 2-1. Process of Appropriate Assessment (AA).**

### Stage 1: Screening for AA

The Screening Stage involves the determination of whether the implementation of the Plan is likely to result in a significant effect(s) on any European Site(s) in the absence of mitigation, either alone or in-combination with other plans and projects, considering the site's COs.

In the context of AA Screening, when applying the 'test of significance' the test is of the "likelihood" of effects rather than the "certainty" of effects. In accordance with the Waddenzee Judgement[3], likely effect is one that cannot be ruled out based on objective information and is underpinned by the precautionary principle and the test of beyond reasonable scientific doubt. This test therefore sets a low bar: a plan should be considered 'likely' to have an effect if the competent authority (in this case UÉ) is unable (on the basis of objective information) to exclude the possibility that the plan could, in the absence of mitigation, have significant effects on any European Site, either alone or in-combination with other plans or projects.

### Stage 2: AA

If the screening has determined there are LSEs from the Plan/Project either alone or in combination with other plans and/or projects on the European Site(s), the implication(s) for European Sites are further assessed in the context of the implications for their COs and Adverse Effects on Site Integrity (AESI) analysed. If it is determined on further analysis and data gathering that the plan/project will not adversely affect the integrity of the relevant European Site(s), then the Stage 2 AA can conclude no AESI. However, if there are potential issues identified for the COs

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62002CJ0127&qid=1702581659279

of the European Site(s), then mitigation is required to protect the site's COs. The AESI analysis is re-run and considers the structure and function of European Sites, their COs, and effects from the project/plan both alone and in-combination with other projects or plans. Where AESI are identified, mitigation measures are proposed as required to avoid adverse effects on the integrity and COs of the European Site(s). The information and data to inform the AA process is documented within a NIS. This is provided to the competent authority to facilitate their AA determination of the plan or project.

### Stage 3: Alternative Solutions

Following AA, including mitigation proposals, if AESI remain, or uncertainty remains and the project/plan is to be progressed, an Assessment of Alternative Solutions is required under the provisions of Article 6(4) of the Habitats Directive. This process examines the Alternative Solutions or options that could allow the Plan or Project to be carried out without adverse effects on any European Site(s). This process will return the assessment to Stage 2 to carry out AA of the Alternative Solutions. If it is demonstrated that all reasonable alternatives have been considered and adverse impacts to a European Site are still expected, the process must proceed to the next stage, or the project is abandoned.

### Stage 4: Imperative Reasons of Overriding Public Interest (IROPI) / Derogation

In the unlikely event where an Assessment of Alternative Solutions fails to identify any suitable alternatives, then for a project or plan to be progressed it must meet the requirements of Imperative Reasons of Overriding Public Interest (IROPI). In this case the provisions of Article 6(3) cannot be met and therefore, the provisions of Article 6(4) are used. If in the light of an assessment of IROPI, it is deemed that the project or plan should proceed, thus compensatory measures are implemented to maintain the coherence of European site network in the face of adverse effects to the integrity of the site(s).

## 2.2 Approach to AA of GWS

The approach to this AA Screening and NIS considered the strategic nature of the GWS and used objective information to determine whether the GWS may have LSEs for European Sites in the manner outlined in Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland (Court of Justice of the European Union, Case C-6/04, Opinion of Advocate General Kokott)[4] and Waddenzee (Court of Justice of the European Union, C-127/02).

## 2.3 Compliance of the GWS development process with the Habitats Directive

The GWS identifies needs in terms of quantity, quality, and reliability, and develops a methodology (Option Assessment Methodology) to develop interventions to address this need. The NIS for the GWS has assessed the GWS and specifically options that are likely to arise from the GWS. The GWS

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62004CC0006

identifies option types that could be applied across the GMA. The NIS for the GWS therefore assesses the potential impacts on European Sites of the GWS at a regional scale within the GMA.

Applying the above approach demonstrates that the development of the GWS is compliant with the requirements of the Habitats Regulations 2011.

## 2.4 Guidance documents in relation to AA

The requirements of Article 6 of the Habitats Directive for the GWS have been applied following the guidance documents:

- AA Screening for Development Management. OPR Practice Note PN01. (OPR, 2021).
- AA of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010).
- Assessment of Plans and Projects in Relation to Natura 2000 Sites – Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2021).
- Communication from the Commission on the Precautionary Principle (European Commission, 2000).
- Marine Natura Impacts Statements in Irish Special Areas of Conservation. A Working Document (Department of Arts, Heritage and the Gaeltacht, 2012); and
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, 2018).

The following circulars have also been used:

- AA under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 and PSSP 2/10 (Department of Environment, Heritage and Local Government, 2010).
- AA of Land Use Plans. Circular Letter SEA 1/08 & NPWS 1/08 (Department of Environment, Heritage and Local Government, 2008a).
- Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites. Circular Letter PD 2/07 and NPWS 1/07 (Department of Environment, Heritage and Local Government, 2007).
- Guidance on Compliance with Regulation 23 of the Habitats Directive. Circular Letter NPWS 2/07 (Department of Environment, Heritage and Local Government, 2007); and
- Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Circular L8/08 (Department of Environment, Heritage and Local Government, 2008b).

## 2.5 Guiding Principles and Case Law

A number of cases have been brought to both the national and European courts in relation to the AA process. OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021) and Department of Environment, Heritage and Local Government (DEHLG) Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG, 2010) form the basis for this AA. In addition, relevant case law, ECJ rulings, and EC publications have also been considered in the preparation of the AA for the GWS.

## 2.6 Consideration of the protection of European Sites

There is some overlap with the Birds Directive (2009/147/EC), the Habitats Directive (92/43/EEC), and the WFD in relation to the protection of water-dependent habitats and species. Under the WFD, areas are designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant European Sites. The linkages between the Birds and Habitats Directives and the WFD were discussed in a document published by the European Commission (2011) which states:

*"Any Natura 2000 site with water-dependent (ground- and/or surface water) Annex I habitat types or Annex II species under the Habitats Directive or with water-dependent bird species of Annex I or migratory bird species of the Birds Directive, and, where the presence of these species or habitats has been the reason for the designation of that protected area, has to be considered for the register of protected areas under WFD Art. 6. These areas are summarised as "water-dependent Natura 2000 sites". For these Natura 2000 sites, the objectives of the Birds and Habitats Directives and WFD apply".*

Therefore, WFD waterbody status has been considered when compiling and assessing options that will involve WFD waterbodies, such as outfalls. As many of the European designated sites in Ireland are water-dependent, they may potentially be impacted by some options and therefore have also been considered in the optioneering process.

## 2.7 Re-screening of European Sites

As outlined in Section 1.7, an initial AA screening was undertaken and is presented in Appendix A. This AA screening was carried out while the full scope of the Draft GWS was in development. As the Draft GWS evolved and further detail became available, European Sites and their qualifying interests were re-screened to confirm that the conclusions of the original AA screening remained robust throughout the primary and agglomeration-level screening stages and into the identification of the GWS. This updated screening also ensured that any additional European Sites with potential impact pathways were captured, while sites with no plausible pathways for effects were removed.

# 3. Galway Wastewater Strategy

## 3.1 Background and overview

From now until 2080 the region faces three key challenges – accommodating regional growth, maintaining compliance with national and EU legislation with the impacts of climate change, and protecting the environment. The optioneering assessment sought to identify necessary interventions to address performance shortfalls and mitigate principal risks at key time horizons (2040, 2055, 2080).

The four UÉ wastewater agglomerations included as part of the GWS Study Area encompass six UÉ wastewater collection networks. These four agglomerations are Galway City (Mutton Island), Athenry, Claregalway and Moycullen. The GWS Study Area contains over 50 known UÉ and private Wastewater Pumping Stations (WWPSs) to convey flows for treatment at the relevant WWTPs. The process considers interventions across all four agglomerations, both within the networks and at the wastewater treatment plants (WWTPs), to evaluate potential synergies when examining options.

The optioneering process seeks to identify optimal environmental interventions that deliver the greatest overall benefit at the lowest whole-life cost. Achieving this requires careful consideration of both environmental performance and cost-efficiency to develop sustainable and practical outcomes. The optioneering process followed good practice guidelines, starting with a long list of generic interventions, and gradually excluding options which were technically non-viable or otherwise deemed unsuitable to address the need. A themed Total Expenditure (TOTEX) hierarchy system was used to consider options, both strategically and at an agglomeration level.

The appraisal of options is inherently complex, addressing a wide range of interrelated challenges. These include environmental capacity in receiving waters, process and flow capacity at treatment plants, the potential siting of treatment facilities and outfalls, regional sludge management strategies, alignment of pipeline routes, connections for new housing and commercial developments, hydraulic performance, risks of flooding and pollution from CSOs, impact on communities during the construction and operation of new infrastructure, social impacts and benefits, and cultural and built heritage impacts. Each issue may present multiple alternative interventions, all of which must be evaluated based on whole-life cost considerations (both Capital Expenditure (CAPEX) and Operational Expenditure (OPEX)), energy efficiency, and carbon emissions.

A critical element of the optioneering and feasible option development process is its evidence-based and transparent methodology. The selection of options is informed by stakeholder priorities and ensures clarity in the rationale behind the adoption or rejection of specific approaches and technologies. *Appendix 5 – Our Approach to Optioneering & Feasible Option Development* documents and justifies the methodology used in identifying the feasible strategies.

## 3.2 Legislative Context and Compliance

A key objective of the Galway Wastewater Strategy is to develop a sustainable wastewater strategy which delivers compliance with the WFD, SEA Directive, Habitats Directive, and the rUWWTD

regulations, with due consideration to changes implemented in the rUWWTD regulations, and the wastewater discharge regulations. The objective of these regulations is to protect our natural watercourses and meet national and international standards.

At a strategic level, the intervention of reviewing our discharge permits to modify the consents and the option of considering flexible permitting has been discounted. These options do not resolve the underlying issues and therefore do not support the delivery of a strategy which protects our environment. With the introduction of tighter future regulatory standards, it is also considered that this approach does not offer future resilience and risks deferring the investment need into a later period, and that it is unlikely to be supported by regulators or stakeholders.

In addition to tighter discharge allowances, the rUWWTD introduces new treatment standards for different size treatment works. Tertiary treatment will be mandatory for agglomerations over 150,000 Population Equivalents (PE) by 2039 and over 10,000 PE, discharging to sensitive areas, by 2045. Quaternary treatment, targeting micropollutants like pharmaceuticals and Per- and poly-fluoroalkyl substances (PFAs), will be required for agglomerations over 150,000 PE (and conditionally over 10,000 PE by risk assessment) by 2045. The intervention of sustainable treatment streams to deal with emerging legislative targets was discounted from the optioneering process as it was considered unlikely to deliver the outcomes needed at the scale required.

## 3.3 Optioneering Process

In accordance with good practice, the process started with an unconstrained long list of interventions developed with stakeholders and subject matter experts. The long list was subsequently assessed against the strategic needs of the Greater Galway Area and the needs of each agglomeration to produce a feasible list of options.

The strategic options were then further assessed using Multi-Criteria Decision Analysis (MCDA), a tool designed to comparatively assess qualitative measures. This was carried out with stakeholders, to facilitate a discussion which considered a wide range of issues and ensure that the preferred options deliver the greatest benefit to the region. From the MCDA, the highest-ranking options for optimisation and integration with the network interventions were taken forward. The high-level optioneering process is set out in *Appendix 5 – Our Approach to Optioneering & Feasible Option Development* and forms the basis of the development of the GWS.

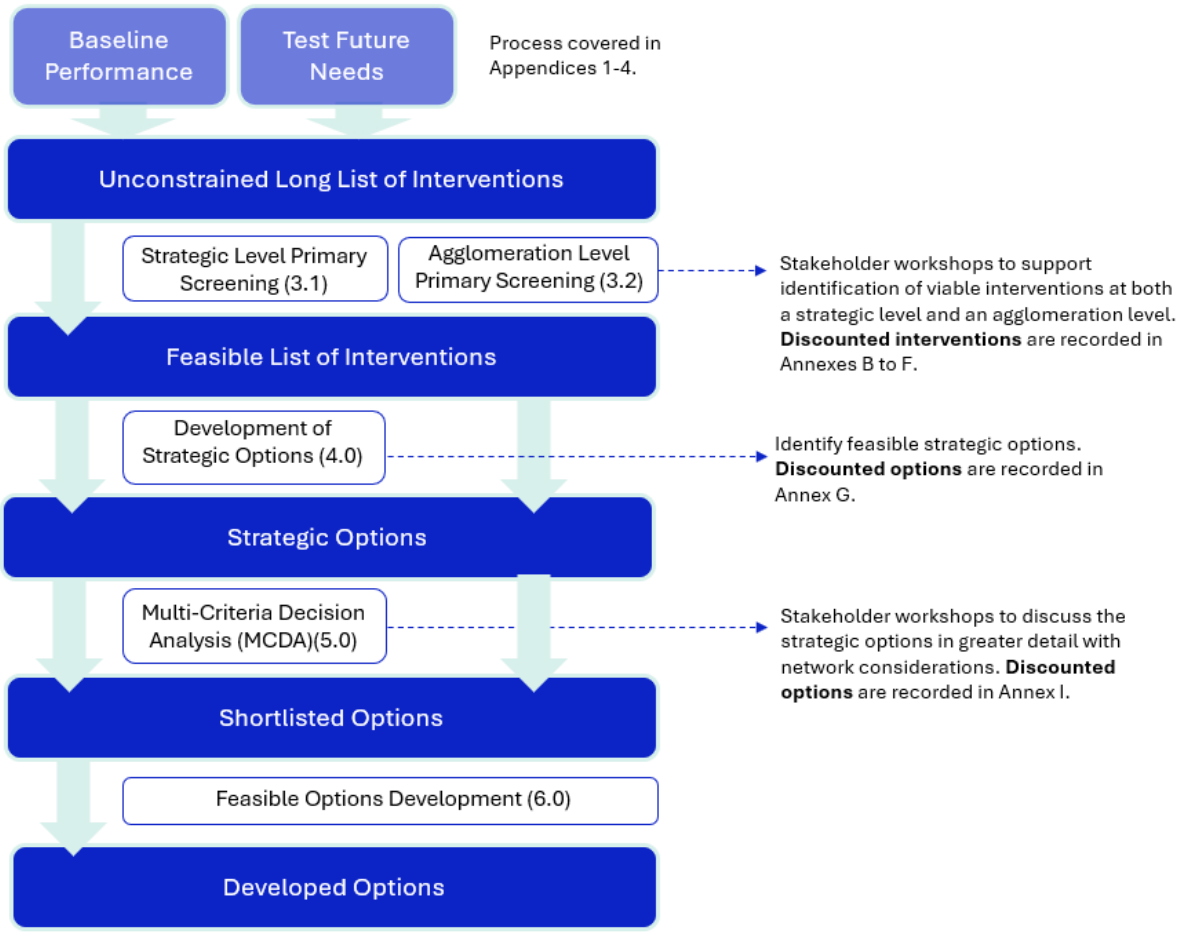


**Figure 3-1: The optioneering process adopted. The relevant sections in the report are referenced for each step.**

## 3.4 Strategic Option Development

For the GWS Study Area, growth emerged as the most significant risk. Analysis revealed that current capacity across the region was insufficient to support the anticipated economic and population growth. The expansion of existing WWTPs was not viable, due to both site limitations and the environmental impact of increased loadings on local waterbodies. A key decision for the strategy was the need to develop a new WWTP within the region.

From the regional distribution of projected growth scenarios three strategic areas were identified which offer scope for the development of a new WWTP. The three strategic areas include a western regional WWTP, a northern regional WWTP or an eastern regional WWTP (Figure 3-2). Determining the precise location of a proposed WWTP is not required at this stage; a detailed site selection process will be undertaken following the completion of the GWS. Instead, indicative locations were considered sufficient to support strategic scenario testing. These options are taken forward for further consideration within the Appendix 5 – Our Approach to Optioneering & Feasible Option

Development.

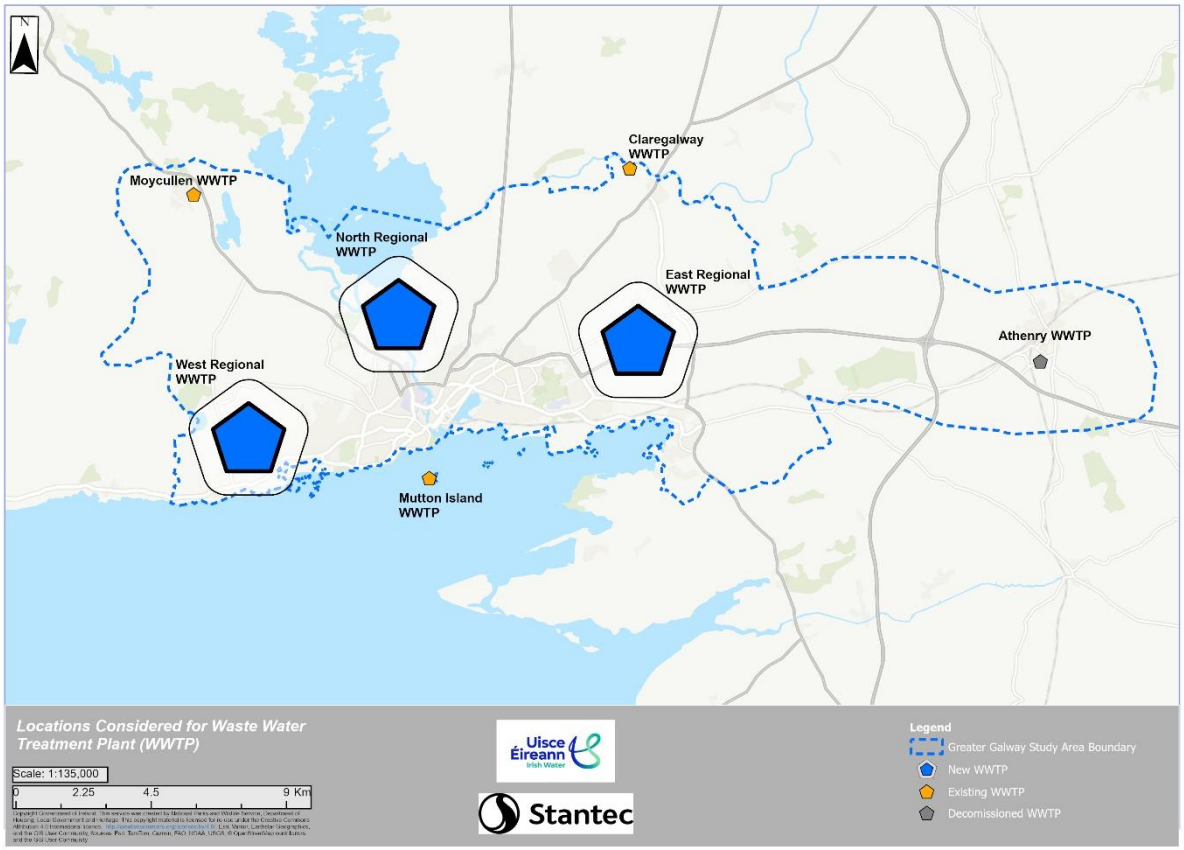


**Figure 3-2: Possible locations for a new regional WWTP**

Each regional WWTP was considered with the three identified indicative discharge locations to form a matrix of three agglomerations and three outfall variations, resulting in nine strategic options. Three of nine strategic scenarios, which included the development of a new WWTP, then underwent MCDA to identify the most beneficial options.

### 3.4.1. Western Regional WWTP (Options 1-3)

The proposed regional strategy centres on the comprehensive redirection of wastewater flows toward the west of Galway City. This strategic shift involves the consolidation of loads from key infrastructure hubs, specifically Athenry, Oranmore, and Galway City East. To facilitate this, significant mechanical upgrades are required: the existing Athenry WWTP will be decommissioned and converted into a terminal pumping station to manage flows from Athenry Village, the Athenry Industrial Development Authority (IDA), and the currently un-serviced area of Craughwell. Similarly, the existing pumping stations at Oranmore and Galway City West must undergo capacity upgrades to ensure they can adequately handle the increased incoming loads.

Under the new configuration, industrial and local flows will be strategically segregated to optimise processing. The Parkmore IDA will transfer directly into the Galway City East collection system, which, along with the Galway City East terminal pumping station, will bypass traditional routes to pump directly to the new western regional WWTP. While Galway City West flows will continue to be treated at the Mutton Island facility, outlying areas such as Bearna will be redirected to the new

regional plant. Additionally, a new rising main will be installed to transfer loads from Furbo to the same facility.

For the remaining regional catchments, Moycullen and Claregalway will maintain decentralised treatment, with loads continuing to be processed within their respective existing WWTPs. To support the expanded network, three strategic outfall points have been identified. These will be positioned west of Galway Bay (situated between Furbo and Bearna), into the River Corrib, and east of Galway Bay, specifically south of Roscam Point. For a visual representation of these connections and the location of key strategic infrastructure, please refer to Figure 3-3.

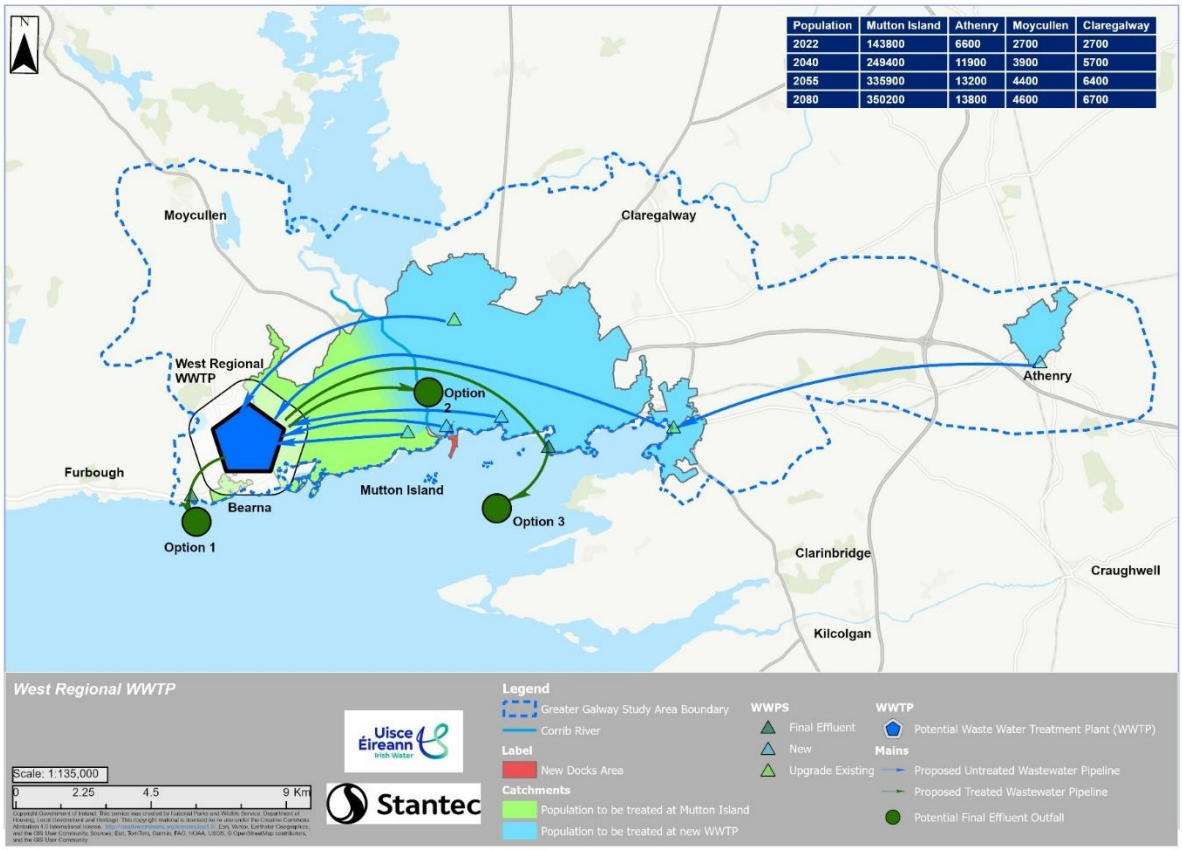


**Figure 3-3: Western regional WWTP**

## 3.4.2. Northern Regional WWTP (Options 4-6)

The proposed strategy centres on the consolidation and redirection of wastewater flows to the north of Galway City, incorporating key infrastructure from Athenry, Oranmore, and Galway City East. To facilitate this, significant mechanical and structural upgrades are required. The existing Athenry WWTP will be decommissioned and converted into a terminal pumping station. This new facility will collect flows from Athenry village, the Athenry IDA, and the currently un-serviced area of Craughwell, transferring the combined load directly to a new Regional WWTP.

Similarly, the existing wastewater pumping station (WWPS) at Oranmore will be upgraded to act as a primary hub for the eastern corridor. This station will manage loads from Oranmore village and the Oranmore IDA, while also enabling the collection of flows from the previously un-serviced areas of Clarinbridge and Kilcolgan. These combined loads will then be transferred from the

Oranmore WWPS to the new Regional WWTP. To complete this northern diversion, the Parkmore IDA and the Galway City East collection systems will be reconfigured to pump directly to the regional facility, necessitating a capacity upgrade at the Galway City East terminal pump station.

In contrast, the treatment strategy for the western corridors will continue to utilise the Mutton Island WWTP. Galway City West and Bearna will maintain their current flow paths toward Mutton Island. To expand service in this area, a new rising main will be installed to transfer loads from Furbo into the Galway City West network, where they will be treated at the Mutton Island facility.

Independent of the primary regional network, the catchments of Moycullen and Claregalway will retain their localised treatment systems, with loads processed within their respective existing plants. To support the integrated network, three strategic outfall locations have been identified: one to the west of Galway Bay (situated between Furbo and Bearna), one into the River Corrib, and a third to the east of Galway Bay, located south of Roscam Point. For a visual representation of these connections and the location of key strategic infrastructure, please refer to Figure 3-4.

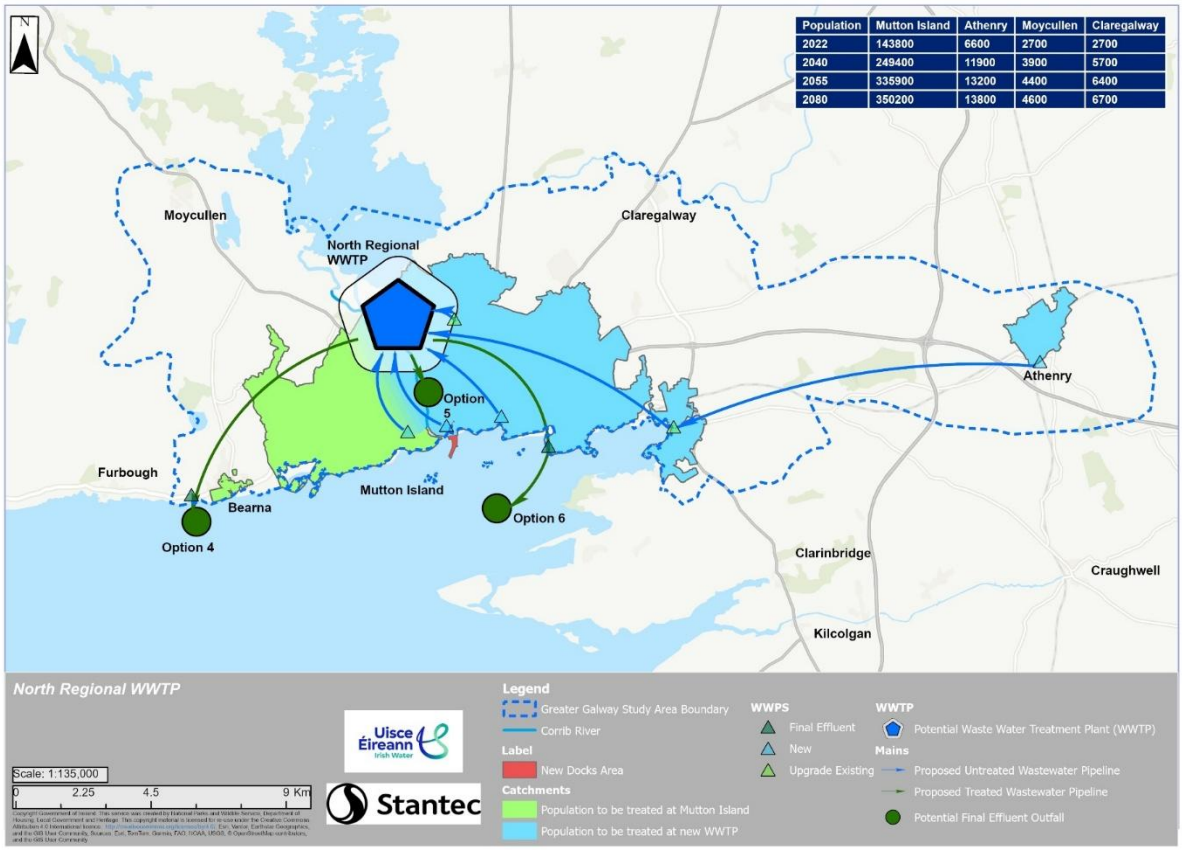


**Figure 3-4: Northern regional WWTP.**

### 3.4.3. Eastern Regional WWTP (Options 7-9)

The proposed strategy focuses on the consolidation and redirection of wastewater flows to the east of Galway City, incorporating key infrastructure from Athenry, Oranmore, and Galway City East. To facilitate this regional transfer, several critical infrastructure upgrades are required. The existing Athenry WWTP will be decommissioned and converted into a new terminal pumping

station. This facility will collect flows from Athenry village, the Athenry IDA, and the currently un-serviced area of Craughwell, transferring the combined load directly to a new Regional WWTP.

Similarly, the eastern corridor will be reinforced through the upgrade of the existing wastewater pumping station at Oranmore. This station will serve as a primary collection hub for Oranmore village and the Oranmore IDA, while also enabling the integration of flows from the un-serviced areas of Clarinbridge and Kilcolgan. These combined loads will then be transferred from the Oranmore WWPS to the new Regional WWTP. To complete this eastern diversion, both the Parkmore IDA and the Galway City East collection systems will be reconfigured to pump directly to the regional facility, necessitating a capacity upgrade at the Galway City East terminal pump station to ensure adequate transfer volumes.

In contrast, the treatment strategy for the western catchments remains centred on the Mutton Island WWTP. Galway City West and Bearna will maintain their current flow paths toward Mutton Island. To expand the reach of this system, a new rising main will be installed to transfer loads from Furbo into the Galway City West network, where they will be treated at the Mutton Island facility.

Finally, the outlying catchments of Moycullen and Claregalway will continue to operate as independent systems, with wastewater treated within their respective existing plants. To support the integrated regional network, three strategic outfall locations have been identified: one to the west of Galway Bay (positioned between Furbo and Bearna), one into the River Corrib, and a third to the east of Galway Bay, situated south of Roscam Point (Figure 3-5).

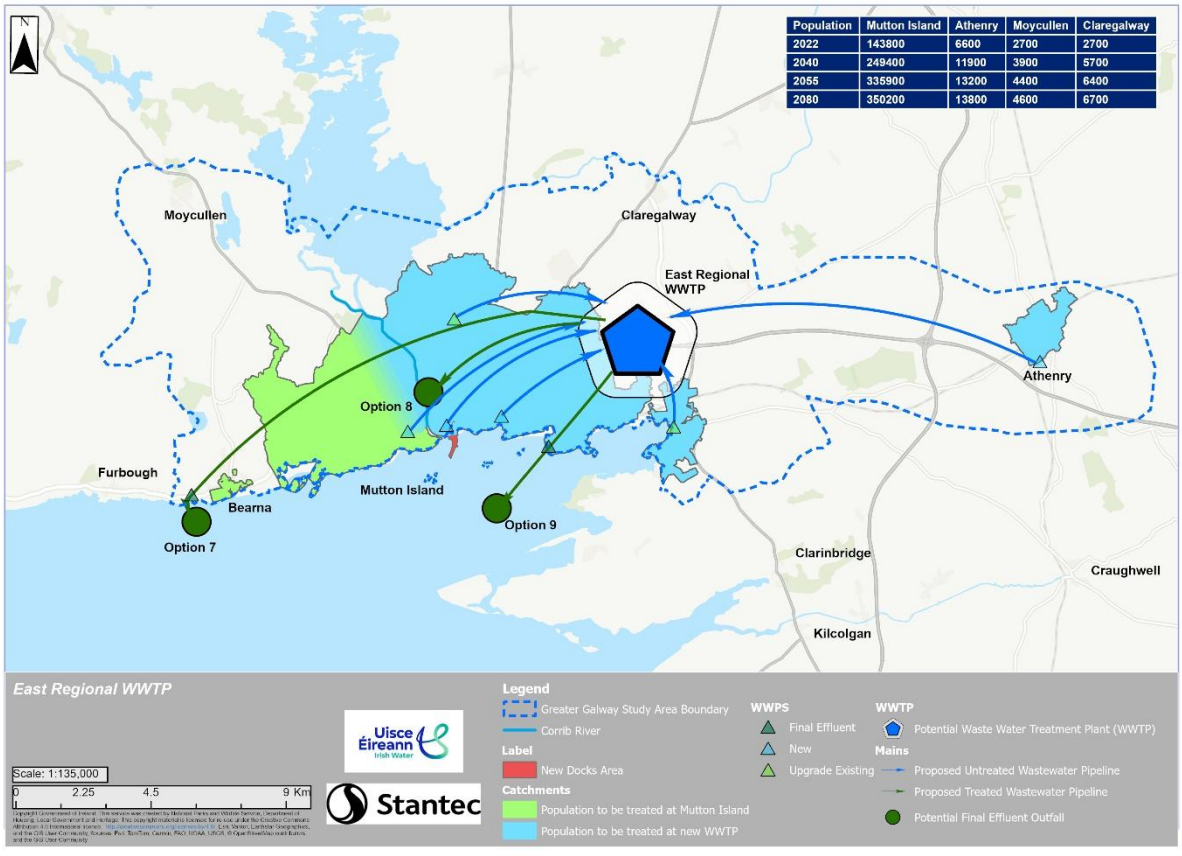


**Figure 3-5: Eastern regional WWTP.**

## 3.5 Outfall Considerations and Water Quality Modelling

A key requirement in the selection of any WWTP location is the identification of a suitable discharge point for treated effluent, along with an understanding of the treatment standards that may apply, as detailed under the rUWWTD. These standards inform the level and type of treatment required to ensure environmental compliance and the protection of receiving waters. For a WWTP of this scale, tertiary and quaternary treatment will be required by 2045.

In identifying appropriate WWTP locations, a balance must be achieved between the cost, time, and technical feasibility of conveying untreated wastewater to the treatment facility and subsequently discharging treated effluent to receiving waters without causing adverse environmental impact.

For the GWS Study Area, both marine outfalls to the coastal environment and freshwater outfalls (rivers and lakes) were considered, as illustrated in Figure 3-6. Modelling was used to inform the suitability of potential discharge locations and their potential environmental performance (as detailed in *Appendix* 4 – *Impact on Water Quality*).

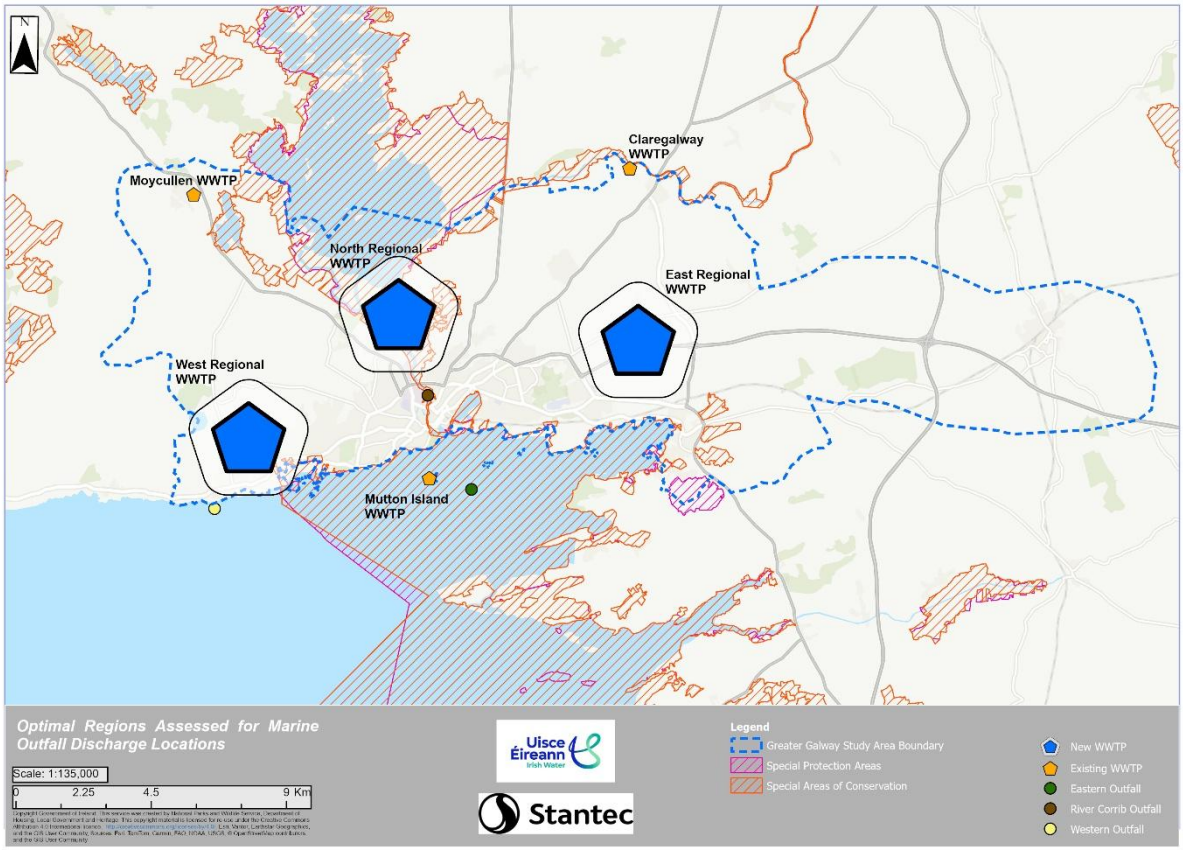


**Figure 3-6: Optimal regions assessed for marine outfall discharge locations.**

### 3.5.1. Marine Outfalls

The strategic screening of marine outfalls focused on their potential to minimise aesthetic and ecological impacts through effective initial dilution at the point discharge. A coarse-resolution oceanographic model was employed to understand these impacts and to support decision-making

during the optioneering process. This modelling helped inform the suitability of potential discharge locations and their potential environmental performance.

At this strategic level, the evaluation of marine outfalls considered the optimal outfall length and placement within broad zones to the east and west of GWS Study Area, both within and outside of European Sites. These zones were identified to support the MCDA process by enabling a high-level understanding of regional feasibility.

Key evaluation criteria Included:

- Dilution performance, specifically compliance with Initial Dilution (ID) guidance
- Discharge depth, outfall length, and marine diffuser design.
- Buildability and engineering complexity, including coastal and seabed conditions.
- Capital and operational cost considerations; and
- Regulatory and environmental constraints, including protected Annex I habitats Annex II species (and the habitats on which they may rely).

Following strategic screening, two potential locations were taken forward for consideration - one east and one west.

### 3.5.2. Freshwater Outfalls

Due to the unique hydrogeological and environmental characteristics of the waterbodies within the GWS Study Area, many rivers exhibit limited assimilative capacity to receive effluent from the large WWTPs required to treat the GWS Study Area up to 2080. Three surface waters within the study area were identified as having notable flow volumes with the possibility to accommodate treated effluent (Figure 3-7). These surface waters included:

- River Corrib.
- River Clare; and
- Lough Corrib.

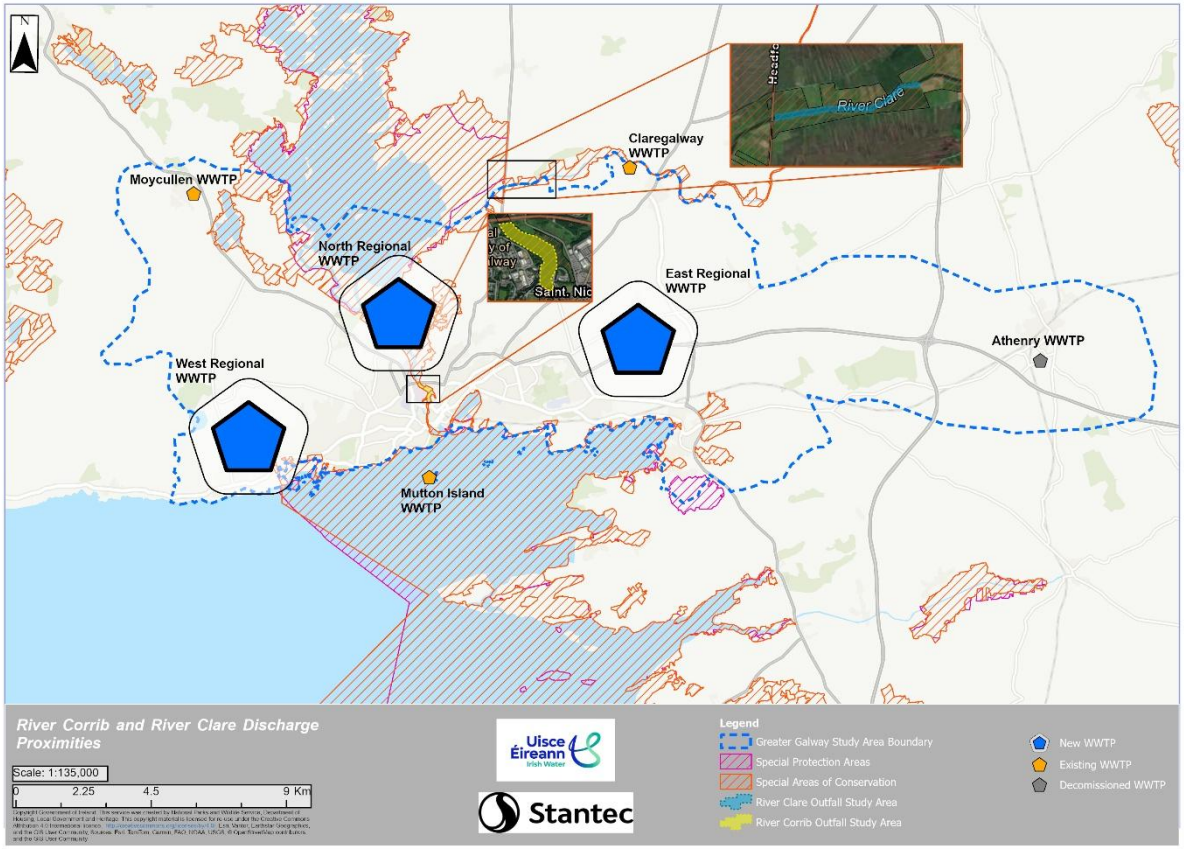


**Figure 3-7: Surface waterbodies assessed for freshwater outfalls.**

These surface waters were assessed and screened as new potential discharge locations for a new regional WWTPs. The strategic screening of freshwater outfalls focused on the feasibility of maintaining compliance with regulatory standards, environmental risks, and long-term resilience. Only the River Corrib was identified as a feasible freshwater outfall.

## 3.6 Network Interventions

Selection of an appropriate location for the WWTP must strike a balance between the requirements for pumping both untreated sewage to the WWTP and discharge of treated effluent to the marine outfall. Extensive conveyancing infrastructure will be needed throughout the GWS Study Area. Implementation of the GWS will prioritise energy efficiency, net zero and energy neutrality targets within the rUWWTD to optimise pipe routes and exploit gravity flow where technically feasible. This should be explored at the individual project feasibility stage and selection of the preferred marine outfall option.

Proposed network interventions are agglomeration-specific to ensure that each intervention is effective in mitigating environmental and performance risks within that area. Existing models, incorporating projected impacts from growth and climate change, have enabled determination of the underlying causes of network challenges and select optimal interventions. These measures are incorporated into the process of recommending options for the wastewater treatment plant, resulting in holistic recommendations derived from the GWS at a system-scale.

Public consultation input will play a key role in shaping these decisions. To that end, the public consultation process associated with the GWS, specifically seeks feedback on these issues in helping to determine the design and planning of these systems in the next stages (as outlined in Section 3.9 below).

Future legislation relating to higher quality wastewater treatment may reduce the volume of wastewater that can be treated at Mutton Island WWTP. In this scenario, to accommodate future growth in the west of the city, a portion of untreated raw effluent would need to be transported across the Corrib River to either the East WWTP or North WWTP.

## 3.7 Optioneering Summary

Two options were shortlisted and taken forward for optimisation alongside proposed network improvements – Options 7 and 9 (as detailed in Sections 3.7.1 and 3.7.2), with Option 9 ranking highest on the MCDA. Both proposed outfall options are deemed feasible, as detailed in the comparative assessment above; however, each presents constraints that must be addressed during the implementation of the GWS. While both options entail certain challenges, the necessity for a new WWTP and corresponding outfall is evident, given the requirement to support anticipated growth in the study area over the medium term.

Further detail relating to the assessment of alternatives options is presented in the *SEA Environmental Report*. Further technical details on each of the options brought forward within the GWS are provided in *Appendix 5 – Our Approach to Optioneering & Feasible Option Development Report*.

### 3.7.1. Option 9 - Eastern Outfall

Option 9 requires the construction of a new marine outfall extending considerable distance into the Inner Galway Bay coastal waterbodies. The transfer of final effluent from the WWTP to the coastline is subject to further appraisal and is depicted for illustrative purposes only, as is the proposed alignment of the marine outfall. The diffuser heads are positioned illustratively; however, since the water column here is shallow, meeting initial dilution requirements would require an outfall length of about 3,500m from Roscam Point. The location of the diffuser heads is within the Inner Galway Bay SPA and Complex SAC. As such, detailed environmental assessments, construction techniques, and route optimisation strategies will be needed to avoid or mitigate for disturbance and directly intersecting any habitats as part of the GWS mitigation.

Wastewater at the WWTP would be treated to a standard that ensures minimal impacts on water quality. The size of the site (>150,000 PE) will require quaternary treatment by 2045 under the rUWWTD, and as such the effluent will be highly treated to stringent regulatory standards. Given the discharge location and effluent quality, direct impacts on public health at designated recreational or bathing waters within the area, as well as marine habitats, are considered unlikely. However, in the absence of a dispersion model at the time of strategy formulation, this assessment should be substantiated through comprehensive, detailed modelling studies.

### 3.7.2. Option 7 – Western Outfall

Option 7 involves the construction of a final effluent pipeline that spans the entire breadth of the city from the WWTP in the east to the proposed western discharge point. The discharge point is located within the Outer Galway Bay coastal water body, along the land-to-coast boundary between Bearna and Furbo. This placement is considered optimal, as it facilitates greater dilution by accessing deeper waters approximately 600 meters from the shoreline. Compared to the eastern outfall, this location offers distinct advantages regarding overall life-cycle costs and carbon footprint. Construction is also likely to be simpler, but this requires confirmation through further surveys and appraisal. Additionally, the diffuser heads are situated outside the Inner Galway Bay SPA and Galway Bay Complex SAC. Nonetheless, given the lack of a dispersion model during the strategy's development, thorough and detailed modelling studies are necessary to confirm that no adverse impacts extend into protected areas.

The construction of a final effluent pipeline that spans the GWS Study Area would be subject to further appraisal and thorough site and route selection processes and will require optimisation to ensure that no protected habitats are disturbed within the Lough Corrib SAC and require consideration as part of our mitigation strategy.

Wastewater at the WWTP would be treated to a standard that ensures minimal impacts on water quality. The size of the site (>150,000 PE) will require quaternary treatment by 2045 under the rUWWTD, and as such the effluent will be highly treated to stringent regulatory standards. Given the discharge location and effluent quality, direct impacts on public health at designated recreational or bathing waters within the area, as well as Annex I habitats, are considered unlikely. However, in the absence of a dispersion model at the time of strategy formulation, this assessment should be substantiated through comprehensive, detailed modelling studies.

## 3.8 Stakeholder engagement

UÉ views stakeholder collaboration as essential to the success of the GWS, recognising that working together can deliver broader benefits beyond just wastewater system improvements. Wastewater drainage systems are fundamentally complex, with numerous known and unknown interactions. While UÉ is responsible for delivering the GWS, active participation from the public and key stakeholders is crucial to its development and long-term success.

Throughout the development of the GWS, UÉ has engaged with key stakeholders, including Local Planning Authorities, the Health Service Executive (HSE), the EPA and various other government departments. Stakeholder insights, as documented in the Stakeholder Register and detailed in *Consultation 1 Responses*, have been instrumental in shaping the strategy. Regular engagement through meetings, technical workshops, and feedback sessions has allowed UÉ to incorporate stakeholder priorities into decision-making.

Looking ahead, it is vital that the GWS continues to explore opportunities for collaboration with stakeholders and customers. UÉ will work closely with other authorities to foster and develop partnership opportunities. Joint initiatives with local authorities, public sector bodies, and other stakeholders will be key to implementing measures such as rainwater harvesting and Sustainable Drainage Systems (SuDS), which can improve overall system efficiency. These efforts will also help

mitigate fluvial flooding risks, where public sewerage systems may become inundated, and enable integrated nature-based solutions for improved surface water management, delivering multiple flood risk benefits.

## 3.9 Public consultation

Public consultation is a key element in ensuring stakeholders and members of the public have an opportunity to contribute to the development of plans and projects in Ireland. UÉ is undertaking an accessible, meaningful, and accountable consultation and engagement process with stakeholders and members of the public throughout the development of the draft GWS.

The consultation approach involves two key stages in the development of the draft GWS, as follows:

- Public Consultation 1 – an eight-week non-statutory public consultation period seeking feedback on the SEA Scoping Report and AA Screening Report for the GWS to determine the scope and level of detail of information to be included in the environmental reports.
- Public Consultation 2 – an eight-week statutory public consultation seeking feedback on the draft GWS and associated SEA Environmental Report and NIS.

This approach recognises that UÉ will be engaging with stakeholders throughout the process and allows the opportunity for stakeholders to contribute to the draft GWS, and outlines to stakeholders how they can influence the GWS. It ensures continuous communication and engagement with environmental authorities, interested parties and the general public as the plan progresses. It also provides an opportunity to communicate the purpose and relevance of the draft GWS, how it is being developed, and outlines how and when they can contribute to the GWS.

To ensure transparency and continuity in engagement, UÉ maintains a stakeholder register, tracking interactions and responses throughout the GWS lifecycle. As the strategy transitions into its implementation phase, sustained collaboration will be essential. UÉ will continue engaging stakeholders through advisory groups, technical working groups, and public consultation updates, ensuring that stakeholder feedback remains at the core of decision-making.

By maintaining an open dialogue and incorporating insights from a diverse range of stakeholders, UÉ aims to deliver a wastewater strategy that not only supports Galway's long-term growth but also enhances environmental protection and public health.

## 3.10 GWS and the environmental assessments

In the GWS, UÉ have presented the following information:

- Developed a sustainable wastewater drainage strategy for the GWS Study Area consistent with the WFD and Urban Wastewater (Nutrient-Sensitive Areas) Regulations S.I. 403/2025.
    - Outlined the requirements for wastewater drainage and treatment capable of meeting the demands of the Study Area in the context of current Development Plans, the National Planning Framework, the RSES 2020 and longer-term development potential of the area up to 2080.

- Identified of alternative interventions for effective management of wastewater to protect and enhance the environment, support social and economic growth aligning with UÉ Water Services Strategic Plan 2050 (WSSP) (UÉ, 2050) and the DHLGH Water Services Policy Statement (WSPS) (DHLGH, 2024).
- Evaluated alternative interventions and identified the optimum wastewater drainage interventions having regard to whole-life cost and environmental performance.
- Identified individual projects for implementing the recommendations of the GWS, together with the prioritisation of such implementation projects.
- Developed an adaptable strategy where outcomes are expected to be linked to volatile influences like climate and population change and confirming that strategy will achieve performance indicators and outcomes at least cost.

The GWS has responded iteratively to environmental assessments undertaken.

## 3.11 Timescale for assessment

The draft GWS has covered the following horizon years of 2030, 2055 and 2080. The GWS will be reviewed cyclically, at least every five years. Following the first review of the GWS, the plan will be revised, recommending options for the next stage. Figure 3-8 illustrates the high-level strategy horizon timeline.

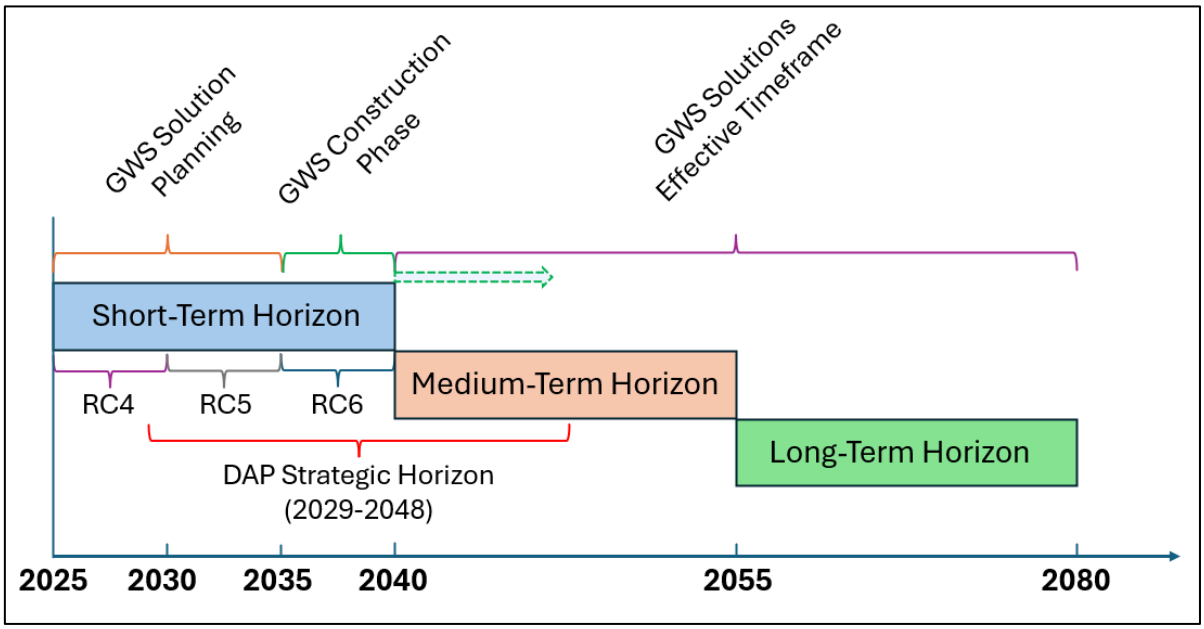


**Figure 3-8. High-level GWS horizon timeline.**

The GWS will apply the Option Assessment Methodologies detailed in the *Appendix 5 - Optioneering and Feasible Option Development Report*, following the consultation process and final amendment, to undertake wastewater strategy in the GWS Study Area. This includes a review of the Risk Based Catchment Screening (RBCS), Baseline Risk and Vulnerability Assessment (BRAVA), options identification and appraisal, and ultimately, making recommendations to ensure the GWS Study Area have a sustainable wastewater drainage strategy over the plan period.

UÉ aim to close as many of the data gaps as possible, to ensure the robustness of the GWS. The development of the GWS also takes into account any changes in best practice methodologies, changes in government policy, legislation and customer behaviour as well as using the latest and best available data.

# 4. Description of Baseline Environment

## 4.1 Overview of European Sites

Sites within the Natura 2000 Network referred to as European Sites include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs are designated for their Qualifying Interests (QI), Annex I habitats and Annex II species and the habitats on which they rely (including functionally linked habitats). SPAs are designated for Special Conservation Interest (SCI) birds and migratory birds designated under Annex I of the Birds Directive, and their supporting habitats. In practice, the common terminology of QI also applies to SCI, therefore QI has been used throughout this document (OPR, 2021).

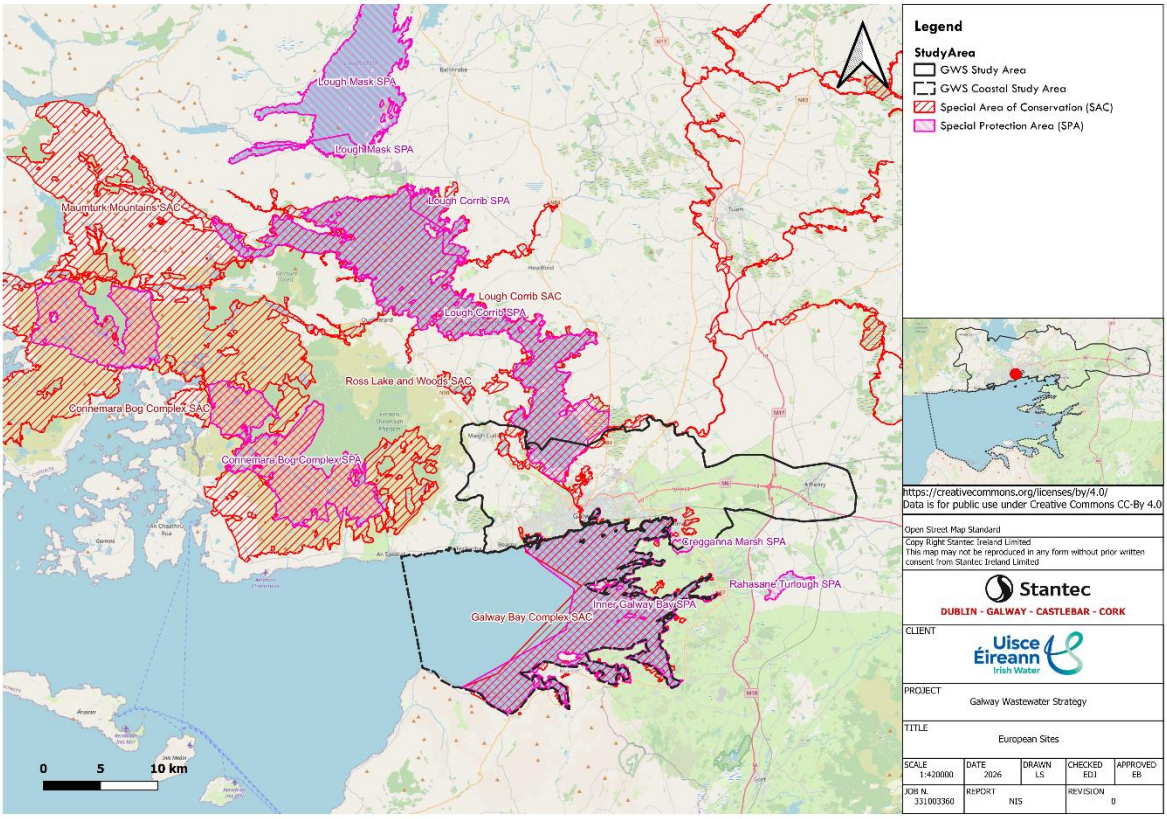


**Figure 4-1: A map of the GWS Study Area and surrounding European Sites, including Special Areas of Conservation (SAC) and Special Protection Areas (SPA).**

For the purposes of this report, an AA screening (defined in Section 2.1) has been carried out on the GWS Study Area (see Figure 4-1 above) and the Zone of Influence (ZoI) of the GWS using a Source - Pathway - Receptor (SPR) model. In terms of the extent of search for SPR analysis, OPR guidance (2021) states:

*"The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km)*".

In addition, the SPR model allows the identification of interactions that comprise a given pathway of effect toward European Sites, QIs, their interactions, and their functionally linked and supporting habitat must be assessed with due consideration of the precautionary principal, as defined within the report glossary.

The ZoI must be evidence-based and derived from multifactorial analysis of influences to make an assessment of effects both alone and in combination (including with other plans and projects identified in the NIS herein and the associated SEA).

In the context of this report, the term 'functional linkage' refers to the role or 'function' that land or sea beyond the boundary of a European Site might fulfil in terms of ecologically supporting the populations for which the site was designated or classified. Such land is therefore 'linked' to the European Site in question because it provides an important role in maintaining or restoring the population of QI at favourable conservation status. Current conservation status for each of the relevant QIs is presented in Appendix D[5][6][7] and the conservation status of bird species is presented in Appendix E based on the Birds of Conservation Concern in Ireland 2020 –2026 assessment (Gilbert, Stanbury & Lewis, 2021).

### 4.1.1. Special Areas of Conservation

SACs cover 58 habitat types recognised in Annex I of the Habitats Directive, with 16 habitats designated as "priority" habitats owing to their ecological vulnerability (NPWS, 2019). Habitats for which SACs are designated include lakes, raised bogs, blanket bogs, turloughs, sand dunes, machair, heaths, rivers, woodlands, estuaries and sea inlets.

In addition, the Habitats Directive recognises 26 Annex II species. Some of the species for which SACs have been designated include but are not limited to: Atlantic salmon *Salmo salar*, otter *Lutra lutra*, lesser horseshoe bat *Rhinolophus hipposideros*, freshwater pearl mussel *Margaritifera margaritifera* and Killarney fern *Trichomanes speciosum*.

There are 441 SACs in Ireland and of these 358 are water-dependent (Department of Housing, Planning and Local Government, 2018c). These SACs support various habitats and species that are dependent on various water sources. There are approximately 800 water bodies within European Sites, all supporting water dependent habitats and species. A number of significant pressures on these water bodies have been identified (Department of Housing, Planning and Local Government, 2018), including:

- Abstractions.
- Agriculture.
- Anthropogenic pressures.
- Forestry.
- Hydromorphological pressures.
- Invasive non-native species (INNS); and

[5] NPWS (2025) The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview

[6] NPWS (2025) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments

[7] NPWS (2025) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments

- Urban wastewater.

Of the pressures noted above, urban wastewater is of relevance to the GWS.

### 4.1.2. Special Protection Areas

The majority of the wintering water birds and breeding seabirds occurring in Ireland are considered to be regularly occurring migratory birds. Over 60% of the 25 Annex I listed species that now occur in the Republic of Ireland on a regular basis belong to the breeding seabird and wintering waterbird groups. This has in part led to the situation of the majority (> 80%) of Ireland's SPAs being designated for these two bird groups.

Some of the productive marine intertidal zones of bays and estuaries are included within SPAs and these provide vital food resources for several wintering wader species, including knot *Calidris canutus*, dunlin *Calidris alpina* and bar-tailed godwit *Limosa lapponica*. Also included in the SPA network are marine waters adjacent to breeding seabird colonies and other important areas for divers, seaducks and grebes.

Finally, a number of inland wetland sites and areas of blanket bog and upland habitats have also been designated as SPAs for wintering water birds. These sites provide important breeding and foraging areas for numerous other species including merlin *Falco columbarius* and golden plover *Pluvialis apricaria*. Agricultural land is also represented within the SPA network ranging from the extensive farmland of upland areas where hedgerows, wet grassland and scrub offer feeding and/or breeding opportunities for hen harrier *Circus cyaneus* to the intensively farmed coastal land where internationally important numbers of swans and geese occur.

### 4.1.3. Conservation Objectives

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of annexed habitats and annexed species of community interest for which an SAC or SPA has been designated. The COs for a European Site are set out to ensure that the QIs/SCIs of that site are maintained or restored to a favourable conservation condition. Maintenance of favourable conservation condition of habitats and species at a site level in turn contributes to maintaining or restoring favourable conservation status of habitats and species at a national level and ultimately at the European site network level.

Detailed site synopses for each European Site are available from the NPWS website[8]. A full list of the COs and QIs/SCIs that each European Site is designated for, as well as the attributes and targets to maintain or restore the QIs/SCIs to a favourable conservation condition are available from the NPWS website[9].

[8] https://www.npws.ie/protected-sites

[9] https://www.npws.ie/protected-sites

# 5. Summary of Screening for AA

## 5.1 Identification of potential impacts and pathways for effect

All European Sites within the GWS area and European Sites with potential effects pathways located outside the GWS were initially considered to be potentially within the ZoI of the GWS; therefore, potential LSEs on the COs for these sites were considered. Section 4.1 outlines the European Sites that are considered to be within the ZoI of at least one potential pathway of the GWS and will therefore be considered further in the assessment.

The GWS core area spans GMA and extends to the surrounding area. The GWS area and European Sites area are shown in Figure 4-1 in Section 4.1. The core GWS Study Area is within the County of Galway; however, sub-catchment of watercourses and waterbodies extend beyond the county boundary. For the purposes of the Stage 1 screening assessment, hydrological linkages were considered, noting waterbodies, bays and rivers that share sub-catchment or close connection by sea. With reference to the precautionary principle, further linkages are possible; therefore, a number of sites outside catchment linkages are also identified with rationale provided, such as potential displacement of birds to alternate SPAs or loss of functional land or where air quality or groundwater resources may be affected. Full details are provided in the AA Screening Report in Appendix A. As outlined in Section 2.7, re-screening was carried out following development of the GWS. The re-screening matrix is presented in Appendix B.

## 5.2 Assessment of Likely Significant Effects

The SPR model was applied taking consideration of all potential impact pathways connecting elements of the GWS to European Sites in view of their COs. The SPR model is a standard tool in environmental assessment to identify and assess potential impact pathways. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the pathway means that there is no likelihood for the effect to occur (e.g. no potential for LSEs). The SPR model is focused solely on the QIs for which European Sites are designated as per the latest COs from the NPWS website[10].Table 5-1 below defines the SPR model, the zones of influence and the extents of sensitivity of QIs for each potential impact pathway used in the assessment. Table 5-2 outlines the potential LSEs associated with the GWS options.

[10] https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives

**Table 5-1. Potential effect source-pathway-receptor (SPR) model and associated Zone of Influence (ZoI) of options arising from the GWS on Qualifying Interests (QIs) which includes Special Conservation Interests (SCI) (receptors) of European Sites.**

| Pathway name | SPR | ZoI | Extent of sensitivity of receptors |
|---|---|---|---|
| Habitat loss – permanent | The provision of new infrastructure or permanent change of habitat from the plan could result in direct loss of QI habitat or habitat which supports QI species in a European Site, or functionally linked land associated with mobile QI species outside the boundaries of European Sites. | The ZoI assessed within the current footprint of the GWS area and functionally linked areas with consideration to relevant QI species. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat loss – temporary | Construction activities including temporary works areas and access routes of the plan could result in the temporary loss of habitats before reinstatement after construction is completed, potentially affecting QI habitat or supporting habitat for QI species in a European Site, or functionally linked land associated with mobile QI species outside the boundaries of European Sites. | The ZoI assessed within the current footprint of the GWS area and functionally linked areas with consideration to relevant QI species. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |

| Pathway name | SPR | ZoI | Extent of sensitivity of receptors |
|---|---|---|---|
| Habitat degradation – changes in water quality | Construction activities and changes in operational traffic / drainage can release oils, chemicals, heavy metals, silt, etc. This can directly affect QI species or habitats or affect them indirectly through loss of aquatic prey species, or through changes in their habitats | The ZoI assessed is within the footprint of the Proposed Scheme or within hydrologically linked areas (to the point where effects would be imperceptible such as where a watercourse meets open sea).<br>Pollutants can travel along hydrological linkages such as watercourses to a considerable distance from works. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – hydrological changes | In-stream structures or changes to drainage from the plan can cause changes in hydrology, which can alter water volumes and flows, which can in turn change the wetness of habitats or cause erosion or deposition of materials. Such changes can affect QI habitats or supporting and functionally linked habitats of QI species. | The ZoI assessed is within surface water catchments that the footprint of the plan lies within. Surface water changes can occur within catchments as changes in one location affect other locations via watercourses for example. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation– | Construction activities such as groundworks, excavations and drainage and permanent changes to drainage can cause changes to | The ZoI assessed is within groundwater catchments that the footprint of the project lies within. | QI habitats are sensitive within the boundary of their designated site. |

| Pathway name | SPR | ZoI | Extent of sensitivity of receptors |
|---|---|---|---|
| hydrogeological changes | groundwater volumes and flows, which can change the hydrogeology of QI habitats and supporting or functionally linked habitats of QI species. | Groundwater changes can occur within catchments as changes in one location affect other locations. | Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – changes in air quality | Construction plant and vehicles emit exhausts containing pollutants that can deposit on QI habitats, which can cause direct toxic effects. | The ZoI assessed is within 200m of the footprint of the plan.<br><br>Pollutant deposition from vehicles is thought to occur in insignificant amounts beyond 200m from the source[11]. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – spread of INNS | Construction activities can cause the spread of INNS already within the construction site (through transfer on plant or within materials moved during earthworks), or by importing materials from outside the | The ZoI assessed is within the footprint of the Proposed Scheme. | QI habitats are sensitive within the boundary of their designated site. |

[11] Transport Infrastructure Ireland (2022) Air Quality Assessment of Proposed National Roads – Standard. Dublin: TII Publications.

| Pathway name | SPR | ZoI | Extent of sensitivity of receptors |
|---|---|---|---|
| | construction site (on the wheels of plant or delivery vehicles, etc). This can cause the degradation of QI habitats or supporting and functionally linked habitats of QI species. | The occurrence of spread or importing of INNS is considered within the construction site. | Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Disturbance of species | Construction activities could result in disturbance of QI species through changes in noise, vibration, movement (of people and/or vehicles) and lighting. Disturbance may lead to the abandonment of breeding, foraging or resting sites by QI species, potentially resulting in increased energy expenditure, reduced fitness, and inability to complete lifecycle stages. | The ZoI assessed is within the footprint of the Proposed Scheme or within 300m of the construction or operation of the plan. 300m is an appropriate distance to assess disturbance as QI species are unlikely to be significantly disturbed beyond this distance[12]. | QI species are sensitive within the boundary of their designated site (in supporting habitat) or within functionally linked habitats where suitable habitat is present within the range of the QI species from their designated site. |
| Mortality | Mortality of individuals of QI species could occur directly through killing of individuals by construction works or indirectly because of pollution entering the watercourse. | The ZoI assessed is within the footprint of the Proposed Scheme, within 50m of watercourse crossings that will be subject to works. Direct mortality from construction activities can only occur within the construction | QI species are sensitive within the boundary of their designated site (in supporting habitat) or within functionally linked habitats where suitable habitat is present within the range of the QI species from their designated site. |

[12] Cutts, N., Phelps, A., Spencer, J., & Hemmingway, K. (2013). Waterbird disturbance mitigation toolkit. Tide toolbox, Interreg IVB North Sea Region Programme.

| Pathway name | SPR | ZoI | Extent of sensitivity of receptors |
|---|---|---|---|
| | | footprint. Indirect mortality can occur near to works at watercourses that sever species commuting routes. | |

It should be noted that one or more of the options may have no effect on European Sites, while others could have beneficial effects for European Sites, for example options that result in net positive effect in overall water quality. However, the implementation of the GWS may give rise to measures that, in the absence of mitigation, could result in a variety of possible effect pathways, including but not limited to those the following:

- Habitat loss – temporary.
- Habitat loss – permanent.
- Habitat degradation – changes in water quality.
- Habitat degradation – hydrological changes.
- Habitat degradation – hydrogeological changes.
- Habitat degradation – changes in air quality.
- Habitat degradation – spread of INNS.
- Disturbance of species; and
- Mortality.

**Table 5-2. Potential Likely Significant Effects (LSEs) in the absence of mitigation from the management option types arising from the GWS.**

| Option | Summary | Potential for LSEs |
|---|---|---|
| **Option 9** | Option 9 is comprised of the installation of a new WWTP and associated pipework in the east of the GWS Study Area. The option also includes installation of a marine outfall to serve as a discharge point for the eastern regional WWTP which is proposed to be in the east of GWS Study Area with an approximate length of 3.5 km. | **Yes**. Potential for direct, indirect, construction, operational and cumulative effects on SACs and SPAs in the absence of mitigation. This option could result in the following effects on QIs of the European Sites or the habitats on which they rely, in the absence of mitigation:<br>• Habitat loss – temporary.<br>• Habitat loss – permanent.<br>• Habitat degradation – changes in water quality.<br>• Habitat degradation – hydrological changes.<br>• Habitat degradation – hydrogeological changes.<br>• Habitat degradation – changes in air quality.<br>• Habitat degradation – spread of INNS.<br>• Disturbance of species; and<br>• Mortality. |

| Option | Summary | Potential for LSEs |
|---|---|---|
| **Option 7** | Option 7 is comprised of the installation of a new WWTP and associated pipework in the east of the GWS Study Area. The option also includes installation of a marine outfall to serve as a discharge point for the eastern regional WWTP which is proposed to be in the west of GWS Study Area with an approximate length of 0.6 km. | **Yes**. Potential for direct, indirect, construction, operational and cumulative effects on SACs and SPAs in the absence of mitigation. This option could result in the following effects on QIs of the European Sites or the habitats on which they rely, in the absence of mitigation:<br>• Habitat loss – temporary.<br>• Habitat loss – permanent.<br>• Habitat degradation – changes in water quality.<br>• Habitat degradation – hydrological changes.<br>• Habitat degradation – hydrogeological changes.<br>• Habitat degradation – changes in air quality.<br>• Habitat degradation – spread of INNS.<br>• Disturbance of species; and<br>• Mortality |

## 5.3 Re-screening

Following refinement of the Draft GWS, the European Sites were re-screened for LSE. The SPR model was used to determine any LSE anticipated because of the GWS. The re-screening matrix is presented in Appendix B.

## 5.4 Screening Conclusion

Based on the information currently available, it was concluded that the potential for LSEs on European Sites, in relation to their COs, cannot be excluded either alone or in-combination. The Plan as it evolves will aim to avoid effects or to mitigate where avoidance is not possible. However, in the absence of mitigation (as required at Stage 1 assessment), and in accordance with the precautionary principle (European Commission, 2000), eleven European Sites that are hydrologically connected and/or functionally linked to the GWS Study Area (Figure 4-1) 1OBJ).

As detailed in the AA Screening Report (Appendix A), in the absence of finalised controls or mitigation measures at the preliminary stage of preparing the GWS, as well as the remaining unconfirmed details in relation to the application of the strategy options, it was concluded that there may be LSEs on one or more European Sites resulting from the implementation of the GWS either alone or in-combination with other Plans and/or Projects.

Following refinement of the GWS, re-screening found a reduction in the number of European Sites screened in for AA. LSE arising from the GWS could not be excluded based on the information

currently available; therefore, in accordance with Article 6(3) of the Habitats Directive, Stage 2 AA of the GWS is required. This is presented in the NIS herein to fully inform the AA determination to be undertaken by UÉ, as the competent authority in this case. Eleven European Sites were brought forward to AA and an NIS prepared to fully inform the AA of the GWS. The following European Sites were screened in for further assessment:

- Connemara Bog Complex SAC.
- Connemara Bog Complex SPA.
- Cregganna Marsh SPA.
- Galway Bay Complex SAC.
- Inner Galway Bay SPA.
- Lough Corrib SAC.
- Lough Corrib SPA.
- Lough Mask SPA.
- Maumturk Mountains SAC.
- Rahasane Turlough SPA; and
- Ross Lake and Woods SAC.

# 6. Assessment of Adverse Effects on Site Integrity

## 6.1 Introduction

The nature and scale of the GWS is set out in Section 3 of this report. As outlined in Section 5, options that will arise from the GWS will potentially result in LSEs on European Sites in the absence of mitigation. Therefore, an assessment of these options is the focus of Section 6. This stage of the assessment process evaluates the potential of the GWS to affect the integrity of a European Site, taking account of the potential for direct, indirect and cumulative impacts alone or in-combination with other Plans and Projects (see Section 7).

## 6.2 Conservation status of QIs

Under Article 11 of the Habitats Directive, each member state is obliged to monitor the conservation status of the natural habitats and species in Annexes I and II and under Article 17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive.

In August 2025, Ireland submitted the fourth assessment of conservation status for 59 habitats and 60 species (including three overview assessments of species at a group level) (NPWS, 2025). A further eight species are considered to be vagrant in Ireland. A summary of the conservation status of the relevant habitats and species (i.e. QIs of European Sites being assessed) and species status of Birds of Conservation Concern in Ireland 2020-2026 are presented in Appendices D[13][14][15] and E[16].

## 6.3 Identification of Potential Impacts and Pathways of Effect

The GWS does not include design detail and/or project-specific location for activities required to fulfil the GWS. Therefore, the AA considers the potential impacts of high-level information details in the GWS. Consequently, the assessment will concern itself with the potential impacts of a high-level strategy which will be implemented through future projects which can only be developed with the consent of another competent authority. It is acknowledged that there is the potential for these future proposals to have an impact on European Sites. This NIS considers, at a high level, the potential effect pathways of GWS options arising from the GWS. The potential effect pathways have been assessed for each European Site in line with the SPR model, as summarised in Table 6-1. Further detail is presented in Appendix B).

[13] NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

[14] NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

[15] NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

[16] https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland/

**Table 6-1: Summary of SPR model screening for AESI relative to European Site Conservation Objectives relevant to Options 7 and 9 (ZoIs and extents of sensitivity of QIs for each potential pathway of effect detailed in Table 5-1).**

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| Connemara Bog Complex SAC<br><br>(1.6km West) | **Source:**<br>Construction activities relating to network improvements, WWTP and marine outfall infrastructure installation within Galway Bay, and operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – temporary<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Atlantic salmon *Salmo salar*<br>• Otter *Lutra lutra* | **Atlantic salmon:**<br>• No significant decline in out-migrating smolt.<br>• No decline in number and distribution of spawning redds due to anthropogenic causes.<br>• At least Q4 water quality results at all sites sampled by EPA.<br>**Otter:**<br>• No significant decline in distribution<br>• No significant decline in extent of terrestrial, marine or freshwater habitat.<br>• No significant decline couching sites and holts.<br>• No significant decline in fish biomass availability. |
| Connemara Bog Complex SPA<br><br>(6.4km West) | **Source:**<br>Construction activities relating to network improvements, WWTP and marine outfall infrastructure installation within Galway Bay, and operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – temporary<br>• Habitat degradation – changes in water quality | **Cormorant:**<br>• Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population.<br>• Sufficient extent of biomass of available prey items across the site to help support the population.<br>• Disturbance occurs at levels that do not significantly impact on breeding cormorant.<br>• Long-term population is stable or increasing. |

[17] Including distance and direction relative to the GWS Study Area.

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Cormorant *Phalacrocorax carbo*<br>• Golden plover *Pluvialis apricaria*<br>• Merlin *Falco columbarius*<br>• Common gull *Larus canus* | **Golden Plover:**<br>• Long term breeding population trend is stable or increasing.<br>• No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation.<br>• Sufficient area of high-quality habitat to support the population target.<br>• Disturbance occurs at levels that do not significantly impact on breeding golden plover.<br>• Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target.<br>**Merlin:**<br>• Breeding population is increasing.<br>• Disturbance occurs at levels that do not significantly impact upon breeding merlin.<br>**Common gull:**<br>• No significant decline in breeding population.<br>• No significant decline in prey biomass.<br>• Disturbance occurs at levels that do not significantly impact on breeding population. |
| Cregganna Marsh SPA<br><br>(Partially within GWS Study Area) | **Source:**<br>Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay, in addition to operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – temporary | **Greenland white-fronted goose:**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• The intensity, frequency, timing, and duration of disturbance occurs at levels that do not significantly impact the |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality<br>**Receptor:**<br>• Greenland white-fronted goose *Anser albifrons flavirostris* | achievement of targets for population trend and spatial distribution.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>• Sufficient area of utilisable habitat available in ecologically important sites outside the SPA. |
| Galway Bay Complex SAC<br><br>(Partially within GWS Study Area) | **Source:**<br>Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay, in addition to operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Tidal mudflats and sandflats | **Tidal mudflats and sandflats**<br>• The permanent habitat area is stable or increasing, subject to natural processes<br>• Conserve the following community types in a natural condition: Intertidal sandy mud community complex; and Intertidal sand community complex.<br>**Coastal lagoons**<br>• Habitat area stable, subject to slight natural variation.<br>• No decline, subject to natural processes.<br>• Median annual salinity, temporal variation, water level fluctuations, and minima within natural ranges.<br>• Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management.<br>• Annual median molybdate reactive phosphorus and dissolved inorganic nitrogen within natural ranges of 0.1mg/L and 0.15mg/L, respectively.<br>• Negative indicator species absent or under control.<br>**Large shallow inlets and bays** |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Coastal lagoons<br>• Large shallow inlets and bays<br>• Reefs<br>• Perennial vegetation of stony Banks<br>• Vegetated sea cliffs of the Atlantic and Baltic coasts<br>• Salicornia mud<br>• Atlantic salt meadows<br>• Mediterranean salt meadows<br>• Turloughs<br>• Juniper scrub<br>• Orchid-rich calcareous grassland<br>• Cladium fens<br>• Alkaline fens<br>• Limestone pavement<br>• Otter<br>• Common (harbour) seal *Phoca vitulina* | • The permanent habitat area is stable or increasing, subject to natural processes.<br>• Maintain the extent of the *Zostera*-dominated community complex and the maërl-dominated community, subject to natural processes.<br>• Conserve the high quality of *Zostera*-dominated communities, subject to natural processes.<br>• Conserve the high quality of the maërl-dominated community, subject to natural processes.<br>• Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Intertidal sand community complex; Fine to medium sand with bivalves community complex; Sandy mud to mixed sediment community complex; Mixed sediment dominated by Mytilidae community complex; Shingle; Fucoid-dominated community complex; *Laminaria*-dominated community complex; and Shallow sponge-dominated community complex.<br>**Reefs**<br>• The distribution of reefs is stable or increasing, subject to natural processes.<br>• The permanent habitat area is stable, subject to natural processes.<br>• Maintain the extent of the *Mytilus*-dominated reef community, subject to natural processes.<br>• Conserve the high quality of the *Mytilus*-dominated reef community, subject to natural processes. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Conserve the following community types in a natural condition: Fucoid-dominated community complex; *Laminaria*-dominated community complex; and Shallow sponge-dominated community complex.<br>**Perennial vegetation of stony Banks**<br>• Area stable or increasing, subject to natural processes, including erosion and succession.<br>• No decline, or change in habitat distribution, subject to natural processes.<br>• Maintain the natural circulation of sediment and organic matter, without any physical obstructions.<br>• Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession<br>• Maintain the typical vegetated shingle flora including the range of subcommunities within the different zones.<br>**Vegetated sea cliffs of the Atlantic and Baltic coasts**<br>• No site-specific conservation objective detailed.<br>**Salicornia mud**<br>• Habitat area stable or increasing, subject to natural processes, including erosion and succession.<br>• No decline, or change in habitat distribution, subject to natural processes.<br>• Maintain/restore, natural circulation of sediments and organic matter, without any physical obstructions.<br>• Maintain, or where necessary restore creek and pan structure, subject to natural processes, including erosion and succession. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.<br>**Atlantic salt meadows**<br>• Habitat area increasing, subject to natural processes, including erosion and succession.<br>• No decline or change in habitat distribution, subject to natural processes.<br>• Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions.<br>• Maintain, or where necessary restore creek and pan structure, subject to natural processes, including erosion and succession.<br>• Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.<br>**Mediterranean salt meadows**<br>• Habitat area stable or increasing, subject to natural processes, including erosion and succession.<br>• No decline, or change in habitat distribution, subject to natural processes.<br>• Maintain/restore, natural circulation of sediments and organic matter, without any physical obstructions.<br>• Maintain, or where necessary restore creek and pan structure, subject to natural processes, including erosion and succession. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.<br>**Turloughs**<br>• Habitat area stable at c.59ha or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Nutrient status appropriate to soil types.<br>• Sufficient wet bare ground, as appropriate<br>• Appropriate water quality to support the natural structure and functioning of the habitat.<br>• Maintain area of sensitive and high conservation value vegetation communities/units at each turlough.<br>• Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal, and/or bird populations.<br>**Juniper scrub**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution.<br>• Appropriate diversity and extent of formation<br>• Negative indicator species, particularly non-native invasive species, absent or under control.<br>**Orchid-rich calcareous grassland**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%. Nonnative invasive species, absent or under control.<br>**Cladium fens**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat.<br>• Appropriate water quality to support the natural structure and functioning of the habitat.<br>**Alkaline fens**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat.<br>• Maintain appropriate water quality to support the natural structure and functioning of the habitat.<br>**Limestone pavement**<br>• No site-specific conservation objective detailed.<br>**Otter**<br>• No significant decline in distribution<br>• No significant decline in extent of terrestrial, marine or freshwater habitat.<br>• No significant decline couching sites and holts.<br>• No significant decline in fish biomass availability. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • No significant increase in barriers to<br>• Connectivity.<br>**Common (harbour) seal**<br>• Species range within the site should not be restricted by artificial barriers to site use.<br>• Conserve breeding, moult haul-out, and resting haul-out sites in a natural condition.<br>• Human activities should occur at levels that do not adversely affect the harbour seal population at the site. |
| Inner Galway Bay SPA<br><br>(Partially within GWS Study Area) | **Source:**<br>Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay, in addition to operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality<br>**Receptors:** | **Black-throated diver**<br>• No site-specific conservation objective detailed.<br>**Great northern diver**<br>• Long-term population is stable or increasing<br>• No significant decrease in the range, timing, or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation.<br>**Cormorant**<br>• No significant decline in breeding population abundance, productivity rate, distribution, and prey biomass availability.<br>• No significant increase in barriers to connectivity.<br>• Disturbance occurs at levels that do not significantly impact on breeding cormorant.<br>• Long-term population is stable or increasing.<br>• No significant decrease in the numbers or range of areas used by cormorant, other than that occurring from natural patterns of variation. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Black-throated diver *Gavia arctica*<br>• Great northern diver *Gavia immer*<br>• Cormorant<br>• Grey heron *Ardea cinerea*<br>• Light-bellied brent goose *Branta bernicla hrota*<br>• Wigeon *Mareca Penelope*<br>• Teal *Anas crecca*<br>• Shoveler *Spatula clypeata*<br>• Red-breasted merganser *Mergus serrator*<br>• Ringed plover *Charadrius hiaticula*<br>• Golden plover<br>• Lapwing *Vanellus Vanellus*<br>• Dunlin *Calidris alpina*<br>• Bar-tailed godwit *Limosa lapponica*<br>• Curlew *Numenius Arquata*<br>• Redshank *Tringa tetanus*<br>• Turnstone *Arenaria interpres*<br>• Black-headed gull *Chroicocephalus ridibundus*<br>• Common gull<br>• Sandwich tern *Thalasseus sandvicensis*<br>• Common tern *Sterna hirundo* | **Grey heron**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, and intensity of use of areas used by grey heron, other than that occurring from natural patterns of variation.<br>**Light-bellied brent goose**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, and intensity of use of areas used by light bellied brent goose, other than that occurring from natural patterns of variation.<br>**Wigeon**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by wigeon, other than that occurring from natural patterns of variation.<br>**Teal**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by teal, other than that occurring from natural patterns of variation.<br>**Shoveler**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by shoveler, other than that occurring from natural patterns of variation.<br>**Red-breasted merganser**<br>• Long term population trend stable or increasing, |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • No significant decrease in the range, timing, or intensity of use of areas by red breasted merganser, other than that occurring from natural patterns of variation.<br>**Ringed plover**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation.<br>**Golden plover**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation.<br>**Lapwing**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by lapwing, other than that occurring from natural patterns of variation.<br>**Dunlin**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation.<br>**Bar-tailed godwit**<br>• Long term population trend stable or increasing, |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • No significant decrease in the range, timing, or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation.<br>**Curlew**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by curlew, other than that occurring from natural patterns of variation.<br>**Redshank**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by redshank, other than that occurring from natural patterns of variation.<br>**Turnstone**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by turnstone, other than that occurring from natural patterns of variation.<br>**Black-headed gull**<br>• Long term population trend stable or increasing,<br>• No significant decrease in the range, timing, or intensity of use of areas by black-headed gull, other than that occurring from natural patterns of variation.<br>**Common gull**<br>• Long term population trend stable or increasing, |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • No significant decrease in the range, timing, or intensity of use of areas by common gull, other than that occurring from natural patterns of variation.<br>**Sandwich tern**<br>• No significant decline in breeding population abundance, productivity rate, distribution, and prey biomass availability.<br>• No significant increase in barriers to connectivity.<br>• Human activities should not occur at levels that do not significantly impact on breeding sandwich tern population.<br>**Common tern**<br>• No significant decline in breeding population abundance, productivity rate, distribution, and prey biomass availability.<br>• No significant increase in barriers to connectivity.<br>• Human activities should not occur at levels that do not significantly impact on breeding sandwich tern population. |
| Lough Corrib SAC<br><br>(Within GWS Study Area) | **Source:**<br>Construction activities relating to network improvements, marine outfall installation and WWTP installation and associated infrastructure installation within GWS Study Area.<br>**Pathways of effect:**<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality | **Oligotrophic waters containing very few minerals**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat.<br>• Restore/Maintain appropriate water quality to support the natural structure and functioning of the habitat.<br>• Maintain high macrophyte status.<br>• Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Oligotrophic waters containing very few minerals<br>• Oligotrophic to mesotrophic standing waters<br>• Hard water lakes<br>• Floating river vegetation<br>• Orchid-rich calcareous grassland<br>• Molinia meadows<br>• Raised bog (active)<br>• Degraded raised bog<br>• Rhynchosporion vegetation<br>• Cladium fens<br>• Petrifying springs<br>• Alkaline fens<br>• Limestone pavement<br>• Old oak woodlands<br>• Bog woodland<br>• Freshwater pearl mussel *Margaritifera margaritifera*<br>• White-clawed crayfish *Austropotamobius pallipes*<br>• Sea lamprey *Petromyzon marinus*<br>• Brook lamprey *Lampetra planeri*<br>• Atlantic salmon | **Oligotrophic to mesotrophic standing waters**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat.<br>• Restore/Maintain appropriate water quality to support the natural structure and functioning of the habitat.<br>• Maintain high macrophyte status.<br>• Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat.<br>**Hard water lakes**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat.<br>• Restore/Maintain appropriate water quality to support the natural structure and functioning of the habitat.<br>• Maintain high macrophyte status.<br>• Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat.<br>**Floating river vegetation**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Lesser horseshoe bat *Rhinolophus hipposideros*<br>• Otter<br>• Slender naiad *Najas flexilis*<br>• Slender green feathermoss *Hamatocaulis vernicosus* | • Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat.<br>• Restore/Maintain appropriate water quality to support the natural structure and functioning of the habitat.<br>• Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat.<br>**Orchid-rich calcareous grassland**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%. Cover of non-native species not more than 1%<br>• No decline in habitat structure and composition.<br>**Molinia meadows**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%. Cover of non-native species not more than 1%<br>• No decline in habitat structure and composition.<br>**Raised bog (active)**<br>• Restore the area of active raised bog to 78.8ha, subject to natural processes.<br>• Restore the distribution and variability of active raised bog across the SAC. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | | • No decline in extent of high bog subject to the conservation requirements of the SAC.<br>• Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat.<br>• Non-native invasive species at insignificant levels and not more than 1% cover.<br>• Air quality surrounding the bogs close to natural reference conditions. The total nitrogen deposition should not exceed 5kg N/ha/yr.<br>• Water quality on the high bog and in transitional areas close to natural reference conditions.<br>**Degraded raised bog**<br>• The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of active raised bogs and a separate conservation objective has not been set in Lough Corrib SAC.<br>**Rhynchosporion vegetation**<br>• Depressions on peat substrates of the Rhynchosporion is an integral part of good quality active raised bogs and thus a separate conservation objective has not been set for the habitat in Lough Corrib SAC.<br>**Cladium fens**<br>• Habitat area stable or increasing, subject to natural processes. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | | • No decline in habitat distribution, subject to natural processes.<br>• Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat.<br>• Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat.<br>• Cover of non-native species not more than 1%<br>• No decline in habitat structure and composition.<br>**Petrifying springs**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat.<br>• Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat.<br>• No decline in habitat structure and composition.<br>**Alkaline fens**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Maintain soil nutrient status within natural range. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | | • Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat.<br>• Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat.<br>• No decline in habitat structure and composition.<br>**Limestone pavement**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration.<br>• No decline in habitat structure and composition.<br>**Old oak woodlands**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution.<br>• No decline in woodland structure and composition.<br>**Bog woodland**<br>• Habitat area stable or increasing, subject to natural processes.<br>• No decline in habitat distribution, subject to natural processes.<br>• No decline in habitat structure and composition.<br>**Freshwater pearl mussel**<br>• Maintain distribution at 9.1km. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | | • Restore Owenriff population to at least one million adult mussels.<br>• Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.<br>• No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.<br>• Restore suitable habitat in more than 8.3km in the Owenriff and Glenawbeg rivers and any additional stretches necessary for salmonid spawning.<br>• Restore condition of suitable habitat.<br>• Restore water quality – macroinvertebrates, macrophytes, and phytobenthos.<br>• Restore substratum quality - stable cobble and gravel substrate with very little fine material, no artificially elevated levels of fine sediment.<br>• Restore to no more than 20% decline of oxygen availability from water column to 5cm depth in substrate.<br>• Restore appropriate hydrological regimes.<br>• Maintain the area and condition of fringing habitats necessary to support the population.<br>**White-clawed crayfish**<br>• No reduction in distribution from baseline.<br>• Maintain water quality at least Q3-4 at all sites sampled by EPA.<br>• No decline in habitat heterogeneity or habitat quality |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | | **Sea lamprey**<br>• Maintain mean catchment juvenile density at least 1/m².<br>• No decline in extent and distribution of spawning beds.<br>• More than 50% of sample sites positive for available juvenile habitat, with a minimum of four positive sites in a catchment, which are at least 5km apart.<br>**Brook lamprey**<br>• Maintain mean catchment ammocoete density of brook/river lamprey at least 5/m².<br>• No decline in extent and distribution of spawning beds.<br>• More than 50% of sample sites positive for available juvenile habitat , with a minimum of four positive sites in a catchment, which are at least 5km apart.<br>**Atlantic salmon**<br>• Conservation limit of adult spawning fish for each system consistently exceeded.<br>• Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling.<br>• No significant decline in out-migrating smolt abundance.<br>• No decline in number and distribution of spawning redds due to anthropogenic causes.<br>• Maintain water quality of at least Q4 at all sites sampled by EPA.<br>**Lesser horseshoe bat**<br>• Minimum number of 100 bats for summer roost.<br>• No decline in summer and auxillary roosts. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | | • No significant decline in extent of potential foraging habitat.<br>• No significant loss of linear features within 2.5km of qualifying roosts.<br>• No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost.<br>**Otter**<br>• No significant decline in distribution<br>• No significant decline in extent of terrestrial, marine or freshwater habitat.<br>• No significant decline couching sites and holts.<br>• No significant decline in fish biomass availability.<br>• No significant increase in barriers to connectivity.<br>**Slender naiad**<br>• Restore the spatial extent, depth range, and cover abundance within the lake, subject to natural processes.<br>• Restore appropriate water quality to support the population of the species.<br>• Maintain the area and condition of fringing habitats necessary to support the population of slender naiad.<br>**Slender green feathermoss**<br>• No decline in distribution, population size, and suitable habitat area, subject to natural processes.<br>• Maintain suitable hydrological conditions. |
| Lough Corrib SPA | **Source:** | **Greenland white-fronted goose**<br>• Long term winter population trend is stable or increasing. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| (Within GWS Study Area) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area.<br>**Pathways of effect:**<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Greenland white-fronted goose<br>• Gadwall *Mareca strepera*<br>• Shoveler<br>• Pochard *Aythya ferina*<br>• Tufted duck *Aythya fuligula*<br>• Common scoter *Melanitta nigra*<br>• Hen harrier *Circus cyaneus*<br>• Coot *Fulica atra*<br>• Golden plover<br>• Black-headed gull<br>• Common gull<br>• Common tern | • Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• The intensity, frequency, timing, and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>• Sufficient area of utilisable habitat available in ecologically important sites outside the SPA.<br>**Gadwall**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| | • Arctic tern *Sterna paradisaea* | • Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>**Shoveler**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>**Pochard**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>**Tufted duck**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>**Common scoter**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient productivity to maintain the population trend as stable or increasing. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation.<br>• Sufficient area of high-quality habitat to support the population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for breeding population trend and spatial distribution of nesting habitat.<br>• Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>**Hen harrier**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient extent of suitable habitats and biomass of available prey items across the site to help support the population.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>• Human activities occur at levels that do not significantly impact upon wintering hen harrier.<br>**Coot**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>**Golden plover**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the winter population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA.<br>• Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target.<br>• Sufficient number of locations, area, and availability of suitable roosting habitat to support the population target.<br>• Sufficient area of utilisable habitat available in ecologically important sites outside the SPA. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | **Black-headed gull**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient availability of suitable nesting sites throughout the SPA to maintain the population<br>• Sufficient extent of biomass of available prey items across the site to help support the population.<br>• Disturbance occurs at levels that do not significantly impact black-headed gull at the breeding site and at areas ecologically connected to the colony.<br>• No significant increase in barriers to connectivity.<br>**Common gull**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient availability of suitable nesting sites throughout the SPA to maintain the population<br>• Sufficient extent of biomass of available prey items across the site to help support the population.<br>• Disturbance occurs at levels that do not significantly impact common gull at the breeding site and at areas ecologically connected to the colony.<br>• No significant increase in barriers to connectivity.<br>**Common tern**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient availability of suitable nesting sites throughout the SPA to maintain the population.<br>• Sufficient extent of biomass of available prey items across the site to help support the population. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • Disturbance occurs at levels that do not significantly impact common tern at the breeding site and at areas ecologically connected to the colony.<br>• No significant increase in barriers to connectivity.<br>**Arctic tern**<br>• Long term winter population trend is stable or increasing.<br>• Sufficient availability of suitable nesting sites throughout the SPA to maintain the population<br>• Sufficient extent of biomass of available prey items across the site to help support the population.<br>• Disturbance occurs at levels that do not significantly impact arctic tern at the breeding site and at areas ecologically connected to the colony.<br>• No significant increase in barriers to connectivity. |
| Lough Mask SPA<br><br>(25.2km North) | **Source:**<br>Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area and operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – temporary<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species | **Tufted duck:**<br>• Long term winter population is stable or increasing.<br>• Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Sufficient area of utilisable habitat available in ecologically important sites outside the SPA.<br>**Common gull:**<br>• No significant decline in breeding population.<br>• No significant decline in prey biomass. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | • Mortality<br>**Receptors:**<br>• Tufted duck<br>• Common gull<br>• Lesser black-backed gull | • Disturbance occurs at levels that do not significantly impact on breeding population.<br>**Lesser black-backed gull:**<br>• Long term breeding population is stable or increasing.<br>• Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target.<br>• Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution. |
| Maumturk Mountains SAC<br><br>(23.3km Northwest) | **Source:**<br>Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay and operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation – changes in water quality<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Atlantic salmon | **Atlantic salmon:**<br>• No significant decline in out-migrating smolt.<br>• No decline in number and distribution of spawning redds due to anthropogenic causes.<br>• At least Q4 water quality results at all sites sampled by EPA. |
| Rahasane Turlough SPA | **Source:**<br>Construction activities relating to network improvements and WWTP installation and | **Golden Plover:**<br>• Long term breeding population trend is stable or increasing. |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
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| (4.4km East) | associated infrastructure within GWS Study Area and operational discharges from the marine outfall.<br>**Pathways of effect:**<br>• Habitat loss – temporary<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Golden plover<br>• Black-tailed godwit *Limosa limosa*<br>• Wigeon | • No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation.<br>• Sufficient area of high-quality habitat to support the population target.<br>• The intensity, frequency, timing, and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target.<br>**Black-tailed godwit:**<br>• Long term winter population is stable or increasing.<br>• Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target (foraging and roosting).<br>• The intensity, frequency, timing, and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Sufficient area of utilisable habitat available in ecologically important sites outside the SPA.<br>**Wigeon:**<br>• Long term winter population is stable or increasing.<br>• Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target (foraging and roosting). |

| European Site[17] | Screened in Source–Pathway–Receptor | Relevant Conservation Objectives |
|---|---|---|
| | | • The intensity, frequency, timing, and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution.<br>• Sufficient area of utilisable habitat available in ecologically important sites outside the SPA. |
| Ross Lake and Woods SAC<br><br>(1.7km North) | **Source:**<br>Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area.<br>**Pathways of effect:**<br>• Habitat loss – temporary<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality<br>**Receptors:**<br>• Lesser horseshoe bat | **Lesser horseshoe bat:**<br>• Minimum number of 100 bats for summer roost.<br>• No significant decline in extent or potential foraging habitat or linear features within 2.5km of qualifying roost.<br>• No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. |

## 6.4 Assessment of Effects

As the GWS developed, options that sought to improve overall water quality or that avoid effects to European Sites, were subject to MCDA, including for the purpose to apply the principle of avoidance of effects. This is in alignment with the duty of public bodies (and other plan-makers/developers) in regard to COs of European Sites, including where those objectives seek that restorative objectives are to be applied.

Combined disciplines and data gathering informed the factors giving rise to effects across time horizons 2030, 2055, 2080 and beyond. The operational effects assessment of the GWS design concept was developed in parallel and integrated to the evolving AA assessment. Opportunities for positive change were highlighted and incorporated to strategic options.

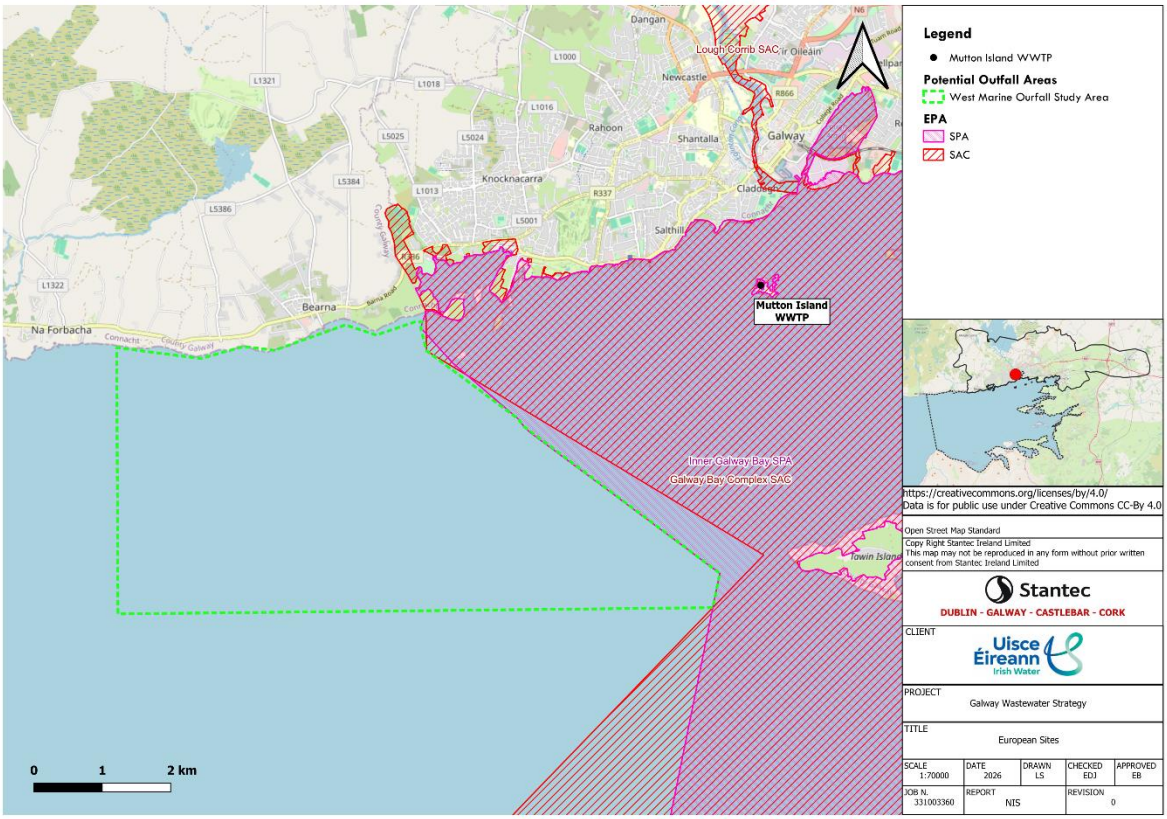


**Figure 6-1: Potential west marine outfall area for eastern regional WWTP within Option 7 in relation to SPA and SAC areas.**

The following sections outline the assessment of the potential pathways of effect relating Options 7 and 9 of the GWS as summarised in Table 5-2. Both options would seek to improve the overall resilience of the network and supply by upgrading existing infrastructure including providing an increase in wastewater treatment capacity. Option 7 consists of the construction of a WWTP in the east and associated pipework, in addition to an outfall in the west of the GWS Study Area (Figure 6-1). Option 9 consists of the construction of the WWTP and associated pipework in the east of the GWS Study Area, in addition to the marine outfall in the east (Figure 6-2). There is the potential for direct and indirect AESI on European Sites through construction-related activities associated with

the options construction works. Both options have the potential to impact Annex I habitats and/or Annex II species if works are required within or near to a European Site. Effects include habitat loss (permanent and temporary), habitat degradation – through changes in water and air quality; hydrological, hydrogeological changes; spread of INNS, and disturbance and mortality of species.

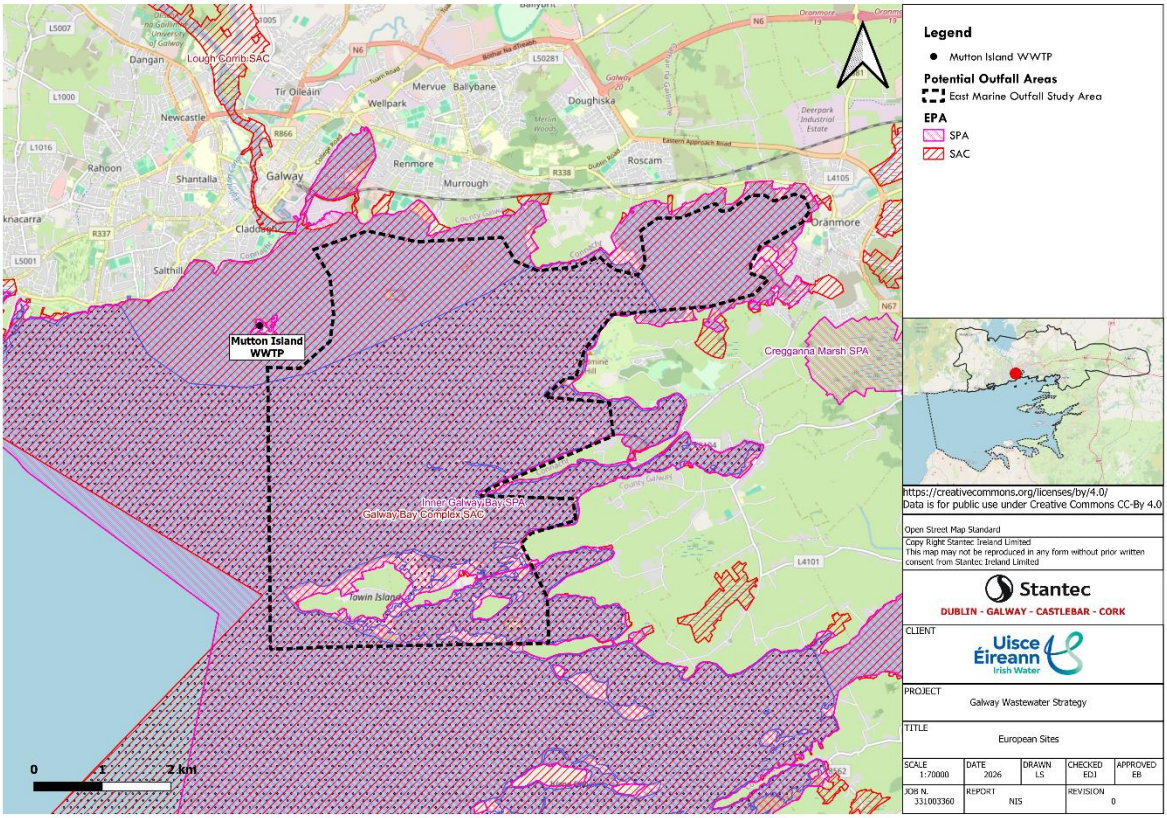


**Figure 6-2: Potential east marine outfall area for eastern regional WWTP within Option 9 in relation to SPA and SAC areas.**

Effluent from the WWTP(s) is intended to be discharged into the sea via a new sea outfall. The treatment process involves treating wastewater to a sufficiently high standard to meet supply standards relevant for release to the environment (see Section 6.4.2). The construction of a new outfall could have a direct or indirect negative impact on aquatic QI species associated with construction of the outfall through disturbance, mortality, habitat loss (temporary or permanent), and/or habitat degradation (though water quality changes or INNS spread), but also by altering the flow regime within the sea, thereby leading to changes in hydrological or hydrogeological conditions, potentially changing Annex I habitat and/or supporting habitat for Annex II species.

### 6.4.1. Habitat loss – permanent or temporary

The reduction in habitat area or functional connectivity of habitats can lead directly to the decline of Annex II species that are supported by these habitats, as they lose critical breeding, foraging, and sheltering areas – for example the interrelationship of wading birds and coastal lagoons. Smaller, fragmented areas of habitats impact migration of wintering birds making it difficult for Annex I bird species to migrate, access genetic exchange, or recover from disturbance events. This

isolation increases vulnerability to further environmental stresses and can lead to local extinctions, gradually eroding the overall biodiversity and resilience of these ecosystems. Species with narrow ecological niches, as is the case for many Annexes I species, are particularly at risk under such scenarios.

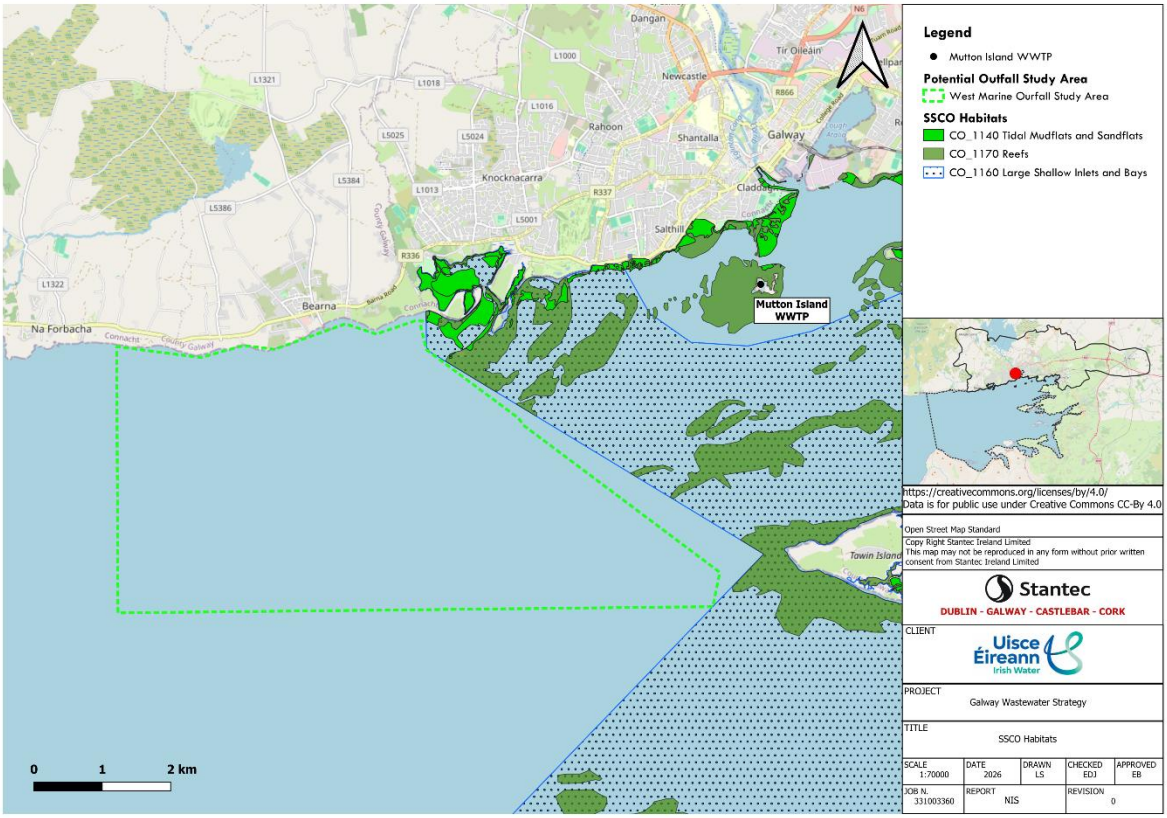


**Figure 6-3: Potential west marine outfall area for the eastern regional WWTP within Option 7 of the GWS in relation to coverage of Annex I habitats (NPWS, 2025)[18].**

The construction of new WWTP(s), associated pipework and marine outfall(s) have the potential to result in temporary and/or permanent habitat loss of the QI habitats of European Sites and/or supporting habitats of the QI species of European Sites. The construction of grey and green interventions, existing WWTP upgrades and new WWTP will result in localised temporary loss of habitat. The expansion of existing WWTP and construction of new WWTP to cope with additional demand from population growth will prevent damage to aquatic habitats and species from impacts relating to that increase.

The AESI will depend on the location of the WWTPs and the habitats within the determined ZoI. Careful site optioneering, planning and construction will be required to avoid and minimise habitat loss. Given the overarching benefits of the marine outfall compared to the freshwater outfalls (detailed in Section 3.5), a marine outfall will be required for GWS options. Both options would require at least one outfall located inside the Galway Bay Complex SAC and Inner Galway Bay SPA areas.

[18] https://www.npws.ie/maps-and-data/habitat-and-species-data.

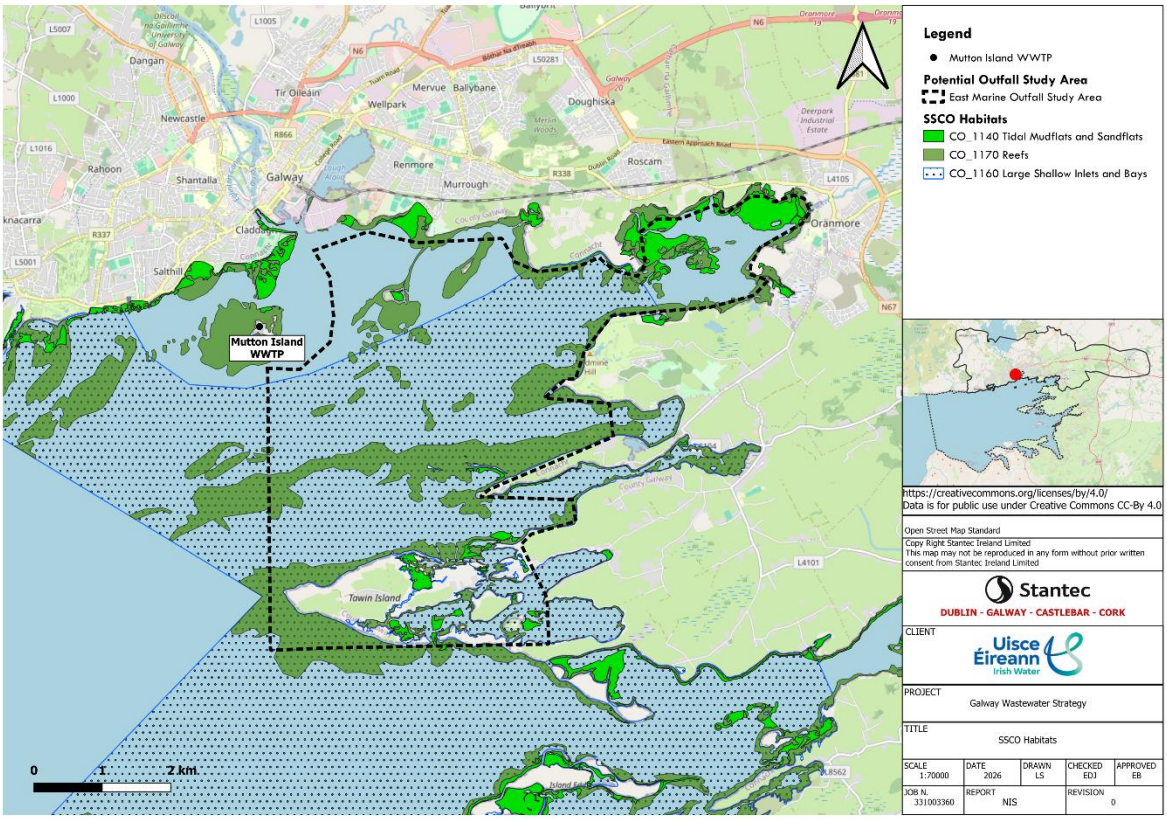


**Figure 6-4: Potential east marine outfall area for the eastern regional WWTP within Option 9 of the GWS in relation to coverage of Annex I habitats (NPWS, 2025)[19].**

The disturbance of seabed would also have impacts on sensitive habitats. However, there would be potential for Biodiversity Net Gain (BNG) within reinstatement (again, this will be location specific) (see Section 8.2.1). Figure 6-3 and Figure 6-4 illustrate the Annex II habitats of Galway Bay Complex SAC that may be impacted by Proposed Outfall Areas for Options 7 and 9, respectively. The notable Annex I habitats that may be impacted by the marine outfall construction include tidal mudflats and sandflats, reefs, and large shallow inlets and bays. Annex I habitats will be avoided in the first instance, followed by reduction/refinement of areas that may be impacted. At project-level, early engagement with regulatory bodies, detailed environmental assessments (including AA), and route optimisation strategies will be employed to ensure that AESI of European Sites are avoided or mitigated.

In summary, through the avoidance of sensitive habitats, the reinstatement of habitats following construction and implementation of best practice mitigation measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to habitat loss.

### 6.4.2. Habitat degradation – changes in water quality

Changes in water quality can have adverse effects on Annex I habitats directly or on water-dependent Annex II species by altering the chemical, physical, and biological characteristics of their supporting habitats. When parameters such as pH, temperature, dissolved oxygen, and

[19] https://www.npws.ie/maps-and-data/habitat-and-species-data.

contaminant levels fluctuate, the physiological balance and survival of fish, invertebrates, macrophytes, and microorganisms can be heavily impacted[20][21][22]. These changes also have indirect effects on water-dependent species such as birds by impacting food resources and degrading breeding, refuge, and foraging habitats.

The construction and/or operational phases of projects arising from the GWS have the potential to result in habitat degradation through changes in water quality on QI habitats and/or supporting habitats of QI species. There is potential for short-term, localised, temporary pollution of watercourses through construction works in close proximity to watercourses and excavation of marine outfall. However, in line with legal requirements and best practice, these are anticipated to be prevented through good construction practices and mitigate the risk of causing a deterioration in water quality, as detailed in Section 8.

Once operational, all WWTP options will discharge highly treated effluents that comply with stringent regulatory standards. In accordance with the requirements of the rUWWTD 2024/3019, both facilities may be required to implement quaternary treatment processes. This advanced treatment stage will ensure the removal of nutrients, micropollutants, and other contaminants to safeguard receiving water quality and public health. This is anticipated to result in a net positive change in water quality, consequently benefiting QI habitats or supporting habitats of water-dependent QIs/SCI.

At this stage, the length of the marine outfall is determined by the need to achieve adequate initial dilution of the treated effluent in the receiving environment, which is critical to meeting environmental quality standards and regulatory compliance. This ensures that concentrations of any residual substances in the discharge plume are reduced rapidly to safe levels and minimise impact to water quality. Therefore, it is anticipated that the GWS will result in major positive effects on water quality and flooding through reduction in spills from storm overflows and WWTP improvements to accommodate population growth and the changing climate.

Furthermore, the strategic assessment detailed within *Appendix 4 – Impacts to Water Quality* indicates that discharges to Galway Bay (west and east marine outfalls) can meet WFD Good status with appropriate outfall design and secondary treatment.

In summary, through the implementation of best practice mitigation measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to habitat degradation through water quality changes.

### 6.4.3. Habitat degradation – changes in air quality

Sources of air quality changes from construction works include vehicle movements and plant emissions. Increased traffic and construction activities from developments contribute to

[20] Millar, W., Monk, W.A. and Gray, M.A., 2024. Effects of winter water quality conditions on Atlantic Salmon embryo mortality and deformity rates in the Serpentine River (New Brunswick, Canada). Canadian Water Resources Journal/Revue canadienne des resources hydriques, 49(3), pp.269-281.

[21] Khaliq, I., Ramampiandra, E.C., Vorburger, C., Narwani, A. and Schuwirth, N., 2024. The effect of water temperature changes on biological water quality assessment. Ecological Indicators, 159, p.111652.

[22] Lewerentz, A., Hoffmann, M., Hovestadt, T., Raeder, U. and Sarmento Cabral, J., 2023. Synergistic effects between global warming and water quality change on modelled macrophyte species richness. Oikos, 2023(10), p.e09803.

atmospheric pollution, particularly nitrogen oxides (NOx) and ammonia ($NH_3$) emissions. These pollutants deposit nitrogen within terrestrial and aquatic ecosystems, encouraging growth of nitrogen-tolerant species and outcompeting sensitive plants, which can result in a loss of biodiversity in habitats such as woodlands, grasslands and heathlands. Air pollution poses a significant threat to biodiversity and ecosystem functioning in terrestrial and aquatic environments. It can lead to soil acidification, eutrophication, and changes in plant community composition[23].

The construction and/or operational phases of projects arising from the GWS have the potential to result in habitat degradation through changes in air quality on QI habitats of European Sites and/or habitats on which QIs of European Sites rely. During construction, it is assumed that best practice means will be adopted, as detailed in Section 8. Construction-related emissions are considered local issues addressed through application of appropriate standards at project-level and are therefore required to be considered within the project-level environmental assessment. Project- and site-specific assessments would be required in order to robustly assess the potential effect(s) and ZoI of projects arising from the GWS in relation to air quality changes.

In summary, through the incorporation of best practice mitigation measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to habitat degradation through air quality changes.

### 6.4.4. Habitat degradation – hydrological changes

Hydrological changes have been found to impact aquatic species by altering their ecosystem, including supporting habitats and food resources. Changes in the flow regime - whether due to climate change, water abstraction, reservoir regulation, or urbanisation, can disrupt natural flooding and drying cycles. These alterations influence the availability and connectivity of essential habitats, which QI species rely on for feeding, breeding, refuge and migration[24]. Additionally, flooding events can disperse pollutants or carry sediments that smother benthic organisms. Such shifts in water quality, can stress aquatic organisms, affecting their metabolism, reproduction, and survival[25].

The project's activities arising from the GWS have the potential to result in habitat degradation through hydrological changes to QI habitats of European Sites and/or supporting habitats of QIs and SCIs of European Sites. Such activities include construction and/or operational phases of proposed regional WWTP(s), associated pipework and marine outfall(s). The GWS also prioritises upgrade measures where storm overflows are currently discharging in or close to sensitive areas. Upgrading the existing infrastructure will assist with reducing storm overflows, thereby reducing hydrological change events which will lead to a positive benefit for aquatic flora and fauna. As the implementation of the plan progresses, the benefits of the plan will extend across the plan area. Within rural areas, catchment management provides an opportunity to slow the rate of drainage,

[23] Stevens, C.J., David, T.I., & Storkey, J. (2018). Atmospheric nitrogen deposition in terrestrial ecosystems: Its impact on plant communities and consequences across trophic levels. *Functional Ecology*, 32, 1757-1769

[24] Zolfagharpour, F., Saghafian, B. and Delavar, M., 2022. Hydrological alteration and biodiversity change along the river network caused by anthropogenic activities and climate variability. Ecological Processes, 11(1), p.19.

[25] Ban, X., Guo, W. and Fu, Y., 2025. Impact of Environmental Factors on Aquatic Ecosystem. Water, 17(10), p.1453.

including of important habitats, contributing to rewilding and supporting natural hydrogeological processes. Within more urban areas, blue/green corridors and SuDS offer opportunities to provide/enhance biodiversity. The level of benefit achieved will depend on the extent of implementation of these green options, their location (providing opportunities to link other habitats) and their design. Overall, this strategy offers the potential for long term effects to habitat(s) through positive hydrological change.

Altered hydrology may lead to changes in sedimentation and erosion which could result in indirect negative impacts on species such as otter – if couches/holts are affected by the changes for example. This could also impact negatively on some QI habitats, such as wet woodland and SCI wetland habitat. Any alteration to the hydrological regime could adversely affect the habitat, which requires periodic flooding to support its favourable conservation status. As such, any changes to the hydrologic regime need to be modelled in the context of these other pressures to ensure that cumulative effects are assessed during the project development/optioneering phase. Projects arising from the GWS are likely to include improvement to flood alleviation through increasing network capacity. Further studies and mitigation measures are to be applied at project-level, as detailed in Section 8. Additionally, development which modifies stream hydraulics may increase bed mobilisation and reducing retentive habitats, which can diminish floodplain inundation [26]. These changes can lead to urban flash floods and water scarcity, highlighting the need for sustainable planning practices [27].

Given these considerations, the proposed outfall lengths are regarded as more favourable under the criterion of water quality protection. Continued refinement through hydrodynamic modelling will further confirm this assessment during subsequent appraisal phases. Further studies are recommended in Section 8.3 to inform potential hydrological effects as a result of each outfall option. This information will inform a project-level environmental assessment, including AA and NIS.

In summary, through the incorporation of further studies and the incorporation of best practice mitigation measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to habitat degradation through hydrological changes.

### 6.4.5. Habitat degradation – hydrogeological changes

Development and associated infrastructure may significantly alter hydrogeological processes, impacting habitat condition, stability, and ecosystem health. Key alterations include changes in volume and chemical composition to surface and groundwaters within the GWS Study Area and within hydrologically connected areas. Development of infrastructure can lead to increased runoff due to impervious surfaces, while infiltration decreases as natural landscapes are replaced with

[26] Anim, D. O., Fletcher, T. D., Vietz, G. J., Pasternack, G. B., & Burns, M. J. (2018). Effect of urbanization on stream hydraulics. *River Research and Applications*, *34*(7), 661-674

[27] Sheldon, F., Leigh, C., Neilan, W., Newham, M., Polson, C., Hadwen, W. Urbanization: Hydrology, Water Quality, and Influences on Ecosystem Health, Editor(s): Ashok K. Sharma, Ted Gardner, Don Begbie, Approaches to Water Sensitive Urban Design, Woodhead Publishing (2019). Pages 229-248, ISBN 9780128128435. https://doi.org/10.1016/B978-0-12-812843-5.00011-3

buildings and roads[28]. Sensitive habitats such as wetland depend on specific groundwater chemistry and stable water levels. Hydrogeological instability can lead to scrub encroachment of wetland habitats, degrading habitat and directly impacting wetland habitats and indirectly affecting species supported by wetland habitats. Hydrogeological changes that alter the extent of open water or wetland habitats limit foraging and breeding success for QIs/SCIs.

The incorporation of standard pollution prevention measures within designs of projects arising from the GWS would reduce the risk of water quality changes to ground and surface waterbodies leading to habitat degradation through hydrogeological changes. Further studies are recommended in Section 8.3 to inform potential hydrogeological effects as a result of each outfall option. This information will inform a project-level environmental assessment, including AA and NIS.

In summary, through the integration of further studies and the incorporation of avoidance, mitigation and habitat reinstatement measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to habitat degradation through hydrogeological changes.

### 6.4.6. Habitat degradation – spread of INNS

There is a potential for habitat degradation through spread of INNS as a result of the construction and operational phases of proposed WWTP, associated pipework and marine outfalls. INNS refer to those listed under European Union (Invasive Alien Species) Regulations 2024 (S.I. 374/2024) and/or listed under the Third Schedule of S.I. 477/2011. INNS have the potential to impact Annex I habitats and SCI wetlands by altering species composition, while Annex II species may be impacted by predation or out-competing by INNS, for example.

A review of INNS records[29] within the GWS Study Area indicates a total of 75 INNS were recorded within the last 10 years, including Japanese knotweed *Reynoutria japonica*, Himalayan balsam *Impatiens glandulifera*, zebra mussel *Dreissena polymorpha*, Canadian waterweed *Elodea canadensis*, and New Zealand pigmyweed *Crassula helmsii*. Given the extensive records within the GWS Study Area, there is the potential for terrestrial and aquatic invasive flora and fauna species to be present within and adjacent to the construction area. If present, these could potentially be spread to habitats within SACs/SPAs during construction works/operation.

The introduction or spread of INNS within a European Site has the potential to cause an AESI through direct or indirect effects on QIs or supporting habitats of QIs and SCIs; therefore, further studies and mitigation measures will be incorporated into all projects arising from the GWS. Site-specific surveys will be required in order to assess the presence of INNS within locations deemed feasible for the projects arising from the GWS, as detailed in Section 8.

In summary, through compliance with INNS legislation and the incorporation of best practice mitigation measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to habitat degradation through INNS spread.

[28] Yang, F., Zhao, C., Wang, J., Liu, C., Sun, Y., Soomro, S., Hu, C. (2022). Grid-quantification study on the effect of rapid urbanization on hydrological processes. Water Supply; 22 (6): 5853–5872. doi: https://doi.org/10.2166/ws.2022.202

[29] https://records.biodiversityireland.ie/stats/taxon-stats

### 6.4.7. Disturbance or mortality of species

Disturbance of birds during territory establishment has been shown to reduce bird territories and species richness by approximately 15%[30]. Human presence during critical developmental stages can impair nestling growth and body condition[31]. However, careful site optioneering in relation to European Sites or supporting habitats of QI species can help balance development requirements with conservation objectives. Species most affected by human disturbance include those sensitive to human presence, open-cup nesters, and above-ground foragers[32]. These findings highlight the importance of managing human activities in sensitive areas to minimise negative impacts on bird populations.

The construction and/or operational phases of proposed options have the potential to result in disturbance or mortality of Annex II species, QIs of European Sites. Impacts include noise and vibration from construction works and operations, including vehicle movements. As avoidance of European Sites is incorporated in the GWS in the first instance, mitigation measures specific to QIs within the ZoI of projects arising from the GWS would be required in a project- and site-specific basis. Overall, construction noise can be managed through good construction practice and appropriate design standards and siting to take account of sensitive receptors, as detailed in Section 8. These and operational effects are considered local issues and addressed through application of appropriate standards at project-level and are therefore not considered at plan-level for the GWS.

In summary, through the integration of further studies and the incorporation of best practice mitigation measures, no AESI of European Sites are anticipated at plan-level stage for GWS in relation to disturbance or mortality of Annex II species and SCIs.

[30] Bötsch, Y., Tablado, Z., & Jenni, L. (2017). Experimental evidence of human recreational disturbance effects on bird-territory establishment. *Proceedings of the Royal Society B: Biological Sciences*, *284*(1858), 20170846.

[31] Remacha, C., Delgado, J. A., Bulaic, M., & Perez-Tris, J. (2016). Human disturbance during early life impairs nestling growth in birds inhabiting a nature recreation area. *PloS one*, *11*(11), e0166748.

[32] Bötsch, Y., Tablado, Z., & Jenni, L. (2017). Experimental evidence of human recreational disturbance effects on bird-territory establishment. *Proceedings of the Royal Society B: Biological Sciences*, *284*(1858), 20170846.

# 7. In-combination Effects

## 7.1 Assessment of in-combination effects

Under Article 6(3) of the Habitats Directive an assessment of in-combination effects of the GWS with other plans and projects is required. The assessment used the best available information at the time of writing within the relevant ZoIs outlined in Section 6, across the GWS time horizons – 2030, 2055 and 2080. Effects can include, but are not limited to, multiple effects of the same or similar type from a number of developments on the same receptor/resource.

In line with the relevant guidance (European Commission, 2000), consideration of in-combination effects was undertaken using a stepwise approach, as follows:

1. Identify plans/projects that might act in-combination.
2. Identify the types of LSEs that might occur.
3. Define boundaries of the assessment.
4. Identify pathways for effects; and
5. Prediction and assessment.

Consideration has been given, at this stage of the GWS, to other relevant plans on a similarly strategic level that have clear potential to have an in-combination effect upon European Sites. This included projects that fall within the GWS implementation period. The plans and projects listed below have been assessed:

### 7.1.1. Plans

- Catchment Flood Risk Assessment and Management Programme (CFRAM) (OPW, 2018)
- Climate Action Plan 2024 (DCEE, 2024)
- Galway City Biodiversity Action Plan Revision 2025 to 2030 (Galway City Council, 2023)
- Galway City Climate Action Plan 2024-2029 (Galway City Council, 2024)
- Galway City Development Plan 2022-2029 (Galway City Council, 2022)
- Galway City Heritage and Biodiversity Plan 2021-2026 (Galway City Council, 2021)
- Galway County Climate Action, Heritage and Biodiversity Plan 2024 – 2030 (Galway County Council, 2024)
- Galway County Development Plan 2022-2028 (Galway County Council, 2022)
- Ireland Nature Restoration Plan (planned launch 2026) (currently undetermined following failure to ratify at EU Environment Council, 2024)
- National Biodiversity Action Plan 2023-2030 (DHLGH, 2024)
- Lead in Drinking Water Mitigation Plan (UÉ, 2016)

- Marine Protected Areas (MPAs) Bill (DHLGH, 2022)
- National Adaptation Framework (DCEE, 2018)
- National Development Plan 2021-2030 (DPER, 2021)
- National Marine Planning Framework (NMPF) (DCEE, 2021)
- National Planning Framework Ireland 2040 (DHLGH, 2018)
- National Wastewater Sludge Management Plan (UÉ, 2016)
- Northern and Western Regional Spatial and Economic Strategy 2020-2032 (RSES) (Northern and Western Regional Assembly, 2020)
- Regional Water Resources Plan – North & West (UÉ, 2023)
- River Basin Management Plan for Ireland 2022-2027 (DHLGH, 2024)
- UÉ Biodiversity Action Plan (UÉ, 2021)
- Water Quality and Water Services Infrastructure, Climate Change Sectoral Adaptation Plan (DHPLG, 2019)
- WSSP2050 (UÉ, 2025)
- Water Services Policy Statement 2024-2030 (WSPS) (DHLGH, 2024)

### 7.1.2. Projects

- Athenry Sewerage Scheme Network Upgrade
- Galway City Wastewater Network Upgrades
- Galway Harbour Extension
- N6 Galway City Ring Road
- Upgrade works to SSE Renewables Derradda wind turbine park
- Gannow Ltd wind turbine development
- RWE Renewables Ireland wind turbine development

## 7.2 Summary of assessment of in-combination effects

Full details relating to the Plans and Projects, in addition to the assessment of AESI of the GWS in-combination with other Plans and Projects is presented in the Draft GWS**.** Following assessment of AESI of the GWS in-combination with other Plans and Projects, it has been determined that in-combination AESI of GWS on European Sites is not anticipated based on the plan-level detail.

**Table 7-1. In-combination assessment of Adverse Effects on Site Integrity (AESI) of GWS on European Sites in relation to the Plans and Projects listed in Section 7.1 above [Y = Yes; N = No].**

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| **Catchment Flood Risk Assessment and Management Programme (CFRAM)**<br>The programme aims to provide a comprehensive picture of flood risk and develop sustainable, catchment-based strategies for prevention, protection, and preparedness. | Potential adverse effects of the plan include:<br>• Habitat degradation – hydrological changes<br>• Habitat degradation – hydrogeological changes | The CFRAM Programme identifies measures and options for managing the flood risks for localised high-risk areas within catchments as a whole and prepares a strategic Flood Risk Management Plan. The GWS would further help to reduce the flood risk and would instead have cumulative benefits to the receptors. As such, no AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **Climate Action Plan 2024**<br>A roadmap of actions to meet national climate objective the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy by 2050. | N/A | This plan outlines high-level aims to protect, enhance and mitigate for climate resilience, biodiversity, and environmental sustainability throughout the plan area. Protection of European Sites is inherent to the plan.<br>No AESI are anticipated as a result of this Plan in-combination with GWS. | N |
| **Galway City Biodiversity Action Plan Revision 2025 to 2030**<br>The plan aims to identify sources and compile information in relation to the local biodiversity of an area, to set out a framework with a series of actions to protect local biodiversity, to raise awareness of biodiversity, its importance (locally and globally), and to encourage | N/A | This Plan outlines high-level aims to protect, enhance and mitigate for biodiversity throughout the plan area. Protection of European Sites is inherent to the plan.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |

[33] [Y = Yes; N = No]

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| involvement of stakeholders to protect and enhance biodiversity in the area. | | | |
| **Galway City Climate Action Plan 2024-2029 (GCCAP)**<br>The plan aims to reduce greenhouse gas emissions across its own assets and infrastructure, in addition to influencing, facilitating, and co-ordinating the climate actions of communities and other stakeholders. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | The GCCAP sets out how Galway City Council aims to contribute its share to achieving national climate objectives over the next 5 years and beyond toward 2050. It will act as a key instrument that strengthens the links between national and international climate policy and the delivery of effective climate action at local and community levels, through place-based climate action.<br>Under Action ID 23, the GCCAP supports the upgrade of stormwater pipe capacity in collaboration with UÉ, arising from the completion of the GWS. Therefore, any in-combination effects would be assessed within a project-level environmental assessment for any project arising from the GWS.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **Galway City Development Plan 2022-2029**<br>The plan sets out the policies and objectives for the development of Galway City over the plan period | According to the AA, if unmitigated, the Galway City Development Plan result in significant effects on 11 European Sites. Potential significant effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality | The Galway City Development Plans sets an agenda for development to make adequate provision for the scale of population growth projected in Galway City. The GWS will propose wastewater strategies to meet the projected demand.<br>The plan NIS states: Having incorporated mitigation measures, the plan is not foreseen to give rise to any effect on the integrity of European Sites, alone or in -combination with other plans or projects (except as | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Habitat degradation – hydrological changes<br>• Disturbance of species | provided for in Article 6 (4) of the Habitats Directive, viz. there must be: (a) no Alternative Solution available, (b) imperative reasons of overriding public interest for the plan to process; and (c) Adequate compensatory measures in place. This evaluation is made in view of the conservation objectives of the habitats or species, for which these sites have been designated). [34] | |
| **Galway City Heritage and Biodiversity Plan 2021-2026**<br>The plan aims to identify, raise awareness of, and promote the built, cultural, natural, intangible heritage of the city and integrate it into the aims of Galway City Council. | N/A | This plan outlines high-level aims to protect, enhance and mitigate for local heritage biodiversity throughout the plan area. Protection of European Sites is inherent to the plan.<br>No AESI are anticipated as a result of this Plan in-combination with GWS. | N |
| **Galway County Climate Action, Heritage and Biodiversity Plan**<br>The plan aims to deliver transformative climate mitigation and adaptation actions across the county and within our own organisation while ensuring a just transition. | N/A | This plan outlines high-level aims to protect, enhance and mitigate for climate resilience, heritage and biodiversity throughout the plan area. Protection of European Sites is inherent to the plan.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **Galway County Development Plan 2022-2028** | Potential adverse effects of the plan include:<br>• Habitat loss – temporary | According to the plan Natura Impact Report[35], In-combination effects from interactions with other plans and projects was considered in the assessment and the | N |

[34] https://consult.galwaycity.ie/en/consultation/galway-city-development-plan-2023-2029-0

[35] CAAS Ltd. (2022) Consolidated Natura Impact Report – Galway County Development Plan 2022-2028

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| The plan sets out a range of policy objectives supporting development which seeks to develop in a sustainable and environmentally sensitive manner. It promotes climate change agenda and sets out the housing and economic priorities for the relevant period. | • Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Disturbance of species | mitigation measures incorporated into the Plan, are seen to be robust to ensure there will be no significant effects as a result of the implementation of the Plan either alone or in-combination with other plans/projects.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **Ireland Nature Restoration Plan**<br>This plan is in draft and is aimed at reversing biodiversity loss and restoring ecosystems. It aligns with the EU's Nature Restoration Law. The plan focuses on strengthening food security, providing safe drinking water, reducing air pollution, and sustaining livelihoods and well-being for society. | • N/A | This plan outlines high-level aims to strengthen food security, provide safe drinking water, reducing air pollution, and sustaining livelihoods and well-being for society. The plan aims protect, enhance biodiversity throughout the plan area. Protection of European Sites is inherent to the plan.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **Lead in Drinking Water Mitigation Plan (LDWMP)**<br>The plan provides a framework of measures for implementation to effectively address the currently elevated levels of lead in drinking water experienced by some UÉ customers as a result of lead piping. Corrective water treatment will include pH adjustment and orthophosphate treatment to reduce plumbosolvency risk over the short to | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes | As per the plan AA, the policies and objectives of the LDWMP were devised to anticipate and avoid, as appropriate, measures that would likely have AESI on European Sites. The potential for direct, indirect and cumulative impacts affecting European Sites was assessed in the plan NIS. The appraisal undertaken in the NIS was informed by modelling and specialist reporting with reference to the ecological communities and habitats potentially affected by the Plan, in order to provide a scientific basis for evaluations. The AA determined that the plan would not result in AESI on any | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| medium term. Enhanced wastewater treatment (to remove an equivalent amount of phosphorus levels arising from the Orthophosphate treatment at the Water Treatment Plant) is relevant to GWS, | • Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species | European Sites within the study area alone or in-combination with any Plans or Projects.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **Marine Protected Areas (MPAs) Bill**<br>The draft legislation is intended to work in parallel with the Maritime Area Planning Act (2021) and the suite of existing legal biodiversity protection measures. The bill aims to effectively balance all conservation requirements and the long-term, sustainable use of Ireland's valuable and diverse marine environment. | • N/A | This MPAs Bill outlines high-level aims balance all conservation requirements and the long-term, sustainable use of Ireland's valuable and diverse marine environment. Protection of European Sites is inherent to the MPAs Bill.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **National Adaptation Framework (NAF)**<br>The NAF outlines a whole of government and society approach to climate adaptation in Ireland. It also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector, and the research community. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality | The NAF outlines high-level aims to improve the enabling environment for climate adaptation throughout the plan area. The NAF specifies the national strategy for applying adaptation measures in different sectors. In water quality and water services infrastructure, it encourages measures to adopt the 'integrated catchment management' approach. The GWS is relevant to the implementing of measures identified and addressing the recommendations of the NAF. Therefore, any in-combination effects would be assessed within a project-level environmental assessment for any project arising from the GWS. | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **National Biodiversity Action Plan 2023-2030**<br>The plan aims to deliver transformative changes required to the ways in which the government and society value and protect nature. | N/A | This Plan outlines high-level aims to protect, enhance and mitigate for biodiversity throughout the plan area. Protection of European Sites is inherent to the Plan.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **National Development Plan 2021-2030**<br>The plan sets out the government's over-arching investment strategy and budget. The plan aims to balance the significant demand for public investment across all sectors and regions of Ireland, with a major focus on improving the delivery of infrastructure project to ensure speed of delivery and value for money. | N/A | This investment includes the projects and programmes committed to in UÉ's Capital Investment Plan 2020-2024 approved by the Commission for Regulation of Utilities under Revenue Control 3.5. The GWS has taken into account population and economic growth and the related requirements for wastewater services. As this plan is focused on investment strategy and budget, no AESI is anticipated as result of the plan alone or in-combination with other Plans or Projects.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **National Marine Planning Framework (NMPF)**<br>The plan aims to bring together all marine-based human activities, outlining the Government's vision, objectives, and | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality | The NMPF provides policies for sustainable planning and management of marine resources, balancing ecological, economic and social objectives in relation to aspects such as the environment, biodiversity, commercial fisheries, and renewable energy. As part of this, the NMPF includes specific objectives and planning policies related to water | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| marine planning policies for each marine activity. | • Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | quality and to wastewater treatment and disposal which have been taken into account in the development of the GWS.<br>In accordance with the NMPF NIS[36], projects arising from the NMPF would require environmental assessment, including project-specific screening, avoidance, mitigation measures or Alternative Solution assessment, where necessary. As a result, no AESI is anticipated as a result of the NMPF.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **National Planning Framework Ireland 2040 (NPF)**<br>The National Planning Framework and the National Development Plan 2021-2030 combine to form Project Ireland 2040. The NPF sets the vision and strategy for the development of our country to 2040 and the NDP provides the enabling investment to implement that strategy. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS | The NPF details the overarching policy and planning framework for the social, economic, and cultural development of our country. Environmental considerations have been integrated into the NPF. In accordance with the NPF NIS[37], projects arising from the NPF would require environmental assessment, including project-specific screening, avoidance, mitigation measures or Alternative Solution assessment, where necessary. As a result, no AESI is anticipated as a result of the NPF.<br>No AESI are anticipated as a result of the NPF in-combination with GWS. | N |

[36] https://assets.gov.ie/static/documents/national-marine-planning-framework-post-consultation-natura-impact-statement-nis.pdf

[37] http://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Disturbance of species<br>• Mortality | | |
| **National Wastewater Sludge Management Plan (NWSMP)**<br>The plan sets out a nationwide standardised approach to ensure that treated wastewater sludge is effectively managed, stored, transported, and re-used in a sustainable way, to safeguard public health and the environment. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | The NWSMP sets out a nationwide standardised approach to ensure that treated wastewater sludge is effectively managed, stored, transported, and re-used in a sustainable way, to safeguard public health and the environment. This plan is relevant to GWS. The draft NIS[38] states: that all actions arising from the NWSMP will require adherence to mitigation measures detailed in the draft NIS (and subsequently NWSMP), and relevant regulator provisions, in an aim to prevent pollution and other AESI of European Sites. Actions arising from the NWSMP also require project-level environmental assessment, including AA where necessary.<br>No AESI are anticipated as a result of the NWSMP in-combination with GWS. | N |
| **Northern and Western Regional Spatial and Economic Strategy 2020-2032 (RSES)**<br>The strategy provides a high-level development framework for the Northern and Western Region that supports the implementation of the National Planning | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality | The RSES details the overarching policy and planning framework for the social, economic and cultural development of the northern and western region. Environmental considerations have been integrated into the RSES. In accordance with the NPF NIS[39], projects arising from the RSES would require environmental assessment, including project-specific screening, | N |

[38] https://www.water.ie/sites/default/files/iw-documents/our-projects/NWSMP_NIS_sep.pdf

[39] https://www.nwra.ie/pdfs/NWRA-RSES-2020-2032.pdf

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| Framework (NPF) and the relevant economic policies and objectives of Government. | • Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | avoidance, mitigation measures or Alternative Solution assessment, where necessary. As a result, no AESI is anticipated as a result of the RSES.<br>No AESI are anticipated as a result of the RSES in-combination with GWS. | |
| **Regional Water Resources Plan – North & West (RWRP)**<br>The plan aims to review water supply needs collectively for the entire North West region and across the spectrum of risk including quality, quantity, reliability, and sustainability. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | The RWRP details long term interventions through long term Catchment Management and nature-based solutions opportunities to reduce pollution in groundwater and surface waters and water treatment issues. The RWRP is relevant to GWS. In accordance with the RWRP NIS[40], implementation of appropriate mitigation for protecting European Sites, there will be no AESI of any European Site(s), either alone or in-combination with other Plans or Projects.<br>No AESI are anticipated as a result of the RWRP in-combination with GWS. | N |
| **River Basin Management Plan for Ireland 2022-2027 (RBMP)** | Potential adverse effects of the plan include: | The GWS has taken into account the objectives and targets of the RBMP for the environment and the specific | N |

[40] https://www.water.ie/sites/default/files/docs/rwrp-northwest/2023/Regional-Water-Resources-Plan-North-West-NIS.pdf

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| The RBMP sets out the measures that are necessary to protect and restore water quality in Ireland. The overall aim of the plan is to ensure that our natural waters are sustainably managed and that freshwater resources are protected so as to maintain and improve Ireland's water environment. | • Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | actions identified for UÉ. The GWS would have significant benefit on the outcome of the RBMP. The integration of the GWS into RBMP has led to more holistic and sustainable water resource management.<br>In accordance with the RBMP NIS[41], implementation of appropriate mitigation for protecting European Sites, there will be no AESI of any European Site(s), either alone or in-combination with other Plans or Projects.<br>No AESI are anticipated as a result of the RBMP in-combination with GWS. | |
| **UÉ Biodiversity Action Plan (BAP)**<br>The BAP aims to help conserve, enhance, and work with the natural environment. The BAP outlines our strategic aims and the actions UÉ will take to achieve them. | N/A | This Plan outlines high-level aims to protect, enhance and mitigate for biodiversity throughout the plan area.<br>No AESI are anticipated as a result of this Plan in-combination with GWS. | N |
| **Water Quality and Water Services Infrastructure, Climate Change Sectoral Adaptation Plan**<br>The plan is focused on managing the risks from climate change for water quality and for water services infrastructure and describes the key risks and proposes necessary adaptive measures. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes | The plan is a set of adaptive measures to address impacts of climate change, specifically related to water quality and for water services infrastructure. The adaptive measures relevant to UÉ and GWS include increasing wastewater network capacity; improvement of asset management; monitoring programmes; planning and flood defence; and development of integrated catchment management and nature-based solutions. | N |

[41] https://assets.gov.ie/static/documents/water-action-plan-appendix-11-eau-determination.pdf

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan would require environmental assessment, including project-specific screening, avoidance, mitigation measures or Alternative Solution assessment where necessary. As a result, no AESI is anticipated as a result at the plan-level stage.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **Water Services Strategic Plan 2050 (WSSP)**<br>The plan presents UÉ's objectives for the next 25 years and the means by which we will achieve them. It aligns with requirements set out in the Water Services (No. 2) Act 2013. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | Given the overarching strategies and objectives within the WSSP to protect the environment, and with the implementation of mitigation measures, including project-level AA, no AESI of European Sites are anticipated as a result of in-combination effects.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| **Water Services Policy Statement 2024-2030 (WSPS)**<br>The statement will contribute to the development of water services policy in the short and medium term through the objectives and priorities established in the statement and it will provide a framework for UÉ to consolidate and develop public water services through its Strategic Funding Plan. | Potential adverse effects of the plan include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | The WSPS provides the framework within which funding and investment plans are agreed. It sets out the priorities of government regarding the provision of water services during the period of a WSSP (see above). In accordance with the WSPS AA (within SEA report)[42], overarching mitigation measures as detailed in the SEA are adhered to for any activities arising from the WSPS. In addition, projects arising from the WSPS would require environmental assessment, including project-specific screening, avoidance, mitigation measures or Alternative Solution assessment, where necessary. As a result, no AESI are anticipated as a result of the WSPS.<br><br>No AESI are anticipated as a result of the WSPS in-combination with GWS | N |
| **Athenry Sewerage Scheme Network Upgrade**<br>The project aims to upgrade the wastewater network infrastructure in Athenry, reducing the risk of sewer flooding and addressing non-compliant sewer overflows into the River Clarin. | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan in would require environmental assessment, including project-specific screening, avoidance, mitigation measures, or Alternative Solution assessment where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have | N |

[42] https://www.water.ie/sites/default/files/2024-06/Draft-Water-Services-Strategic-Plan-2050-SEA-Environmental-Report.pdf

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **Galway City Wastewater Network Upgrades**<br>The project involves the repair and relining of the existing sewers where defects were identified, thereby reducing odour issues and sewer flooding in the area. | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan would require environmental assessment, including project-specific screening, avoidance, mitigation measures, or Alternative Solution assessment, where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **Galway Harbour Extension**<br>The project involves extension of the existing harbour in Galway. | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan in would require environmental assessment, including project-specific | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | screening, avoidance, mitigation measures, or Alternative Solution assessment where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **N6 Galway City Ring Road**<br>The project involves development of a ring road circumventing Galway City. | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan in would require environmental assessment, including project-specific screening, avoidance, mitigation measures, or Alternative Solution assessment where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI. | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | | No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **Upgrade works to SSE Renewables Derradda wind turbine park**<br>10-year permission for a change to the dimensions of nine previously consented turbines (Galway County Council Planning Reference 10/303 and 11/429 and An Bord Pleanala Planning Reference PL07.239118). | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan in would require environmental assessment, including project-specific screening, avoidance, mitigation measures, or Alternative Solution assessment where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |
| **Gannow Ltd. wind turbine development**<br>The project comprises a 10-year development of 8 no. wind turbines and associated infrastructure. | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan in would require environmental assessment, including project-specific screening, avoidance, mitigation measures, or Alternative Solution assessment where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental | N |

| Plan/Project | Potential effect(s) | Potential for in-combination effects and mitigation | In-combination AESI? (Y/N)[33] |
|---|---|---|---|
| | • Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | |
| **RWE Renewables Ireland wind turbine development**<br>The project comprises of 11 no. wind turbines and associated infrastructure. | Potential adverse effects of the project include:<br>• Habitat loss – temporary<br>• Habitat loss – permanent<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | In line with Habitats Directive Article 6(3), consent for the proposals arising from the plan cannot be granted unless the prerequisites set by Article 6(4) are met. Therefore, projects arising from the plan in would require environmental assessment, including project-specific screening, avoidance, mitigation measures, or Alternative Solution assessment where necessary.<br>The NIS for the GWS (herein) has also identified the requirement for project-level environmental assessments, while high-level mitigation measures have been outlined in Section 8 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European Sites from in-combination effects that could lead to AESI.<br>No AESI are anticipated as a result of this plan in-combination with GWS. | N |

# 8. Mitigation

The optioneering phase of the development of the GWS incorporated measures to avoid AESI, as detailed in Section 3. The optioneering methodology applied to the GWS during development considered the avoidance of European Sites. Many of the LSEs identified during the AA screening can be addressed with standard mitigation measures applied at the project-level. Avoidance and mitigation measures specific to the remaining option types within the GWS are detailed in Sections 8.1 and 8.2, respectively.

The assumptions of the GWS options include the implementation of standard mitigation measures, such as the operation of the strategy in line with regulatory requirements and the use of good construction practice. Examples of standard measures expected to be embedded in the design and development of infrastructure options are listed in Table 8-1.

**Table 8-1. Assumptions of GWS construction activities.**

| Topic | Objective |
|---|---|
| Studies and surveys | Feasibility and scheme option studies including detailed pipeline routing, siting, and technology options to avoid and minimise effects on European Sites, QIs/SCIs and supporting habitats. |
| | Studies, surveys and consultation on environmental effects of proposed development following relevant good practice guidance to inform design, identify relevant mitigation and to support appropriate planning permission and licencing processes. |
| | Investigation, monitoring, and modelling studies for water discharge to be agreed where relevant in context of schemes meeting WFD no deterioration requirements and RBMP objectives. |
| Works programme | The works programme and requirements for each option will be determined at the earliest opportunity to allow surveys and mitigation to be appropriately scheduled and to provide sufficient time for consultations with bodies such as the NPWS, EPA, and Inland Fisheries Ireland (IFI). |
| | Studies, surveys, and consultation to inform timing of construction activities for any works arising from the GWS. |
| Short term / construction impacts | Use of construction techniques that avoid or minimise disruption to major infrastructure (rail and strategic road networks) and river crossings such as directional drilling (where appropriate). |
| | No works to take place within or in close proximity to European Sites without necessary consents in place. Impacts to be avoided and |

| Topic | Objective |
|---|---|
| | mitigated for through detailed routing and trenchless construction approaches or timing to avoid disturbance where appropriate. |
| | Appropriate permissions and consents to be obtained for all works which may affect a European protected species or nationally protected species. |
| | A suitably qualified and experienced ecological clerk of works (ECoW) to carry out site supervision works during activities that affect sensitive habitats and species, ensure that site specific mitigation identified following surveys is undertaken. |
| | Appropriate watercourse consents and environmental permits to be obtained for construction activities in or near water. |
| | Consent for noisy works to be obtained and noise barriers used where required. |
| | Best practice measures to control noise, air, and water pollution in accordance with guidance. |
| Long term mitigation (outside permanent footprints) | Full reinstatement of all habitat types, including hedgerows, and provision of compensation habitat where appropriate. |
| | Full reinstatement of landscape features, and good management practice for the long-term restoration of landscape features. |

## 8.1 Avoidance

While Options 7 and 9 of the GWS have the potential to require construction within and/or adjacent to European Sites, avoidance of QI habitats and/or habitats on which QIs rely is inherent to the GWS. This includes avoiding construction within European Sites in the first instance, followed by avoiding sensitive areas as per mapped habitat areas[43]. While avoidance of European Sites is not possible for all outfall options, avoidance of European Sites will be incorporated into WWTP proposed area determination. Furthermore, standard mitigation measures will be applied to all options, as detailed in Section 8.2 below.

## 8.2 Mitigation measures

In addition to the best practice measures described above, additional mitigation measures and further study requirements have been identified for each option. Habitat/species-specific mitigation measures must be determined at the project-level, following detailed habitat/species

[43] https://www.npws.ie/maps-and-data/habitat-and-species-data

surveys. Detailed species-specific mitigation measures will vary according to a range of factors that cannot be determined at the GWS plan-level. In addition, some general 'best-practice' measures may not be appropriate to the QI/SCI of the European Sites concerned (for example, seasonal restrictions of activities that may impact breeding birds compared to wintering birds, such as vegetation removal). Where options require Environmental Impact Assessment (EIA) and planning permission, mitigation will be identified through this detailed assessment and approval process. For smaller scale development, mitigation would be identified though environmental review and application of good practice guidance. The following sections detail impact-specific measures to be incorporated into construction and operational phases of projects arising from the GWS.

### 8.2.1. Habitat loss - temporary or permanent

Where practical, pipelines will be constructed within existing public roads, therefore limiting or avoiding the potential for habitat loss of Annex I habitat and/or supporting habitat of Annex II species. In the first instance, new infrastructure such as WWTPs will be constructed outside of European Sites, as detailed in Section 8.1 above. Where European Sites cannot be avoided, detailed surveys of habitats within the affected area will be undertaken to locate and avoid sensitive habitats to ensure there is no loss of QI Annex I habitats or supporting habitat of Annex II species. Surveys focusing on mobile QI species/SCIs will ensure any significant areas of supporting habitat (for example, foraging areas for SCI birds very near but outside of an SPA, otter holts outside an SAC boundary) will be identified and avoided or appropriate mitigation measures put in place to protect them. Similarly, any upgrade of existing infrastructure within or adjacent to European Sites will aim to avoid impacts on these habitats and species through appropriate adaptation of design, through the use of directional drilling and pipejacking crossings for example.

Implement best practice construction methods to minimise effects of temporary habitat loss. Habitat is to be reinstated on completion. This will require ecology surveys to be undertaken prior to design to inform the appropriate location or recommendation of design features to safeguard QIs.

The incorporation of BNG into UÉ projects and plans is a rapidly evolving area with certain Local Authorities requiring UÉ to demonstrate a biodiversity gain as part of planning submissions. There is currently no national approach to this, and not all Local Authorities require demonstration of BNG, although this is likely to change in the future.

To mitigate biodiversity loss (i.e. loss or degradation of Annex I habitats and/or supporting habitats of Annex II species), the following hierarchical approach is recommended for both options and all projects arising from the GWS:

- **Green infrastructure:** Constructed wetlands in naturally occurring basin areas may present a sustainable stormwater management intervention, reducing peak flows, improving water quality, and enhancing biodiversity. By integrating these systems as public amenities with walking trails and green spaces, they offer dual benefits of flood resilience and community recreation.
- **Avoid impact:** Identify existing biodiversity and assess the potential impact; Integrate biodiversity considerations early in the design process; Explore alternative locations,

designs, and construction methods to minimise impact (where possible); Prioritise nature-based solutions, such as SuDS for surface water management.

- **Reduce impact:** Minimise working area; Schedule works outside of sensitive seasons for key species; Design lighting to be wildlife-friendly; Reduce habitat loss (e.g., using grasscrete or similar instead of hard surfaces); Support natural regeneration through local seed sourcing; and
- **Restore biodiversity:** Enhance wildlife corridors through landscaping; Control and replace INNS with native vegetation; Plant native species that support birds and pollinators; Replant vegetation over pipelines and explore habitat creation opportunities; Enhance existing natural areas to support wildlife.

### 8.2.2. Habitat degradation - air and water quality changes

Best practice construction measures will be incorporated into project proposals for each option arising from the GWS, including pollution prevention measures - for example, ensuring that sufficient working area is available for pollution prevention measures to be installed, such as bunding or sediment curtains. Additionally, operational phrase processes required to ensure no adverse effects occur, including dispersion studies to assess impacts of effluent discharged from outfalls. Pollution prevention measures will be detailed in a project-specific Construction Environmental Management Plan (CEMP). Best practice construction methodologies are based on the following guidance:

- Construction Industry Research and Information Association (CIRIA) C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide.
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance.
- CIRIA C692: Environmental Good Practice on Site.
- Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes[44]; and
- Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.

The best-practice procedures and measures detailed in these documents will be adhered to for all construction activities arising from the GWS as a minimum standard, unless further studies or project-specific assessments identify additional measures and/or more appropriate measures to mitigate for site/project-specific impacts. In addition, the GWS will include adoption of higher design standards and operation practices to minimise reduction in air and water quality from the expanded and new WWTP(s). Implement best practice construction methods to reduce fugitive dust and toxic gas emission.

[44] https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Crossing-of-Watercourses-during-the-Construction-of-National-Road-Schemes.pdf

### 8.2.3. Habitat degradation hydrological and hydrogeological changes

The projects arising from the GWS will require appropriate consent(s) from the relevant regulatory body (e.g. OPW, EPA, DHLGH), including marine area consents and discharge consents. The projects arising from the GWS must demonstrate that they can be implemented without AESI on European Sites. Where adverse effects from proposals remain following mitigation, in line with Habitats Directive Article 6(3), consent for the proposals cannot be granted unless the prerequisites set by Article 6(4) are met.

The best-practice procedures and measures detailed in these documents will be adhered to for all construction activities arising from the GWS as a minimum standard, unless further studies (detailed in Section 8.3) or project-specific assessments identify additional measures and/or more appropriate measures to mitigate for site/project-specific impacts.

### 8.2.4. Habitat degradation – spread of INNS

INNS surveys will be undertaken for any proposed projects that may arise from the GWS. If INNS are found to be present, an INNS Management Plan will be prepared by a suitably experienced specialist to outline the control and/or removal measures. These measures will ensure such species are not spread during construction or operation of any GWS projects that may arise from options outlined within the GWS. If removing an INNS from a site, application to the NPWS for a licence to do so will be required (under Regulation 49 of S.I. 477/2011). All works relating to INNS will be implemented in line with relevant national guidelines as well as those relevant guidelines produced by UÉ, including the following:

- UÉ Biodiversity Action Plan[45];
- UÉ Water Guidance on the Management of Giant Hogweed[46]; and
- UÉ Guidance on the Management of Himalayan Balsam[47].

INNS management methodologies will be based on the following guidance:

- A manual for the management of vertebrate invasive alien species of Union concern, incorporating animal welfare. 1st Edition. Technical report prepared for the European Commission (Smith, *et al*., 2022).
- Code of Practice. Management of Japanese knotweed (Property Care Association, 2018).
- Guidance Note. Root barrier and Japanese knotweed Remediation (Property Care Association, 2019)
- Management of Invasive Alien Plant Species on National Roads – Standards (Transport Infrastructure Ireland, 2020).
- Management of Invasive Alien Plant Species on National Roads – Technical Guidance (Transport Infrastructure Ireland, 2020).

[45] https://www.water.ie/projects/strategic-plans/biodiversity-action-plan

[46] https://www.water.ie/sites/default/files/iwstandards/IW-AMT-GL-001.pdf

[47] https://www.water.ie/sites/default/files/iwstandards/IW-AMT-GL-002.pdf

- RAPID (Reducing and Preventing IAS Dispersal) LIFE project – Good Practice Management guidance documents for the following species:
    - American mink *Neovision vison*
    - American skunk cabbage *Lysichiton americanus*
    - Carpet sea squirt *Didemnum vexillum*
    - Curly waterweed *Lagarosiphon major*
    - Floating pennywort *Hydrocotyle ranunculoides*
    - Giant hogweed *Heracleum mantegazzianum*
    - Himalayan balsam
    - Japanese knotweed
    - New Zealand pigmyweed
    - Pacific Oyster *Crassostrea gigas*

To safeguard relevant QIs/SCIs, pre-construction surveys will be undertaken for all projects arising from the GWS where required – as determined by a suitably experienced ecologist. Additionally, the implementation of seasonal construction methodology and/or location restrictions may be required. Furthermore, works in sensitive areas will be supervised by a suitably experienced ecologist, with appropriate qualifications to manage the risks associated with the specific QIs/SCIs of the relevant European Site(s).

### 8.2.5. Disturbance and mortality of species

As detailed in Table 8-1 above, implement best practice construction methods to minimise direct and indirect disturbance effects (including physical and noise disturbance) to mitigate disturbance, displacement and mortality of species. Project-level environmental assessment will also be required to assess project-specific construction activities in order to robustly evaluate likely impacts, determine the level and extent of mitigation and the requirement for European Protected Species (EPS) mitigation licences.

Furthermore, habitat is to be reinstated on completion, or if unavoidable, habitat reinstatement, and/or enhancement to be considered to replace damaged or lost habitat to mitigate disturbance or displacement of species as an effect of construction.

## 8.3 Further assessments and data to inform potential effects

As detailed in Sections 8.1 and 8.2, project-level environmental assessments of the projects arising from the GWS will be required in order to assess the potential effects to European Sites, including AA screening and NIS where necessary. This will include habitat and species surveys of any proposed areas of projects arising from the GWS.

In addition, hydrological and hydraulic modelling, informed by the latest climate data and local catchment characteristics, should be used to identify flood-prone areas and inform resilient site

design and asset placement. Hydrodynamic modelling is also required to determine dispersion effects of outfall effluent/discharge.

Furthermore, tidal infiltration can have a significant impact on water quality, wastewater network capacity, and operational efficiency, and has therefore been identified as a major issue. A salinity study will quantify these effects and determine the feasibility of targeted mitigation measures. Potential applications in the GWS Study Area include:

- Tidal impact verification – conduct site-specific salinity testing at key locations where model outputs indicate significant tidal influence (e.g., Salthill, Claddagh Quay, etc.).
- Reduction of unnecessary storage requirements – assess whether excluding tidal infiltration from the model would result in downsized infrastructure needs at locations such as Claddagh Quay SWO, Long Walk SWO, and Oranmore SWO.
- Design optimisation – develop mitigation strategies such as non-return valves or tide gates to minimise saline ingress at high-risk entry points; and
- Measure pre and post rehabilitation effects and update models to reflect residual measures to meet long term targets.

# 9. Conclusion

The GWS is a regional level strategy identifying the options necessary to facilitate provision of sustainable wastewater drainage systems and infrastructure for the Greater Galway Area between now and 2080. The avoidance and/or mitigation of adverse impacts to European Sites has been integrated in the optioneering phase of the GWS, and alternative options have been considered. The GWS includes two options (Option 9 and 7), both of which were considered for further assessment to determine whether they could lead to an AESI on European Sites. Eleven European Sites were assessed for AESI in accordance with AA screening, with re-screening herein following refinement of the GWS. Nine potential pathways of effect were identified and assessed in relation to the GWS, including:

- Habitat loss – temporary.
- Habitat loss – permanent.
- Habitat degradation – changes in water quality.
- Habitat degradation – hydrological changes.
- Habitat degradation – hydrogeological changes.
- Habitat degradation – changes in air quality.
- Habitat degradation – spread of INNS.
- Disturbance of species; and
- Mortality.

In-combination effects with other Plans and Projects were assessed within the NIS. Based on the NIS herein, incorporating the avoidance and mitigation measures detailed in Section 8 and detailed for each European Site in Table 7-1 adverse effects on the integrity of the European Sites are not anticipated at plan-level, alone or in-combination with other Plans or Projects. In line with Habitats Directive consent for the proposals arising from the GWS cannot be granted unless the prerequisites of the Habitats Directive are met. Therefore, projects arising from the plan would require environmental assessment, including project-specific screening, avoidance, mitigation measures or Alternative Solution assessment, where necessary. These projects cannot be granted unless the prerequisites set by Article 6(4) are met.

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# Appendix A – AA Screening Report

Uisce Éireann
Irish Water

Report: Sept 2024

# Draft Galway Wastewater Strategy

## (Galway Metropolitan Area, Athenry & Moycullen)

## Appropriate Assessment Screening Report

UE/FF/LDB/0323

# Safeguarding our water for our future

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This report has been prepared by the Ryan Hanley Stantec Joint Venture ('Ryan Hanley Stantec") on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which both Ryan Hanley and Stantec were appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Ryan Hanley Stantec JV accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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# 1. Introduction

The economic success of the Galway Metropolitan Area (GMA) and surrounding areas under the National Spatial Strategy has led to very significant growth in these areas. As a result of this growth, the wastewater infrastructure is challenged to keep pace with the increased demand for new serviced land for housing, commercial development, and industry. As such, Ryan Hanley Stantec (RHS) was appointed by Uisce Éireann to prepare and deliver a wastewater drainage strategy for these areas, hereafter referred to as the Galway Wastewater Strategy (GWS). The GWS study area includes the Galway Metropolitan Area, Athenry and Moycullen (**Figure 1.1**).

On the 1st of January 2014, through the Water Services Act (No. 1) 2013, Uisce Éireann (at that time known as Irish Water) assumed statutory responsibility for the provision of public water services and management of water and wastewater investment. Uisce Éireann's responsibility is to ensure that all of its customers (households and businesses) receive a safe and reliable water supply and have their wastewater collected, appropriately treated and returned safely to the environment.

The need for a holistic drainage assessment for the Study Area is evident from the high growth projections, compliance challenges of some of the wastewater treatment plants (WWTPs) and sewerage networks, and wastewater treatment capacity requirements to accommodate current and future wastewater loads and address associated pressures on the quality of receiving waters.

Ultimately the aim of the GWS is to identify sustainable wastewater drainage strategy projects for the study area through to 2080, and to establish whether there are likely significant effects across the synergy of plans and projects, with the identification of disbenefits, growth tolerances, and the development of recommendations to address findings. The delivery of a sustainable, integrated wastewater strategy for the study area requires a strategic approach to wastewater infrastructure planning which incorporates needs of stakeholders, supports economic growth, allows for climate change, and meets the demand of a growing population. A sustainable wastewater strategy must be consistent with statutory obligations and regulatory drivers designed to meet both national and international environmental objectives e.g., Water Framework Directive (WFD) and Urban Wastewater Treatment Directives (UWWTD), and those intended to address the impacts of climate change.

The Galway Wastewater Strategy (GWS) is subject to the Strategic Environmental Assessment Directive (SEA Directive) Council Directive 2001/42/EC, the Birds Directive (Council Directive 2009/147/EC) and the Habitats Directive (Council Directive 92/43/EEC). This Appropriate Assessment (AA) Screening Report is required under the Habitats and Birds Directives and was prepared in alignment with the accompanying Strategic Environmental Assessment (SEA) Scoping Report.


**Figure 1-1: GWS Study Area**

## 1.1 Terminology

For the avoidance of doubt, the following terminology will be used throughout the report:

- The Plan: the works associated with the implementation and operation of GWS; and
- European Sites: Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

## 1.2 Aims of this report

The EU Habitats Directive 92/43/EEC (the Habitats Directive) and the Birds Directive (Council Directive 2009/147/EC) provide legal protection to habitats and species of European importance. The Habitats Directive protects habitats and species of community interest through establishment and conservation of a network of sites across Europe, which are referred to as the Natura 2000 network (hereafter referred to as European sites). European sites comprise Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

This report provides information in support of a Screening for Appropriate Assessment (AA) of the GWS in line with the requirements of Article 6(3) of the EU Habitats Directive. It assesses the potential for "likely significant effects" (LSEs) to arise at European site(s) within the Zone of Influence of the GWS strategy (a Project in respect of the conservation objectives of each site.

## 1.3 Legislative Context

### 1.3.1. Underpinning legislation

The Habitats Directive has been transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011) (hereafter referred to as the Habitats Regulations 2011). Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European sites.

Article 6(3) establishes the requirement for AA:

*"Any plan or project not directly connected with or necessary to the management of a European Site, but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

Article 6(4) states:

*"If, in spite of a negative assessment of the implications for the European Site, and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 network is protected. It shall inform the Commission of the compensatory measures adopted."*

Section 177U(1) of the Act states that:

*"A screening for appropriate assessment of a draft Land use plan or application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site."*

Section 177(4) of the Act states that:

*"The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site."*

Where likely significant effects upon a European Site(s) are anticipated, or cannot be excluded, is it the responsibility of the Competent Authority to undertake an 'Appropriate Assessment' under Article 6(3) of the Habitats Directive, informed though a Natura Impact Statement (NIS) to determine whether or not the proposed plan or project would adversely affect the integrity of a European site in light of its Conservation Objectives.

### 1.3.2. Public Authorities and Appropriate Assessment

The duties of public authorities in relation to nature conservation are laid out principally in Article 27 of the Habitats Regulations 2011. Uisce Éireann is defined as a 'public authority' for the purposes of the 2011 Regulations.

The first step of the AA process is to carry out a screening to establish whether, in relation to a particular plan or project, there is potential for LSEs to any European site(s). Specifically, Regulation 42(1) states:

*"Subject to Regulation 42A, a Screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site."*

Regulation 42A applies to situations where the Minister for Housing, Local Government and Heritage is the person responsible for making or adopting the relevant plan or project, so is not applicable in respect of the GWS.

Regulation 42(6) states that:

*"The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site."*

In carrying out the full Appropriate Assessment, the Habitats Regulations 2011 require Uisce Éireann to take into account:

- The NIS;
- Any other plans or projects that may, in combination with the plan or project under consideration, adversely affect the integrity of a European site;
- Any supplemental information furnished in relation to any such report or statement;
- If appropriate, any additional information furnished in relation to the NIS;
- Any information or advice obtained by Uisce Éireann;
- If appropriate, any written submissions or observations made to Uisce Éireann in relation to the application for consent for the GWS; and
- Any other relevant information.

  Following the Appropriate Assessment process, Uisce Éireann must then only adopt the GWS after having determined that the GWS shall not adversely affect the integrity of any European site(s).

## 1.4 Overlap with Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) of the GWS is being carried out concurrently with the AA process. SEA is required under the EU Council Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive) and are transposed into our national legislation via regulations. The purpose of SEA is to enable plan-making authorities to incorporate environmental considerations into decision-making at an early stage and in an integrated way throughout the plan making process and to:

- Identify, evaluate and describe the potential significant environmental effects of implementing the GWS;
- Ensure that identified significant effects are communicated, mitigated and that the effectiveness of mitigation is monitored;
- Identify beneficial (and neutral) effects, and to ensure these are communicated; and
- Provide opportunity for stakeholder and public involvement.

There is a degree of overlap between the requirements of the SEA and AA and, in accordance with best practice, an integrated process has been and will be carried out between the development of the GWS, the SEA and the AA, such as sharing of baseline data where relevant, cohesive assessment of the potential

ecological effects of the GWS on European sites, their qualifying features, and clarification on more technical aspects of the GWS. These processes together will inform and shape the development of the GWS.

The AA Screening Report will be issued with the SEA Scoping Report. In addition, a copy of this AA Screening Report and the SEA Scoping Report will be published online.

Feedback received on the AA Screening Report and the SEA Scoping Report will be reviewed and taken into account as the draft GWS, SEA Environmental Report and NIS are prepared.

As part of the second phase of consultation, Uisce Éireann will carry out a public consultation on the draft GWS together with the SEA Environmental Report and NIS in 2025.

## 1.5 Quality Assurance

This Stage 1 Screening Report for Appropriate Assessment was completed, reviewed and authorised by experienced ecologists, who are affiliated with the Chartered institute of Ecology and Environmental Management (CIEEM).

## 1.6 Consultation

Consultation is a mandatory requirement in the SEA process and responses often make specific reference to the AA process. The CWS will be developed following two phases of consultation. In line with Article 9 (5) of the SEA Regulations (S.I. No. 435 of 2004 as amended by S.I. 200 of 2011), the first consultation will include the SEA Scoping Report being issued to the following statutory Environmental Authorities:

- The Environmental Protection Agency (EPA);
- Department of housing, Local Government and Heritage (DHLGH);
- Department of Environment, Climate and Communications (DECC);
- and the Department of Agriculture, Food and the Marine (DAFM).

The AA Screening Report will be issued with the SEA Scoping Report. In addition, a copy of this AA Screening Report and the SEA Scoping Report will be published online.

Feedback received on the AA Screening Report and the SEA Scoping Report will be reviewed and taken into account as the draft CWS, SEA Environmental Report and NIS are prepared.

As part of the second phase of consultation, Uisce Éireann will carry out a public consultation on the draft GWS together with the SEA Environmental Report and NIS in 2025.

# 2. Development of the GWS

## 2.1 Scope of the GWS

The GWS is a regional level strategy identifying the solutions necessary to facilitate provision of sustainable wastewater drainage systems and infrastructure for the GWS Study Area between now and 2080. The solutions identified will be developed to account for climate change and support economic/ population growth without causing adverse impacts on the environment. The GWS will include the identification of medium and long-term solutions for upgrading and building new wastewater infrastructure up to 2080.

## 2.2 Objectives of the GWS

The key objectives of the GWS include:

- To develop a sustainable wastewater drainage strategy for the GWS study area consistent with the EU Water Framework Directive and Urban Wastewater Treatment Regulations.
- To outline the requirements for wastewater drainage and treatment capable of meeting the demands of the study area in the context of current Development Plans, the National Planning Framework, RSES 2020 – 2032 for Northern and Western Region and longer-term development potential of the area up to 2080.
- Identification of alternative solutions for effective management of wastewater to protect and enhance the environment, support social and economic growth aligning with Uisce Éireann Water Services Strategic Plan (WSSP) and other Uisce Éireann plans and strategies including the National Wastewater Sludge Management Plan (NWWSMP) and the Regional Water Resources Plan (RWRP) North – West.
- Evaluation of alternative solutions and identification of the optimum wastewater drainage solutions having regard to whole-life cost and environmental performance.
- Identification of individual projects for implementing the recommendations of the GWS, together with the prioritisation of such implementation projects.
- To develop an adaptable strategy where outcomes are expected to be linked to volatile influences like climate and population change.

## 2.3 Geographical Scale of the GWS

The study area of the GWS is shown in **Figure 3-1**, and includes the Galway Metropolitan Area (GMA), with the boundary extending to Athenry and Moycullen.

The GWS study area is covered by three catchments namely Galway Bay North (EPA code 31), Corrib (EPA code 30) and Galway Bay South East (EPA code 29) and includes four Uisce Éireann WWTPs namely Mutton Island WWTP (serving Galway City and environs), Athenry WWTP, Moycullen WWTP and Claregalway WWTP.

## 2.4 Temporal Scale

The GWS will provide the strategy for wastewater management in the study area over the period 2025 to 2080 and will be reviewed regularly in light of any significant changes which may alter any conclusions. It is intended that the GWS will be published in Spring 2025, with 2023 as the base years of the study.

## 2.5 Transboundary Effects

The GWS solely covers Uisce Éireann's operational area within and surrounding the GMA which is approximately 100km southwest of the border between the Republic of Ireland and Northern Ireland and is

therefore not a transboundary plan. There are also no shared WFD catchments between the GWS and Northern Ireland. Transboundary effects are therefore not considered any further in the assessment.

## 2.6 Optioneering and Strategy Development

### 2.6.1. Optioneering overview

Optioneering for the GWS will be a complex task which will seek to address challenges relating to hydraulic capacity, wastewater treatment capacity, flooding, environmental compliance, sustainability etc. multiple alternative solutions are possible for each challenge and a final selection will be made with knowledge of sustainable development, energy efficiency, carbon emission and whole life costs.

The general Optioneering and Strategy Selection process for the GWS is listed below and described in more detail in **Sections 2.6.2** to **2.7.2**:

- Development an unconstrained open long list of options for each agglomeration and development of an options hierarchy to be used for ranking of unconstrained options;
- Completion of coarse option-screening to establish constrained options for each agglomeration and design horizon;
- Completion of options shortlisting via primary/ fine screening using a Multi Criteria Assessment (MCA) of the constrained options to develop a short list of feasible options for each agglomeration and design horizon; and
- Strategy selection and phasing based on final assessment of short-listed feasible options.

### 2.6.2. Unconstrained options list

The steps involved in this stage will involve the following:

- Establish a general unconstrained list of possible interventions/ options which could be used to address identified issues. This initial list will not be itemized/ tailored for each individual agglomeration and will not consider in detail the viability of the intervention in terms of cost, scale, environmental issues, practicality, land take etc.
- Develop an unconstrained long list of interventions/ options tailored specifically to each agglomeration/ settlement need and design horizon. The list of interventions will be different for each settlement/ agglomeration and will include options such as existing asset optimisation, asset upgrades, new assets, Nature Based Solutions (NBS), SuDS etc. The long lists will include but not be limited to:
    - No works or Upgrade
    - Minimal Upgrade and Process Optimisation
    - Reuse Existing WWTPs and Upgrade
    - Pump Away Options (in part or total)
    - Construct New WWTPs
    - Relocate or Remove Outfalls
    - Optimising Sludge Treatment Facilities
- Develop an intervention hierarchy to be used on the unconstrained long list for each agglomeration.
- Rank the long list of interventions for each agglomeration using the established intervention hierarchy.

## 2.7 Coarse Screening

Coarse screening will involve an assessment of each option in the long list against a number of criteria to establish which options could involve a major obstacle to strategy development. Some criteria which will be considered include impacts on European Sites, environmental considerations (e.g. noise, proximity to sensitive receptors etc.), space constraints for upgrades/ new assets etc.

Options which are considered unfeasible and would involve a major obstacle to the strategy will be discounted from further consideration and a constrained options list will be established for each agglomeration and design horizon. Some options likely to be considered for the constrained list are described below:

- Treating the wastewater from each agglomeration/ settlement locally.
- Diversion of some or all of the collected wastewater from settlements to the Galway City main drainage network or to a new WWTP.
- Diversion of some flows from the Galway City network to a new WWTP.
- Upgrade of existing infrastructure (e.g. existing pumping stations) or provide new infrastructure such as new pumping station to transfer flows between catchments and different network locations.
- Optimising existing WWTP capacity, provision of additional treatment capacity.
- Optimising sludge treatment facilities in accordance with UÉ's wastewater sludge strategy.
- Upgrade of discharge outfalls and SWOs to ensure compliance environmental legislation (e.g. ensure compliance with SWO spills etc).
- Upgrade infrastructure to improve resilience in the context of emergencies such as failure of one or more major pumping stations failures, power supply failure at major pumping stations and WWTPs, or other critical infrastructure failure.

### 2.7.1. Options shortlisting – Fine Screening

The constrained list of options will be evaluated against primary criteria and corresponding sub-criteria via a Multi Criteria Assessment (MCA). The criteria selected for the MCA will be based on technical feasibility, environmental benefit, societal benefit, relative cost etc.

Using the MCA, a short list of options will be developed for each agglomeration and time horizon to meet the catchment need.

### 2.7.2. Scenario development, strategy selection and phasing

This stage will involve the following:

- Alternative solution scenarios for each settlement or agglomeration will be established based on the short list of options for each agglomeration. The scenarios may involve a combination of different options to solve each individual need and provide a solution strategy for the agglomeration as a whole (e.g. new storage tank to reduce SWO spills, new WWTP to improve final effluent discharge quality etc.). Long term strategic plans and growth projections will be considered in determining potential option combinations, and a phased development approach used to facilitate the use of existing assets as far as possible.
- In the preparation of scenarios, it will be necessary to undertake some local optimisation and solution refinement (e.g. hydraulic modellers will test different combinations of storage, sewer upsizing and surface water separation to target sewer flooding before arriving at one or more successful combinations).

- Further assessment of the scenarios will be completed using MCA. The MCA will be developed to include criteria and factors identified during the previous stages of the study (e.g. water quality modelling outputs, SEA/ AA findings, feedback from public consultation, network modelling shortfalls etc.). Furthermore, the MCA will also capture characteristics of the scenarios which address renewable energy, energy efficiency (to IS399 requirements), climate change vulnerability and resilience, waste and the circular economy, biodiversity benefits from nature-based solutions and wellbeing measures for staff and the community, A recommended solution will be established for each agglomeration/ settlement using this MCA.

A programme for delivery will be established to identify timelines for implementing the recommendations of the GWS together with the prioritisation of such implementation projects. The phasing of implementations is important so that key facilities are built or upgraded to meet the changing needs through growth.

## 2.8 Consideration of European Sites

There is some overlap with the Birds Directive (2009/147/EC), the Habitats Directive (92/43/EEC) and the Water Framework Directive (WFD) (2000/60/EC) in relation to the protection of water dependent habitats and species. Under the WFD areas are designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant European sites. The linkages between the Birds and Habitats Directives and the WFD were discussed in a document published by the European Commission (2011) which states:

*"Any Natura 2000 site with water-dependent (ground- and/or surface water) Annex I habitat types or Annex II species under the Habitats Directive or with water-dependent bird species of Annex I or migratory bird species of the Birds Directive, and, where the presence of these species or habitats has been the reason for the designation of that protected area, has to be considered for the register of protected areas under WFD Art. 6. These areas are summarised as "water-dependent Natura 2000 sites". For these Natura 2000 sites, the objectives of the Birds and Habitats Directives and WFD apply".*

Therefore, WFD waterbody status will be taken into account when compiling and assessing options that will involve WFD waterbodies, such as outfalls. As many of the European designated sites in Ireland are water-dependent, they may potentially be impacted by some options and therefore will also be taken into account in the optioneering process.

# 3. Methodology

## 3.1 Stages of Appropriate Assessment (AA)

The methodology for undertaking assessment in relation to AA has evolved from European Commission (2021) guidance and Irish guidance from the former Department of Environment, Heritage and Local Government (2010). The relevant national guidance is detailed in **section 3.3**. The guidance sets out a four-stage approach to AA (as illustrated in Figure 3-1 Process of Appropriate Assessment (AA) below). An AA can be carried out for either Plans or Projects, with Plans defined as "all statutory and non-statutory land use, framework and sectoral plans and strategies" and Projects defined as "the execution of construction works or of other installations or schemes – other interventions in the natural surroundings and landscape including those involving the extraction of minerals" (Directive 85/337/EEC). If at any stage in the process it is determined that there will be no implications for the European site in view of the site's conservation objectives, the process is effectively completed. The four stages are:

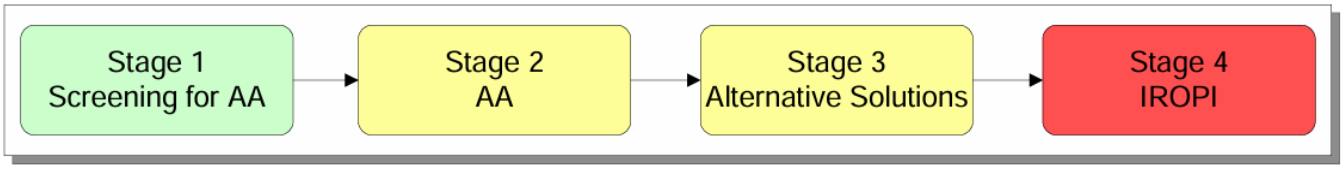


**Figure 3-1 Process of Appropriate Assessment (AA).**

### Stage 1: Screening for Appropriate Assessment

The Screening Stage involves the determination of the whether the implementation of the Plan is likely to result in a significant effect(s) on any European site(s), either alone or in-combination with other plans and projects, in light of the site's conservation objectives.

### Stage 2: Appropriate Assessment

If the screening has determined there are LSEs from the Plan/Project either alone or in combination with other plans and/or projects on the European site(s), the implication for European sites are further assessed in the context of the implications for their conservation objectives and Adverse Effects on Site Integrity (AESI) analysed. If it is determined on further analysis and data gathering that the plan/project will not adversely affect the integrity of the relevant European site(s) then the Stage 2 Appropriate Assessment can conclude no AESI. However, if there are potential issues identified for the conservation objectives of the European site(s) then mitigation is required to protect the site's conservation objectives. The AESI analysis is re-run and considers the structure and function of European sites, their conservation objectives and effects from the project/plan both alone and in-combination with other projects or plans. Where AESI are identified, mitigation measures are proposed as required to avoid adverse effects on the integrity and conservation objectives of the European site(s). The information and data to inform the AA process is documented within a NIS. This is provided to the competent authority to facilitate their AA determination of the plan or project.

### Stage 3: Alternative Solutions

Following AA, including mitigation proposals, if AESI remain, or uncertainty remains and the project/plan is to be progressed, an Assessment of Alternative Solutions is required under the provisions of Article 6(4) of the Habitats Directive. This process examines the alternative solutions or options that could allow the Plan or Project to be carried out without adverse effects on any European site(s). This process will return the assessment to Stage 2 to carry out appropriate assessment of the alternative solutions. If it is demonstrated

that all reasonable alternatives have been considered and adverse impacts to a European site are still expected, the process must proceed to the next stage, or the project is abandoned.

### Stage 4: Imperative Reasons of Overriding Public Interest (IROPI) / Derogation

In the unlikely event where an Assessment of Alternative Solutions fails to identify any suitable alternatives, then for a project or plan to be progressed it must meet the requirements of Imperative Reasons of Overriding Public Interest (IROPI). In this case the provisions of Article 6(3) cannot be met and therefore, the provisions of Article 6(4) are used. If in the light of an assessment of IROPI, it is deemed that the project or plan should proceed, thus compensatory measures are implemented to maintain the coherence of European site network in the face of adverse effects to the integrity of the site(s).

## 3.2 Approach to AA of GWS

The approach to this AA Screening takes consideration of the strategic nature of the GWS and uses objective information to determine whether the GWS will have LSEs for European sites in the manner outlined in Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland (Court of Justice of the European Union, Case C-6/04, Opinion of Advocate General Kokott)[1] and Waddenzee (Court of Justice of the European Union, C-127/02).

### 3.2.1. Application of the AA process at plan-level

In the context of AA Screening, when applying the 'test of significance' the test is of the "likelihood" of effects rather than the "certainty" of effects. In accordance with the Waddenzee Judgement[2], likely effect is one that cannot be ruled out based on objective information and is underpinned by the precautionary principle and the test of beyond reasonable scientific doubt. This test therefore sets a low bar: a plan should be considered 'likely' to have an effect if the competent authority (in this case Uisce Éireann) is unable (on the basis of objective information) to exclude the possibility that the plan could have significant effects on any European site, either alone or in-combination with other plans or projects.

This AA Screening Report is provided at the earliest stage of integrated working to support the shaping of optimal solutions. The purpose includes to inform and guide the development of the GWS Strategy concept stage options and recommendations.

Where specific recommendations of the GWS are developed as projects, this work is intended to inform project-level screening and Appropriate Assessment. This work will be beneficial to the in-depth evaluation of options and avoidance of effects.

### 3.2.2. Compliance of the GWS development process with the Habitats Directive

The GWS identifies needs in terms of quantity, quality and reliability, and develops a methodology (Option Assessment Methodology) to develop interventions to address this need. The AA Screening for the GWS has assessed at a high level the Options Assessment Methodology and the option types that are likely to arise from the GWS. The GWS identifies option types that could be applied across the GMA. The AA Screening for the GWS therefore assesses the potential impacts on European sites of the GWS at a regional scale within the GMA.

Applying the above approach demonstrates that the development of the GWS is compliant with the requirements of the Habitats Directive.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62004CC0006 (accessed April 2024)

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62002CJ0127&qid=1702581659279 (access April 2024)

## 3.3 Guidance documents in relation to AA

The requirements of Article 6 of the Habitats Directive for the GWS have been applied following the guidance documents:

- AA of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010a);
- Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. (Office of the Planning Regulator, 2021).
- Assessment of Plans and Projects in Relation to Natura 2000 Sites – Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2021);
- Communication from the Commission on the Precautionary Principle (European Commission, 2000);
- Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission (European Commission, 2007);
- Marine Natura Impacts Statements in Irish Special Areas of Conservation. A Working Document (Department of Arts, Heritage and the Gaeltacht, 2012); and
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, 2018).

The following circulars have also been used:

- AA under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 and PSSP 2/10 (Department of Environment, Heritage and Local Government, 2010b);
- AA of Land Use Plans. Circular Letter SEA 1/08 & NPWS 1/08 (Department of Environment, Heritage and Local Government, 2008a);
- Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites. Circular Letter PD 2/07 and NPWS 1/07 Department of Environment, Heritage and Local Government, 2007a);
- Guidance on Compliance with Regulation 23 of the Habitats Directive. Circular Letter NPWS 2/07 (Department of Environment, Heritage and Local Government, 2007b); and
- Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Circular L8/08 (Department of Environment, Heritage and Local Government, 2008b).

## 3.4 Guiding Principles and Case Law

A number of cases have been brought to both the national and European courts in relation to the AA process. Irish departmental guidance (Department of Environment, Heritage and Local Government, 2010a) in relation to AA was published over 10 years ago. Therefore, recent case law has, in many cases, superseded this guidance. However, recent guidance from the OPR (2021) in relation to AA Screening has now been published and considered in this assessment. Relevant case law, ECJ rulings and EC publications have also been considered in the preparation of the AA Screening for the GWS.

## 3.5 Identification of European Sites

Sites within the Natura 2000 Network referred to as European Sites include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs designated for their Qualifying Interests (QI), Annex I habitats and Annex II species (excepting bird species) and the habitats on which they rely (including functional linkage). SPAs are designated for Special Conservation Interest (SCI) Annex I birds and migratory birds and their habitats.

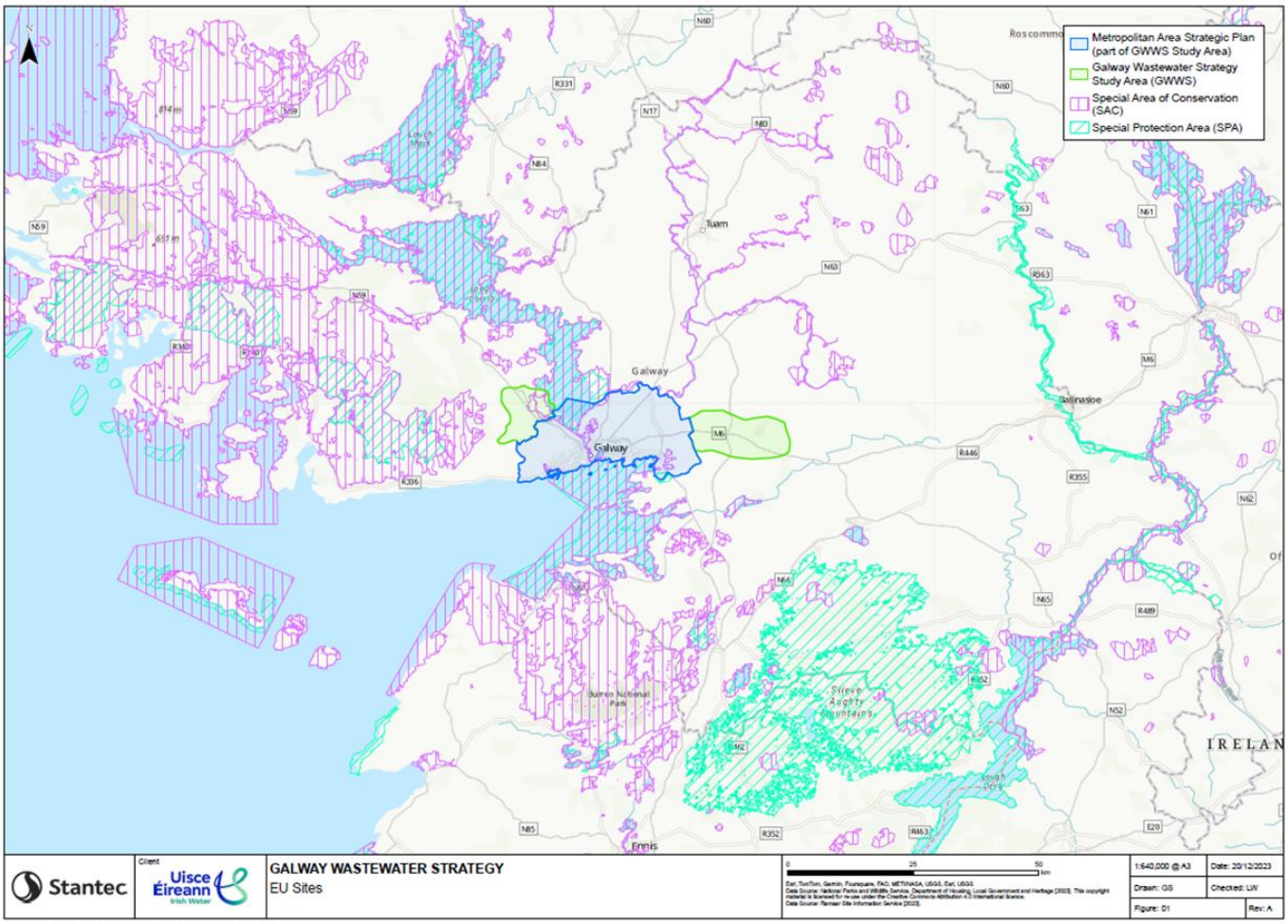


**Figure 3-1. A map of the Galway Wastewater Strategy (GWS) study area and surrounding European Sites, including Special Areas of Conservation (SAC) and Special Protection Areas (SPA).**

For the purposes of this report, an AA screening (defined in **Section 3.1**) has been carried out of the GWS study area (see **Figure 3-1** above) and the Zone of Influence (ZoI) of the Strategy using a Source - Pathway - Receptor model. In terms of the extent of search for source – pathway - receptor analysis, Irish departmental guidance states:

*"A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Wilson et al., 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case by case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in combination effects*".

In addition, the Source - Pathway - Receptor approach to the identification of interactions that comprise a given pathway of effect toward Sites, Species, their interactions, and their functionally linked and supporting habitat must be assessed through the lens of the precautionary principal.

The ZoI must be evidence-based and derived from multifactorial analysis of influences to make an assessment of effects both alone and in combination (including with other plans identified in the associated SEA).

In the context of this report, the term 'functional linkage' refers to the role or 'function' that land or sea beyond the boundary of a European site might fulfil in terms of ecologically supporting the populations for which the site was designated or classified. Such land is therefore 'linked' to the European site in question because it provides an important role in maintaining or restoring the population of QI at favourable conservation status.

### 3.5.1. Special Areas of Conservation

SACs cover 58 habitat types recognised in Annex I of the Habitats Directive, with 16 habitats designated as "priority" habitats owing to their ecological vulnerability (NPWS, 2019a). Habitats for which SACs are designated include lakes, raised bogs, blanket bogs, turloughs, sand dunes, machair, heaths, rivers, woodlands, estuaries and sea inlets. In addition, the Habitats Directive recognises 26 Annex II species. Some of the species for which SACs have been designated include but are not limited to: Atlantic salmon (*Salmo salar*), otter (*Lutra lutra*), lesser horseshoe bat (*Rhinolophus hipposideros*), freshwater pearl mussel (*Margaritifera margaritifera*) and Killarney fern (*Trichomanes speciosum*). There are 441 SACs in Ireland and of these 358 are water-dependent (Department of Housing, Planning and Local Government, 2018c). These SACs support various habitats and species that are dependent on various water sources. There are approximately 800 water bodies within European sites, all supporting water dependent habitats and species. A number of significant pressures on these water bodies have been identified (Department of Housing, Planning and Local Government, 2018c), including:

- Agriculture;
- Hydromorphological pressures;
- Forestry;
- Urban wastewater;
- Anthropogenic pressures;
- Abstractions; and
- Invasive species.

Of the pressures noted above, urban wastewater is of particular relevance to the GWS.

### 3.5.2. Special Protection Areas

The majority of the wintering water birds and breeding seabirds occurring in Ireland are considered to be regularly occurring migratory birds. Over 60% of the 25 Annex I listed species that now occur in the Republic of Ireland on a regular basis belong to the breeding seabird and wintering waterbird groups. This has in part led to the situation of the majority (> 80%) of Ireland's SPAs being designated for these two bird groups.

Some of the productive marine intertidal zones of bays and estuaries are included within SPAs and these provide vital food resources for several wintering wader species, including knot (*Calidris canutus*), dunlin (*Calidris alpina*) and bar-tailed godwit (*Limosa lapponica*). Also included in the SPA network are marine waters adjacent to breeding seabird colonies and other important areas for divers, seaducks and grebes.

Finally, a number of inland wetland sites and areas of blanket bog and upland habitats have also been designated as SPAs for wintering water birds. These sites provide important breeding and foraging areas for numerous other species including merlin (Falco columbarius) and golden plover (*Pluvialis apricaria*). Agricultural land is also represented within the SPA network ranging from the extensive farmland of upland areas where hedgerows, wet grassland and scrub offer feeding and/or breeding opportunities for hen harrier (*Circus cyaneus*) to the intensively farmed coastal land where internationally important numbers of swans and geese occur.

### 3.5.3. Conservation Objectives

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of annexed habitats and annexed species of community interest for which an SAC or SPA has been designated. The conservation objectives (COs) for a European site are set out to ensure that the QIs/SCIs of that site are maintained or restored to a favourable conservation condition. Maintenance of favourable conservation condition of habitats and species at a site level in turn contributes to maintaining or restoring favourable conservation status of habitats and species at a national level and ultimately at the European site network level.

Detailed site synopses for each European site are available from the NPWS website[3]. For all Site details provided, latest synopsis, conservation objectives and citation information at NPWS were accessed in preparation of this report. This has been abridged and interpreted using professional judgement.

In Ireland 'generic' COs have been prepared for all European sites, while 'site specific' COs have been prepared for a number of individual sites to take account of the specific QIs/SCIs of that site. Both the generic and the site-specific COs aim to define the requirements for favourable conservation condition for habitats and species at the site level. Generic COs, which have been developed by NPWS, encompass the spirit of site-specific COs in the context of maintaining and restoring favourable conservation condition as follows:

- For SACs: "To maintain or restore the favourable conservation condition of the Annex I habitats and/or Annex II species for which the SAC has been selected".
- For SPAs: "To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA".

Following on from this, favourable conservation status (or condition, at a site level) of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is "favourable".

The favourable conservation status (or condition, at a site level) of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and

[3] https://www.npws.ie/protected-sites (accessed April 2024)

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

# 4. Screening

## 4.1 Screening

This Screening for AA was informed by a desk study of all relevant environmental information and involved the following steps (broadly based on (European Commission, 2021)):

- Determined if the proposed Plan is directly connected with or necessary to the management of the site;
- Description of the proposed Plan;
- Identification of relevant European site(s);
- Assessment of likely significant effects (LSEs) on European sites; and
- Screening conclusion.

## 4.2 Is the GWS exempt from assessment?

The GWS is not directly connected with or necessary to the management of a European site and therefore is not exempt from assessment.

## 4.3 Description of the GWS

An overview of the GWS, including background and context are provided in sections 1 and 2 of this report.

## 4.4 Identification of European Sites within the GWS

As discussed in section 3, all European sites within the GWS area and European sites with potential effects pathways located outside the GWS were initially considered to be potentially within the ZoI of the GWS, therefore potential LSEs on the conservation objectives for these sites will be considered. **Section 4.6** outlines the European sites that are considered to be within the ZoI of at least one potential pathway of the GWS and will therefore be considered further in the assessment.

The GWS core area spans Galway Metropolitan Area (GMA) and extends to the surrounding area. The GWS area and European sites area is shown in **Figure 3-1**. The core study area is within the County of Galway, however sub-catchment of watercourses and waterbodies extend beyond the county boundary. Sites that share a sub-catchment with the GWS study have direct hydrological linkage and therefore have been deemed to be within the ZoI of the GWS. For the purposes of this Stage 1 assessment hydrological linkages are considered noting waterbodies, bays and rivers that share sub-catchment or close connection by sea. With reference to the precautionary principle further linkages are possible, thus a number of sites outside catchment linkages are also identified with rationale provided, such as potential displacement of birds to alternate SPAs or loss of functional land, as stated in **Section 3.5**, or where air quality or groundwater resources may be affected. Further details are provided in tables at **Appendix A** to **C**.

All European sites considered in the ZoI of the GWS including distances from the GWS area, the QIs and details of threats and pressures to these sites is provided in **Appendix C.**

## 4.5 Assessment of Likely Significant Effects (LSEs)

The GWS methodology will identify suitable options for the various areas throughout the GWS area. The option types that will arise from the GWS will potentially result in LSEs on European sites in the absence of mitigation. Therefore, a high-level assessment of the potential LSEs of these management option types is the focus of this assessment.

When assessing the GWS, the 'source-pathway-receptor' model is applied taking consideration of all potential impact pathways connecting elements of the GWS to European sites in view of their conservation objectives.

The source-pathway-receptor model is a standard tool in environmental assessment to identify and assess potential impact pathways. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the pathway means that there is no likelihood for the effect to occur (e.g. no potential for LSEs).

The source-pathway-receptor model is focused solely on the QIs for which European sites are designated as per the latest conservation objectives from the NPWS website[4].

Table 4-1 below defines the source-pathway-receptor model, the zones of influence and the extents of sensitivity of QIs for each potential impact pathway used in the assessment. It should be noted that some of the options may have no effect on European sites, while others could have beneficial impacts on European sites, for example options that seek to improve overall water quality. However, the implementation of the GWS may give rise to measures that could result in a variety of potential effects.

**Table 4-1Potential effect sources and pathways of options arising from the GWS on qualifying interests (receptors) of European sites.**

| Pathway name | Source-pathway-receptor model | Zone of Influence (ZoI) | Extent of sensitivity of receptors |
|---|---|---|---|
| Habitat loss – permanent | The provision of new infrastructure or permanent change of habitat from the plan could result in direct loss of QI habitat or habitat which supports QI species in a European site, or functionally linked land associated with mobile QI species outside the boundaries of European sites. | The ZoI assessed with within the current footprint of the GWS area and functionally linked areas with consideration to relevant QI species. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat loss – temporary | Construction activities including temporary works areas and access routes of the plan could result in the temporary loss of habitats before reinstatement after construction is completed, | The ZoI assessed with within the current footprint of the GWS area and functionally linked areas with | QI habitats are sensitive within the boundary of their designated site. |

[4] https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives

| Pathway name | Source-pathway-receptor model | Zone of Influence (ZoI) | Extent of sensitivity of receptors |
|---|---|---|---|
| | potentially affecting QI habitat or supporting habitat for QI species in a European site, or functionally linked land associated with mobile QI species outside the boundaries of European sites. | consideration to relevant QI species. | Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – changes in water quality | Construction activities and changes in operational traffic / drainage can release oils, chemicals, heavy metals, silt etc. This can directly affect QI species or habitats or affect them indirectly through loss of aquatic prey species, or through changes in their habitats | The ZoI assessed is within the footprint of the Proposed Scheme or within hydrologically linked areas (to the point where effects would be imperceptible such as where a watercourse meets open sea)<br>Pollutants can travel along hydrological linkages such as watercourses to a considerable distance from works. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – hydrological changes | In-stream structures or changes to drainage from the plan can cause changes in hydrology, which can alter water volumes and flows, which can in turn change the wetness of habitats or cause erosion or deposition of materials. Such changes can affect QI habitats or supporting and functionally linked habitats of QI species. | The ZoI assessed is within surface water catchments that the footprint of the plan lies within. Surface water changes can occur within catchments as changes in one location affect other locations via watercourses for example. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation– hydrogeological changes | Construction activities such as groundworks, excavations and drainage and permanent changes to drainage can cause changes to groundwater volumes and flows, which can change the | The ZoI assessed is within groundwater catchments that the footprint of the project lies within Groundwater changes can occur within catchments as | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site. |

| Pathway name | Source-pathway-receptor model | Zone of Influence (ZoI) | Extent of sensitivity of receptors |
|---|---|---|---|
| | hydrogeology of QI habitats and supporting or functionally linked habitats of QI species. | changes in one location affect other locations. | Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – changes in air quality | Construction plant and vehicles emit exhausts containing pollutants that can deposit on QI habitats, which can cause direct toxic. | The ZoI assessed is within 200m of the footprint of the plan.<br><br>Pollutant deposition from vehicles is thought to occur in insignificant amounts beyond 200m from the source. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Habitat degradation – spread of invasive species | Construction activities can cause the spread of invasive species already within the construction site (through transfer on plant or within materials moved during earthworks), or by importing materials from outside the construction site (on the wheels of plant or delivery vehicles, etc). This can cause the degradation of QI habitats or supporting and functionally linked habitats of QI species | The ZoI assessed is within the footprint of the Proposed Scheme.<br><br>The spread or importing of invasive species can only occur within the construction site. | QI habitats are sensitive within the boundary of their designated site.<br><br>Supporting habitats of QI species are sensitive within the boundary of their designated site.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. |
| Disturbance of species | Construction activities could result in disturbance of QI species through changes in noise, vibration, movement (of people and/or vehicles) and lighting. Disturbance may lead to the abandonment of breeding, foraging or resting sites by QI species, potentially resulting in increased energy expenditure, | The ZoI assessed is within the footprint of the Proposed Scheme or within 300m of the construction or operation of the plan. 300m is considered to be an appropriate distance to assess disturbance as QI species are unlikely to be | QI species are sensitive within the boundary of their designated site (in supporting habitat) or within functionally linked habitats where suitable habitat is present within the range of the QI species from their designated site. |

| Pathway name | Source-pathway-receptor model | Zone of Influence (ZoI) | Extent of sensitivity of receptors |
|---|---|---|---|
| | reduced fitness and inability to complete lifecycle stages. | significantly disturbed beyond this distance. | |
| Mortality | Mortality of individuals of QI species could occur directly through killing of individuals by construction works or indirectly as a result of pollution entering the watercourse | The ZoI assessed is within the footprint of the Proposed Scheme, within 50m of watercourse crossings that will be subject to works. Direct mortality from construction activities can only occur within the construction footprint. Indirect mortality can occur near to works at watercourses that sever species commuting routes | QI species are sensitive within the boundary of their designated site (in supporting habitat) or within functionally linked habitats where suitable habitat is present within the range of the QI species from their designated site. |

## 4.6 Identification of relevant European sites and QIs

The 'source-pathway-receptor' model was applied taking consideration of all potential impact pathways connecting elements of the GWS to European sites in view of their Conservation Objectives.

The following assessment is comprised of European sites that have direct functional linkage to the GWS area. See **Appendix C** for further detail on hydrological linkage for each site. These European sites have been determined to most likely to be subject to LSEs in the absence of avoidance of effect and/or mitigation. These comprise 9 SACs and 3 SPAs:

- **Black Head-Poulsallagh Complex SAC** is located approximately 10.4km from the GWS study area, separated by sea across Galway Bay and is designated for water-dependent species, features and habitats. There is hydrological connectivity between this site and the GWS study area, thus likely significant effects on water-dependent features cannot be discounted without further study. This site lies within the ZoI(s) for:
    - Habitat degradation – changes in water quality

  QIs screened in:

    - Submerged or partially submerged sea caves – dependent on excellent water quality and nutrient balances. This site is functionally linked to the GWS area; thus, an LSE as a result of the

drainage works, including flow alteration and water quality deterioration during the construction stage cannot be excluded without further study.

- Reefs - dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. This site is functionally linked to the GWS area; thus, an LSE as a result of the drainage works, including flow alteration and water quality deterioration during the construction stage cannot be excluded without further study.

- **Connemara Bog Complex SAC** is located approximately 1.6km from the GWS study area and is designated for aquatic habitats and water-dependent species, including Atlantic salmon (*Salmo salar*) and otter (*Lutra lutra*). There is hydrological connectivity between this site and the GWS study area, thus likely significant effects on water-dependent features cannot be discounted without further study. This site lies within the ZoI(s) for:
  - Habitat loss – permanent
  - Habitat loss – temporary
  - Habitat degradation – changes in air quality
  - Habitat degradation – changes in water quality
  - Disturbance of species
  - Mortality

  QIs screened in:
  - Coastal lagoons – sensitive to anthropogenic activities, including land drainage and reclamation and construction runoff into waterbodies. This site is functionally linked to the GWS area; thus, drainage works, including flow alteration and air/water quality deterioration during the construction stage may cause as LSE.
  - Reefs – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include land drainage and reclamation and construction runoff into waterbodies. This site is functionally linked to the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
  - Atlantic salmon – potential impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is functionally linked to the GWS area; thus, LSE cannot be discounted at this stage.
  - Otter – threats include habitat alteration, water quality deterioration and disturbance/risk of mortality during the construction phase. This site is functionally linked to the GWS area; thus, LSE cannot be discounted without further study.

- Oligotrophic to Mesotrophic Standing Waters - impacts may include direct impact, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Dystrophic Lakes - impacts from changes in air and water quality, indirectly through construction.
- Floating River Vegetation - impacts from changes in air and water quality, indirectly through construction.
- Wet Heath - impacts from changes in air and water quality, indirectly through construction.
- Dry Heath - impacts from changes in air and water quality, indirectly through construction.
- Molinia Meadows - impacts from changes in air and water quality, indirectly through construction.
- Blanket Bogs (Active) - impacts from changes in air and water quality, indirectly through construction.
- Transition Mires - impacts from changes in air and water quality, indirectly through construction.
- Rhynchosporion Vegetation - impacts from changes in air and water quality, indirectly through construction.
- Alkaline Fens - impacts from changes in air and water quality, indirectly through construction.
- Old Oak Woodlands - impacts from changes in air and water quality, indirectly through construction.
- Marsh Fritillary (Euphydryas aurinia) - impacts from changes in air and water quality, indirectly through construction.
- Slender Naiad (Najas flexilis) - impacts from changes in air and water quality, indirectly through construction.

- **Cregganna Marsh SPA** is located partially within the GWS study area and is designated for Greenland white-fronted goose (*Anser albifrons flavirostris*). This site lies within the ZoI(s) for:
  - Habitat loss – permanent
  - Habitat loss – temporary
  - Habitat degradation – changes in water quality
  - Habitat degradation – hydrological changes

- Habitat degradation– hydrogeological changes
- Habitat degradation – changes in air quality
- Disturbance of species
- Mortality

QIs screened in:

- Greenland white-fronted goose – potential impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.

- **Galway Bay Complex SAC** is located partially within the GWS study area and is designated for aquatic habitats and water-dependent species, including common seal (*Phoca vitulina*) and otter. This site lies within the ZoI(s) for:
  - Habitat loss – permanent
  - Habitat loss – temporary
  - Habitat degradation – changes in water quality
  - Disturbance of species
  - Mortality

  QIs screened in:

  - Tidal mudflats and sandflats - dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
  - Coastal lagoons - dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
  - Large shallow inlets and bays – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- Reefs – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Perennial vegetation of stony banks – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora of the intertidal and sub-tidal. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Vegetated sea cliffs of the Atlantic and Baltic coasts – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- *Salicornia* mud – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Atlantic salt meadows – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include habitat alteration, land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Mediterranean salt meadows – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include habitat alteration, land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Turloughs – dependency on excellent water quality, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Potential impacts include habitat alteration, land drainage and reclamation and construction runoff into waterbodies. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- Juniper scrub – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Orchid-rich calcareous grassland – potential impacts may include direct impact such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- *Cladium* fens – potential impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Alkaline fens – potential impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Limestone pavement – potential impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Otter – potential impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Common (harbour) seal – potential impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- **Gortnandarragh Limestone Pavement SAC** is located approximately 5.8km from the GWS study area and is designated for limestone pavement. There is hydrological connectivity between this site and the GWS study area, thus likely significant effects on water-dependent features cannot be discounted without further study. This site lies within the ZoI(s) for:
  - Habitat degradation– hydrogeological changes

  QIs screened in:

- Limestone pavement– impacts may include direct impact, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- **Inner Galway Bay SPA** is located partially within the GWS study area and is designated for water-dependent species, This site lies within the ZoI(s) for:
  - Habitat loss – permanent
  - Habitat loss – temporary
  - Habitat degradation – changes in water quality
  - Habitat degradation – changes in air quality
  - Disturbance of species
  - Mortality

  QIs screened in*:
  - Black-throated diver (*Gavia arctica*)
  - Great northern diver (*Gavia Immer*)
  - Cormorant (*Phalacrocorax carbo*)
  - Grey heron (*Ardea cinerea*)
  - Light-bellied brent goose (*Branta bernicla hrota*)
  - Wigeon (*Anas penelope*)
  - Teal (*Anas crecca*)
  - Red-breasted merganser (*Mergus serrator*)
  - Ringed plover (*Charadrius hiaticula*)
  - Golden plover
  - Lapwing (*Vanellus vanellus*)
  - Dunlin (*Calidris alpina*)
  - Bar-tailed godwit (*Limosa lapponica*)
  - Curlew (*Numenius Arquata*)
  - Redshank (*Tringa tetanus*)
  - Turnstone (*Arenaria interpres*)
  - Black-headed gull (*Chroicocephalus ridibundus*)
  - Common gull (*Larus canus*)

- Sandwich tern (*Sterna sandvicensis*)
- Common tern (*Sterna hirundo*)

* Impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.

- **Lough Corrib SAC** is partially within the GWS study area and is designated for aquatic habitats and water-dependent species, including fresh-water pearl mussel (*Margaritifera margaritifera*) and sea lamprey (*Petromyzon marinus*). This site lies within the ZoI(s) for:
  - Habitat loss – permanent
  - Habitat loss – temporary
  - Habitat degradation – changes in water quality
  - Habitat degradation – changes in air quality
  - Habitat degradation – hydrological changes
  - Habitat degradation – hydrogeological changes
  - Disturbance of species
  - Mortality

  QIs screened in:

  - Oligotrophic waters containing very few minerals – impacts may include direct impact, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
  - Oligotrophic to mesotrophic standing waters – impacts may include direct impact, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
  - Hard water lakes – impacts may include direct impact, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
  - Floating river vegetation – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- Orchid-rich calcareous grassland – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- *Molinia* meadows – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Raised bog (active) – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Degraded raised bog – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Rhynchosporion vegetation – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Cladium fens – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Petrifying springs – impacts may include direct impact, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Alkaline fens – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- Limestone pavement – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Old oak woodlands –impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Bog woodland – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Freshwater pearl mussel (*Margaritifera margaritifera*) – impacts include habitat alteration, water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.
- White-clawed crayfish (*Austropotamobius pallipes*) – impacts include habitat alteration, water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.
- Sea lamprey (*Petromyzon marinus*) – impacts include habitat alteration, water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.
- Brook lamprey (*Lampetra planeri*) – impacts include habitat alteration, water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.
- Atlantic salmon – impacts include habitat alteration, water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.
- Lesser horseshoe bat – impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.
- Otter – potential impactss include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS

area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- Slender naiad (*Najas flexilis*) – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
- Slender green feather-moss (*Hamatocaulis vernicosus*) – impacts may include direct impacts such as, habitat loss/alteration, construction runoff into waterbodies and groundwater level changes. This site is partially within the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- **Lough Corrib SPA** is partially within the GWS study area and is designated for water-dependent species. This site lies within the ZoI(s) for:
  - Habitat loss – permanent
  - Habitat loss – temporary
  - Habitat degradation – changes in water quality
  - Habitat degradation – changes in air quality
  - Disturbance of species
  - Mortality

  QIs screened in*:
  - Greenland white-fronted goose
  - Gadwall (*Anas strepera*)
  - Shoveler (*Anus clypeat*)
  - Pochard (*Aythya ferina*)
  - Tufted duck (*Aythya fuligula*)
  - Common scoter (*Melanitta nigra*)
  - Hen harrier (*Circus cyaneus*)
  - Coot (*Fulica atra*)
  - Golden plover
  - Black-headed gull
  - Common gull
  - Common tern
  - Arctic tern (*Sterna paradisaea*)

* Impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is partially within the GWS area; thus, LSE cannot be discount without further study.

- **Maumturk Mountains SAC** is located approximately 23.3km from the GWS study area and is designated for aquatic habitats and water-dependent species. There is hydrological connectivity between this site and the GWS study area, thus likely significant effects on water-dependent features cannot be discounted without further study. – This site lies within the ZoI(s) for:
    - Habitat degradation – changes in water quality
    - Habitat degradation– hydrological changes
    - Habitat degradation– hydrogeological changes

  QIs screened in:
    - Atlantic salmon – potential impacts include water quality deterioration, hydrological and hydrogeological changes during the construction phase. This site is functionally linked to the GWS area; thus, LSE cannot be discount without further study.

- **Monivea Bog SAC** is located approximately 4.6km from the GWS study area and is designated for water-dependent habitats and species. There is hydrological connectivity between this site and the GWS study area, thus likely significant effects on water-dependent features cannot be discounted without further study. This site lies within the ZoI(s) for:
    - Habitat degradation – hydrological changes
    - Habitat degradation – changes in air quality
    - Habitat degradation– hydrogeological changes

  QIs screened in:
    - Raised bog (active) – impacts may include indirect impacts, such as construction runoff into waterbodies and groundwater level changes. This site is functionally linked to the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
    - Degraded raised bog– impacts may include indirect impacts, such as construction runoff into waterbodies and groundwater level changes. This site is functionally linked to the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
    - Rhynchosporion vegetation – impacts may include indirect impacts, such as construction runoff into waterbodies and groundwater level changes. This site is functionally linked to the GWS

area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.

- **Ross Lake and Woods SAC** is located approximately 1.7km from the GWS study area and is designated for lesser horseshoe bat and hard water lakes. There is hydrological connectivity between this site and the GWS study area, thus foraging habitat and water quality may be affected as a result of the GWS. This site lies within the ZoI(s) for:
    - Habitat degradation – hydrological changes
    - Habitat degradation – changes in air quality
    - Habitat degradation – changes in water quality
    - Disturbance of species
    - Mortality

  Qis screened in:
    - Hard water lakes – impacts may include direct impacts**,** such as construction runoff into waterbodies and groundwater level changes. This site is functionally linked to the GWS area; thus, drainage works, including flow alteration and water quality deterioration during the construction stage may cause as LSE.
    - Lesser horseshoe bat – potential impacts include habitat alteration, air/water quality deterioration and disturbance/risk of mortality during the construction phase. This site is functionally linked to the GWS area; thus, LSE cannot be discount without further study.

The 11 European sites detailed above share direct hydrological linkage with the GWS study area. **Appendix C** provides a more detailed assessment of the qualifying interests and potential LSEs of these European sites.

Based on the source and pathways detailed in **Table 4-1**, all SPAs and SACs that had the potential for functional links, either directly or indirectly, to the GWS study area were screened, these are detailed further in **Appendix A**.

The summary rationale table in **Appendix A** presents the full list of European sites reviewed with some sites screened out of AA.

Additional to the 11 European sites that are hydrologically connected to the GWS Study area, 10 further SPAs were also screened in, due to the potential for their QIs to be present within the GWS study area, utilising supporting habitat and therefore potentially subject to disturbance or displacement. These included the following sites, along with their distance to the GWS study area:

- Rahasane Turlough SPA – 4.4km
- Connemara Complex SPA – 6.4km
- Lough Rea SPA – 11.6km
- Slieve Aughty Mountains – 12.1km
- Coole-Garryland SPA – 16.6km

- Lough Cutra SPA – 23.9km
- Lough Mask SPA – 25.2km
- River Suck Callows SPA – 30.2km
- Cliff of Moher SPA – 30.7km
- Corofin Wetlands SPA 30.7km

There were additional SPA sites beyond these 10, some located along the coast to the GWS study area, however it was considered unlikely, due to the distance from these sites, that their Qis would be utilising habitats within the study area, to the extent that an impact may be considered possible.

The integrated assessment of the GWS has recently commenced and is completing initial data gathering stage, with associated definition of scope for modelling. Modelling will need to incorporate sufficient detail in the rural context to allow the assessment of operational effects, in particular to the receiving environment - much of which is heavily designated.

Based on the information currently available, it is concluded that the potential for LSEs on European sites, in relation to their conservation objectives, cannot be excluded either alone or in-combination. The Plan as it evolves will aim to avoid effects or to mitigate where avoidance is not possible. However, in the absence of mitigation (as required at stage 1 assessment), in accordance with the precautionary principle (European Commission, 2000), and because operational effects of the plan are not yet at options stage, 11 sites that are hydrologically connected to the GWS study area are 'screened in' for further assessment, along with 10 SPAs that may be functionally linked to the GWS study area.

## 4.7 In-combination Effects

Under Article 6(3) of the Habitats Directive an assessment of in-combination effects of the GWS with other plans and projects is considered. Consideration has been given, at this stage of the GWS, to other relevant plans on a similarly strategic level that have clear potential to have an in-combination effect upon European sites. If new relevant plans arise, these plans will be included in the NIS assessment as appropriate. Relevant projects will also be included for in-combination assessment. The plans listed below are currently being considered and assessed:

- Barna Pump Station Upgrade
- Oranmore Pump Station Upgrade
- Lough Atalia Pump Station and Rising Main Upgrade
- Moycullen WWTP Upgrade (NRRP-SM2)
- Athenry WWTP Upgrade (PAL)
- Athenry Sewerage Scheme Network Upgrade (awarded to Coffeys in 2023)
- Galway City Wastewater Network Upgrades (arising from Stage 4 Galway City Development Plan 2023-2029)
- Northern and Western Regional Spatial and Economic Strategy 2020-2032 (Northern and Western Regional Assembly, 2020).
- Water Services Strategic Plan (Uisce Éireann, 2015).
- Draft Uisce Éireann Water Services Strategic Plan 2024-2050 (WSSP)
- Water Quality and Water Services Infrastructure, Climate Change Sectoral Adaptation Plan (DHPLG, 2019).
- Water Services Policy Statement 2024-2030 (WSPS) DHLGH 2024

- National Wastewater Sludge Management Plan (Uisce Éireann, 2016a).
- Lead in Drinking Water Mitigation Plan (Uisce Éireann, 2016b).
- Regional Water Resources Plan – North West (Uisce Éireann, 2023).
- Uisce Éireann Biodiversity Action Plan (Uisce Éireann, 2021).
- National Planning Framework. Ireland 2040 Our Plan (DHPLG, 2018a).
- National Development Plan 2021-2030 (DPER, 2021).
- National Adaptation Framework (DCCAE, 2018).
- National Marine Planning Framework (NMPF) (DHPLG, 2021).
- Ireland's 4th National Biodiversity Action Plan 2023-2030 (DHLGH, 2024).
- Catchment Flood Risk Assessment and Management Programme (CFRAM) Office of Public Works (OPW), 2018).
- River Basin Management Plan (RBMP) 2018-2021 (DHPLG, 2018c)
- Draft River Basin Management Plan for Ireland 2022-2027 (DHLGH, 2022).
- Climate Action Plan 2024 (DECC, 2024).
- Galway City Development Plan 2022-2029 (Galway City Council, 2022).
- Galway County Development Plan 2022-2028 (Galway County Council, 2022).
- Galway City Heritage and Biodiversity Plan 2021-2026 (Galway City Council, 2021).
- Galway County Climate Action, Heritage and Biodiversity Plan Draft (and summary report) 2024 – 2030
- Galway City Climate Action Plan LACAP 2024-2029 (Galway City Council, 2024).
- Galway City Biodiversity Action Plan Revision 2025 to 2030
- Strategic Plan 2019-2024 (NFGWS, 2019)
- Ireland Nature Restoration Plan (planned launch 2026) (currently undetermined following failure to ratify at EU Environment Council, 2024)
- Marine Protected Areas (MPAs) Bill (due to be published April 2024), with associated Marine Planning changes, if enacted.

Discussions with Uisce Éireann and the local authorities identify strategies (such as the Regional Spatial and Economic Strategy RSES 2020-2032) and indicate that there are further projects proposed that may impact / influence on the GWS. Additionally, there are also projects that will be dependent on the findings of the GWS. The following Uisce Éireann projects are currently being progressed and have been highlighted with potential to interact with the GWS.

RHS will consult with all relevant third-party stakeholders regarding other existing or proposed projects that may interact with the GWS. The Integrated work shall take account of plans and policies such as the Draft Climate Action Plan 2024-29 (with climate change scenario forecasting), the Water Services Strategic Plan (WSSP) and Water Service Strategic Plan 2050 (WSSP2050) economic and development land use plans and zoning such as Galway County Development Plan 2022-2028, and European site-specific conservation objectives.

As the GWS develops, options that seek to improve overall water quality or that avoid effects to EU Sites, will be subject to Multicriteria Analysis (MCA) including for the purpose to apply the principle of avoidance of effects. This is in alignment with the duty of public bodies (and other plan-makers/developers) in regard to conservation objectives of EU Sites, including where those objectives seek that restorative objectives are to be applied.

Combined disciplines and data gathering will inform the factors giving rise to effects across time horizons 2030, 2055, 2080 and beyond. The operational effects assessment of the Plan design concept will be developed in parallel and integrated to the evolving AA assessment. Opportunities for positive change will be highlighted and incorporated to strategic options.

# 5. Screening Conclusion

The Stage 1 AA process (Screening for AA) described herein related to the Galway Wastewater Strategy (GWS). The GWS is a regional scale Plan covering the GWS Study Area in County Galway.

As the definition of the options within the plan are intended to minimise effects, and these are in development at strategic level, and thus due to uncertainty relating to the GWS outcomes, it is considered that the potential for likely significant effects (LSEs) on European Sites, in relation to their conservation objectives, cannot be excluded either alone or in-combination. In the absence of more detailed information on the GWS and management options listed therein at this stage, the precautionary principle must be applied.

**In accordance with Article 6(3) of the Habitats Directive, Stage 2 Appropriate Assessment of the GWS is required. This will be presented in a Natura Impact Statement (NIS) to fully inform the AA determination to be undertaken by the Uisce Éireann.**

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# Appendix A – Full List of European Sites and designations considered, with Screening Determination

**See also Appendix C Screening table of European Sites Screened In with direct linkage through sub-catchment intersection with GWS area.**

| European Site | Design ation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchmen t Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Cregganna Marsh | SPA | Partially within study area | Yes | Yes | Yes | Shared | N/A | **Screened in** |
| Galway Bay Complex | SAC | Partially within study area | Yes | Yes | Yes | Shared | N/A | **Screened in** |
| Inner Galway Bay | SPA | Partially within study area | Yes | Yes | Yes | Shared | N/A | **Screened in** |
| Lough Corrib | SAC | Partially within study area | Yes | Yes | Yes | Shared | N/A | **Screened in** |

[5] The Screening Decision at this time follows the Precautionary Principle (European Commission, 2000) and will respond to further development of the Study.

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Lough Corrib | SPA | Partially within study area | Yes | Yes | Yes | Shared | N/A | **Screened in** |
| Connemara Bog Complex | SAC | 1.6km | Yes | Unknown | Yes | Shared | N/A | **Screened in** |
| Ross Lake and Woods | SAC | 1.7km | Yes | Unknown | Yes | Shared | N/A | **Screened in** |
| Rahasane Turlough | SAC | 4.4km | Yes | No | No | Not shared | No | Screened out |
| Rahasane Turlough | SPA | 4.4km | Yes | No | Yes | Not shared | Yes<br><br>Displacement or synergistic effects possible as SPA | **Screened in** |
| Monivea Bog | SAC | 4.6km | Yes | Yes | No | Shared | Yes<br>Synergistic effects if in combination applies | **Screened in** |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Gortnandarragh Limestone Pavement | SAC | 5.8km | Yes | Yes | No | Shared | Yes<br><br>Synergistic effects if in combination applies | **Screened in** |
| Lough Fingall Complex | SAC | 6.3km | No | No | No | Not shared. | No | Screened out |
| Connemara Bog Complex | SPA | 6.4km | Yes | No | Yes | Not shared | Yes<br><br>Displacement or synergistic effects as SPA | **Screened in** |
| Castletaylor Complex | SAC | 7.7km | Yes | No | No | Not shared | No | Screened out |
| Kiltiernan Turlough | SAC | 8.5km | Yes | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Ardrahan Grassland | SAC | 9.3km | Yes | No | No | Not shared | No | Screened out |
| Black Head-Poulsallagh Complex | SAC | 10.4km | Yes | Yes | Yes | Connected by sea | Yes | **Screened in** |
| East Burren Complex | SAC | 11.6km | Yes | No | No | Not shared | No however - Considered with adjacent sites. Groundwater dependent habitats<br>Synergistic effects if in combination applies | Screened out |
| Lough Rea | SPA | 11.6km | Yes | No | Yes | Not shared | Yes<br>Displacement or synergistic effects possible as SPA | **Screened in** |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Lough Rea | SAC | 11.6km | Yes | No | No | Not shared | No<br><br>Synergistic effects if in combination applies | Screened out |
| Slieve Aughty Mountains | SPA | 12.1km | Yes | No | No | Not shared | Yes<br><br>Displacement or synergistic effects possible as SPA | **Screened in** |
| Moneen Mountain | SAC | 12.4km | No | No | No | Not shared | No | Screened out |
| Cahermore Turlough | SAC | 14.5km | Yes | No | No | Not shared | No | Screened out |
| Peterswell Turlough | SAC | 14.5km | Yes | No | No | Not shared | No | Screened out |
| Coole-Garryland Complex | SAC | 14.7km | Yes | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Ballyvaughan Turlough | SAC | 14.8km | No | No | No | Not shared | No | Screened out |
| Cloughmoyne | SAC | 15.3km | Yes | Yes | No | Shared | No<br>Due to the distance upstream and separation of the site by upstream waterbodies from the study area there is no pathway for effect. | Screened out |
| Ballinduff Turlough | SAC | 15.5km | Yes | No | No | Not shared | No | Screened out |
| Sonnagh Bog | SAC | 15.6km | Yes | No | No | Not shared | No | Screened out |
| Caherglassaun Turlough | SAC | 15.8km | Yes | No | No | Not shared | No | Screened out |
| Coole-Garryland | SPA | 16.6km | Yes | No | Yes | Not shared | Yes | **Screened in** |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Displacement or synergistic effects possible as SPA | |
| Lough Coy | SAC | 16.8km | Yes | No | No | Not shared | No | Screened out |
| Carrowbaun, Newhall and Ballylee Turloughs | SAC | 16.8km | Yes | No | No | Not shared | No | Screened out |
| Kiltartan Cave (Coole) | SAC | 17.8km | Yes | No | No | Not shared | No | Screened out |
| Shrule Turlough | SAC | 20.0km | Yes | No | No | Not shared | No | Screened out |
| Mocorha Lough | SAC | 20.4km | Yes | No | No | Not shared | No | Screened out |
| Kilkieran Bay And Islands | SAC | 22.2km | Yes | Yes | No | Connected by sea | No – Only connected by sea, due to distance | Screened out |

| European Site | Design ation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchmen t Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | and no freshwater connection the potential for impact is extremely unlikely. | |
| Ballymaglancy Cave, Cong | SAC | 22.9km | Yes | No | No | Shared | No | Screened out |
| Kildun Souterrain | SAC | 23.0km | Yes | No | No | Not shared | No | Screened out |
| Termon Lough | SAC | 23.1km | Yes | No | No | Not shared | No | Screened out |
| Lough Carra/Mask Complex | SAC | 23.2km | Yes | No | No | Not shared | No | Screened out |
| Maumturk Mountains | SAC | 23.3km | Yes | Yes | No | Shared | Yes | **Screened in** |
| Levally Lough | SAC | 23.4km | Yes | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Lough Cutra | SAC | 23.9km | Yes | No | No | Not shared | No | Screened out |
| Lough Cutra | SPA | 23.9km | Yes | No | Yes | Not shared | Yes<br><br>Displacement or synergistic effects possible as SPA | **Screened in** |
| Derrinlough (Cloonkeenleana node) Bog | SAC | 23.9km | Yes | No | No | Not shared | No | Screened out |
| Carrownagappul Bog | SAC | 24.0km | Yes | No | No | Not shared | No | Screened out |
| Clyard Kettle-holes | SAC | 24.1km | Yes | No | No | Not shared | No | Screened out |
| Shankill West Bog | SAC | 24.5km | Yes | No | No | Not shared | No | Screened out |
| Drummin Wood | SAC | 24.8km | No | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Ballyteige (Clare) | SAC | 24.9km | Yes | No | No | Not shared | No | Screened out |
| Lough Mask | SPA | 25.2km | Yes | No | Yes | Not shared | Yes<br><br>Displacement or synergistic effects possible as SPA | **Screened in** |
| Termon Lough | SAC | 25.3km | Yes | No | No | Not shared | No | Screened out |
| Gortacarnaun Wood | SAC | 26.4km | No | No | No | Not shared | No | Screened out |
| Curraghlehanagh Bog | SAC | 27.4km | Yes | No | No | Not shared | No | Screened out |
| Glenloughaun Esker | SAC | 28.6km | Yes | No | No | Not shared | No | Screened out |
| Skealoghan Turlough | SAC | 28.6km | Yes | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Ardkill Turlough | SAC | 28.8km | Yes | No | No | Not shared | No | Screened out |
| Inishmore Island | SAC | 29.1km | Yes | No | No | Connected by sea | No – Only connected by sea, due to distance and no freshwater connection the potential for impact is extremely unlikely. | Screened out |
| Greaghans Turlough | SAC | 29.1km | - | No | No | Not shared | Yes | Screened out |
| Cregg House Stables, Crusheen | SAC | 29.5km | - | No | No | Not shared | Yes | Screened out |
| Cregduff Lough | SAC | 47.3km | Hydrogeology | No | No | Not shared. Connected by sea and land to | No – Only connected by sea, due to distance and no freshwater connection the | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | catchment effects | potential for impact is extremely unlikely. | |
| Ballyogan Lough | SAC | 29.5km | - | No | No | Not shared | Yes | Screened out |
| Inisheer Island | SAC | 29.5km | Intertidal features sensitive to water quality | No | No | Connected by sea | No – Only connected by sea, due to distance and no freshwater connection the potential for impact is extremely unlikely. | Screened out |
| Kilglassan/Caheravoostia Turlough Complex | SAC | 30.0km | Yes | No | No | Not shared | No | Screened out |
| Moyree River System | SAC | 30.0km | Yes | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Inishmaan Island | SAC | 30.1km | Yes | No | No | Connected by sea | No – Only connected by sea, due to distance and no freshwater connection the potential for impact is extremely unlikely. | Screened out |
| River Suck Callows | SPA | 30.2km | Yes | No | Yes | Not shared | Yes<br>Displacement or synergistic effects possible as SPA | **Screened in** |
| Cliffs of Moher | SPA | 30.7km | Yes | No | Yes | Not shared | Yes<br>Displacement or synergistic effects possible as SPA | **Screened in** |
| Corofin Wetlands | SPA | 30.7km | Yes | No | Yes | Not shared | Yes | **Screened in** |

| European Site | Design ation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchmen t Shared OR Not shared with study boundary | Potential for in - combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Displacement or synergistic effects possible as SPA | |
| Pollagoona Bog | SAC | 30.7km | Yes | No | No | Not shared | No | Screened out |
| Pollnaknockaun Wood Nature Reserve | SAC | 31.2km | No | No | No | Not shared | No | Screened out |
| Lough Lurgeen Bog/Glenamadd y Turlough | SAC | 31.2km | Yes | No | No | Not shared | No | Screened out |
| Ardgraigue Bog | SAC | 31.7km | Yes | No | No | Not shared | No | Screened out |
| Camderry Bog | SAC | 31.7km | Yes | No | No | Not shared | No | Screened out |
| Inishmore | SPA | 32.2km | Yes | No – connected by sea | No – unlikely due to distance | Shared by Sea /Waterbod | No – Only connected by sea, due to distance and no freshwater | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | y (Galway Bay) | connection the potential for impact is extremely unlikely. | |
| Dromore Woods and Loughs | SAC | 32.6km | - | No | No | Not shared | No | Screened out |
| Derrycrag Wood Nature Reserve | SAC | 32.7km | - | No | No | Not shared | No | Screened out |
| Rosturra Wood | SAC | 32.8km | - | No | No | Not shared | No | Screened out |
| Barroughter Bog | SAC | 33.2km | - | No | No | Not shared | No | Screened out |
| Cloonmoylan Bog | SAC | 33.5km | - | No | No | Not shared | No | Screened out |
| Inagh River Estuary | SAC | 33.8km | - | No | No | Not shared | No | Screened out |
| Loughatorick South Bog | SAC | 34.1km | - | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Lough Carra | SPA | 34.4km | Yes | No | No – unlikely due to distance | Not shared | No | Screened out |
| Ballygar (Aghrane) Bog | SAC | 34.4km | - | No | No | Not shared | No | Screened out |
| Lough Derg (Shannon) | SPA | 34.5km | - | No | No | Not shared | No | Screened out |
| Lough Derg, North-east Shore | SAC | 34.5km | - | No | No | Not shared | No | Screened out |
| Glendree Bog | SAC | 34.8km | - | No | No | Not shared | No | Screened out |
| Lisnageeragh Bog and Ballinastack Turlough | SAC | 35.0km | - | No | No | Not shared | No | Screened out |
| Carrowkeel Turlough | SAC | 35.0km | - | No | No | Not shared | No | Screened out |
| Killeglan Grassland | SAC | 35.3km | - | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Ballycullinan Lake | SAC | 35.9km | - | No | No | Not shared | No | Screened out |
| Aughrim (Aghrane) Bog | SAC | 36.1km | - | No | No | Not shared | No | Screened out |
| Old Farm Buildings, Ballymacrogan | SAC | 36.3km | - | No | No | Not shared | No | Screened out |
| Slyne Head to Ardmore Point Islands | SPA | 37.4km | Yes | No – connected by sea | No – unlikely due to distance | Shared by Sea/ Waterbody (Galway Bay) | No – Only connected by sea, due to distance and no freshwater connection the potential for impact is extremely unlikely. | Screened out |
| Four Roads Turlough | SAC | 37.6km | Yes | No | No | Not shared | No | Screened out |
| Four Roads Turlough | SPA | 37.6km | Yes | No | No – unlikely due to distance | Not shared | No - | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Williamstown Turloughs | SAC | 37.7km | - | No | No | Not shared | No | Screened out |
| The Twelve Bens/Garraun Complex | SAC | 38.3km | - | No | No | Not shared | No | Screened out |
| River Shannon Callows | SAC | 38.7km | Yes | No | No | Not shared | No | Screened out |
| Middle Shannon Callows | SPA | 38.7km | Yes | No | No – unlikely due to distance | Not shared | No | Screened out |
| Mweelrea/Sheeffry/Erriff Complex | SAC | 39.0km | - | No | No | Not shared | No | Screened out |
| Kilsallagh Bog | SAC | 39.3km | - | No | No | Not shared | No | Screened out |
| Lough Croan Turlough | SPA | 39.5km | Yes | No | No – unlikely due to distance | Not shared | No | Screened out |
| Lough Croan Turlough | SAC | 39.5km | Yes | No | No | Not shared | No | Screened out |

| European Site | Designation | Distance to GWS area | Water dependent SAC/SPA | Hydrologically connected to GWS Study area | Potential for supporting habitat outside of SPA/SAC within GWS study area | Sub catchment Shared OR Not shared with study boundary | Potential for in-combination linkage, thus decision to be reviewed in AA (N/A if already shares sub-catchment with Galway study area) | Screening Decision[5] |
|---|---|---|---|---|---|---|---|---|
| Old Domestic Buildings, Rylane | SAC | 39.5km | - | No | No | Not shared | No | Screened out |

# Appendix B – Threats and pressures related to (11) European Sites within the study area; those that share sub-catchments with it; or are connected closely by sea (see Appendix A map)

**With regard to Schedule 4 of the Regulations:** ***Please note that activities other than those listed in association with the citation of a site, "such as effluent discharge, construction work, [..] require a licence or permission from the appropriate consent authority*****".**

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| Black Head-Poulsallagh Complex SAC | 10.4km southwest | Designated for Limestone pavements in intimate association with other Annex I habitats including the below with Atlantic hazel woodland, an internationally rare woodland type.<br>• [8330] Submerged or partially submerged sea caves<br>• [8420] Limestone pavements<br>• [4060] Alpine and Boreal heaths<br>• [5130] Juniperus communis formations on heaths or calcareous grasslands<br>• [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates<br>• [722o] Petrifying springs with tufa formation (Cratoneurion)<br>• [6510] Lowland hay meadows ( Alopecurus pratensis, Sanguisorba<br>• Petalwort *Petalophyllum ralfsii*<br>• [1170] Reefs | Threats include Applying inorganic or organic fertiliser, including slurry. Application of pesticides, including herbicides. Water abstraction, sinking of boreholes and wells. Works on, or alterations to, the banks, bed or flow of a drain, watercourse or waterbody. Drainage works including digging, deepening, widening or blocking a drain, watercourse or waterbody.<br><br>Conservation objectives for perennial vegetation of stony banks and Petalwort. COs for all these habitats should be used in conjunction with each other as appropriate.<br><br>*Petalophyllum ralfsii* grows in damp sand and in compacted, sandy ground, maintained by rabbit (Oryctolagus cuniculus) grazing and trampling (by walkers). The extent of suitable habitat at Fanore is estimated to be c.35 $m^2$ and occurs on a trampled path in a damp flat depression strewn with large limestone boulders between sand dunes.<br>The area of active floodplain at and upstream of the *P.ralfsi* habitat should be maintained. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | • [3260] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation | Intertidal reef community complex; Laminaria-dominated community complex |
| Connemara Bog Complex SAC | 1.6km west | Designated for four Annex I/II species and 14 Annex I/II habitats, two of which are priority (*):<br>• [1150] Coastal Lagoons*<br>• [1170] Reefs<br>• [3110] Oligotrophic Waters containing very few minerals<br>• [3130] Oligotrophic to Mesotrophic Standing Waters<br>• [3160] Dystrophic Lakes, pools<br>• [3260] Floating River Vegetation<br>• [4010] Wet Heath<br>• [4030] Dry Heath<br>• [6410] *Molinia* Meadows<br>• [7130] Blanket Bogs (Active)*<br>• [7140] Transition Mires<br>• [7150] Rhynchosporion Vegetation<br>• [7230] Alkaline Fens<br>• [91A0] Old Oak Woodlands | The main damaging operations and threats in the Connemara Bog Complex are peat cutting, over-grazing and afforestation.<br>Extensive peat extraction using 'Difco' machines has become common in the region in recent years, and cutting by excavator and hopper is also increasing.<br>The hand-cutting of peat is less threatening as it is usually on a much smaller scale, but nonetheless it should be controlled within the site.<br>Over-grazing and poaching by sheep and cattle are a widespread problem within the site, with erosion of peat ensuing.<br>Other threats and potentially damaging operations include land drainage and reclamation, applying inorganic or organic fertiliser, including slurry quarrying and dumping. Application of pesticides, including herbicides. Drainage works including digging, deepening, widening or blocking a drain, watercourse or waterbody. Water abstraction, sinking of boreholes and wells. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | • [1065] Marsh Fritillary (*Euphydryas aurinia*)<br>• [1106] Atlantic Salmon (*Salmo salar*)<br>• [1355] Otter (*Lutra lutra*)<br>• [1833] Slender Naiad (*Najas flexilis*) | |
| Cregganna Marsh SPA | Partially within study area | Designated for E.U. Birds Directive species:<br>• Greenland White-fronted Goose (157)<br><br>Associated also to nearby Rahasane Turlough SPAs | Threats include habitat alteration and nutrient input.<br><br>Conservation objectives note a 54% decline in the Greenland White-fronted Goose colony using a 5 year mean of peak counts. This has occurred since the baseline in 1994/95 to 2015/16-2019/20.<br>Assessment corresponds to a report by Burke et al. (2018) Conservation objectives note that the suitability and availability of habitat areas are likely to vary throughout the season, for example, due to variation in land management practices or the abundance of resources available. Factors such as intensity, frequency, timing, and duration of a (direct or indirect) disturbance source must be taken into account to determine the potential impact upon the targets for population trend and spatial distribution.<br>The number, location, shape, and area of potential barriers to foraging and undisturbed loafing should be taken into account to determine potential impact.<br><br>Access to ecologically important sites outside the SPA should be considered with regard to the requirements of the wintering population, for certain activities, such as foraging when preferred foraging areas are |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | | unavailable due to disturbance, extensive flooding, or other factors.<br>A synergistic and cumulative effects assessment will evaluate growth trajectories (to discuss the receiving capacity /displacement /disturbance against these trajectories), the changing burdens of land use practices and options, and associated declines across the ecologically linked available sites. The use of linked sites is related to the findings of modelling and forecasts for flood frequency and extent/rainfall saturation and associated foraging quality amongst other key factors. |
| Galway Bay Complex SAC | Partially within study area | Designated for two Annex II species and 15 Annex I habitats, five of which are priority (*):<br>• [1140] Tidal Mudflats and Sandflats<br>• [1150] Coastal Lagoons*<br>• [1160] Large Shallow Inlets and Bays<br>• [1170] Reefs<br>• [1220] Perennial Vegetation of Stony Banks<br>• [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts<br>• [1310] *Salicornia* Mud<br>• [1330] Atlantic Salt Meadows<br>• [1410] Mediterranean Salt Meadows | The site includes areas used for fishing and aquaculture.<br>Sewage effluent and aquaculture detritus could be deleterious to benthic communities. Eutrophication is probably affecting some of the lagoons and is a continued threat to the site.<br>Drainage is a general threat to the turlough and fen habitats.<br>Reef and sediment communities are vulnerable to nutrients, pollution, pH change, sedimentation, disturbance or compaction.<br>*Paracentrotus lividus* are vulnerable to over-fishing.<br>Extraction of maerl in Galway Bay is a threat to the site.<br>Shoreline and terrestrial habitats are under pressure from urban expansion and recreational activities. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | • [3180] Turloughs*<br>• [5130] Juniper Scrub<br>• [6210] Orchid-rich Calcareous Grassland*<br>• [8420] Limestone pavements*<br>• [7210] *Cladium* Fens*<br>• [7230] Alkaline Fens<br>• [8240] Limestone Pavement*<br>• [1355] Otter (*Lutra lutra*)<br>• [1365] Common (Harbour) Seal (*Phoca vitulina*)<br>This large coastal site is listed as of immense conservation importance, with many habitats listed on Annex I of the E.U. Habitats Directive, 4 of which have priority status 000268_Rev15.Docx Version date: 10.12.2015 (lagoon, Cladium fen, turlough and orchid-rich calcareous grassland). The examples of shallow bays, reefs, lagoons and saltmarshes found are amongst the best in the country. Supports an important Common Seal colony and a breeding Otter population (Annex II species), and 6 regular Annex I E.U. Birds Directive species.<br>The site has the Country's only recorded littoral community characterised by *Fucus* | Bird populations may be disturbed by aquaculture activities.<br>Activities listed for notification include: Applying inorganic or organic fertiliser, including slurry. Application of pesticides, including herbicide. Works on, or alterations to, the banks, bed or flow of a drain, watercourse or waterbody. Drainage works including digging, deepening, widening or blocking a drain, watercourse or waterbody. Water abstraction, sinking of boreholes and wells. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | *serratus* and the only recorded piddock (bivalve mollusc) bed. | |
| Gortnandarragh Limestone Pavement SAC | 5.8km northwest | Designated for one Annex I habitats, which is also a priority habitat (*):<br>• [8240] Limestone Pavement* | Distinctiveness is underpinned in part by hydrodynamics of site: slopes, clints and grykes, exposed areas and sheltered. Supports rare bryophytes, forbs and invertebrates. Threats can be inferred to include change to hydrology.<br>Yew in particular exhibits the effects of severe browsing pressure.<br>The heath appears to be under-grazed, and scrub is invading.<br>The main land use on the site is extensive grazing by cattle and goats.<br>Threats to the site include over-grazing, land reclamation and quarrying, the latter two already occurring to a small extent within the site. |
| Inner Galway Bay SPA | Partially within study area | Designated for E.U. Birds Directive species (population estimate):<br>• Black-throated Diver (36)<br>• Great Northern Diver (88)<br>• Cormorant (266)<br>• Grey Heron (102)<br>• Light-bellied Brent Goose (676)<br>• Wigeon (1168)<br>• Teal (700)<br>• Red-breasted Merganser (249)<br>• Ringed Plover (335) | Vulnerability to WQ deterioration and reduction or change to habitat quality (e.g. eutrophication of saltmarsh). In combination effects of trawling/fishing etc on marine resources. Population resilience e.g. 50% declines in seabird general abundance in British and Irish coasts over the last 20 years (complex as bird flu likely to have compromised recent increases in Ireland)<br><br>Citation: Seabird species make extensive use of the marine waters adjacent to their breeding colonies. Foraging range: max. 50km, mean max. 31.67km, mean 8.46km (BirdLife International Seabird Database |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | • Golden Plover (2030)<br>• Lapwing (3969)<br>• Dunlin (2155)<br>• Bar-tailed Godwit (447)<br>• Curlew (697)<br>• Redshank (505)<br>• Turnstone (182)<br>• Black-headed Gull (1941)<br>• Common Gull (1066)<br>• Sandwich Tern (81 pairs)<br>• Common Tern (98 pairs)<br>• Wetland and Waterbirds | (Birdlife International, 2013)) See Galway Bay Complex SAC.<br><br>Specified activities for notification include: Drainage works including digging, deepening, widening or blocking a drain, watercourse or waterbody. |
| Lough Corrib SAC | Partially within study area | Designated for nine Annex I/II species and 15 Annex I/II habitats, five of which are priority (*):<br>• [3110] Oligotrophic Waters containing very few minerals<br>• [3130] Oligotrophic to Mesotrophic Standing Waters<br>• [3140] Hard Water Lakes<br>• [3260] Floating River Vegetation<br>• [6210] Orchid-rich Calcareous Grassland*<br>• [6410] Molinia Meadows | Peat cutting, drainage and other land use activities have created areas of degraded bog, which are more susceptible to drying and burning damage.<br>The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localized eutrophication of the lake, and housing and boating development, which is causing the loss of native lakeshore vegetation.<br>The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning.<br>Peat cutting threatens Addergoole Bog. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | • [7110] Raised Bog (Active)*<br>• [7120] Degraded Raised Bog<br>• [7150] Rhynchosporion Vegetation<br>• [7210] Cladium Fens*<br>• [7220] Petrifying Springs*<br>• [7230] Alkaline Fens<br>• [8240] Limestone Pavement*<br>• [91A0] Old Oak Woodlands<br>• [91D0] Bog Woodland*<br>• [1029] Freshwater Pearl Mussel (Margaritifera margaritifera)<br>• [1092] White-clawed Crayfish (Austropotamobius pallipes)<br>• [1095] Sea Lamprey (Petromyzon marinus)<br>• [1096] Brook Lamprey (Lampetra planeri)<br>• [1106] Atlantic Salmon (Salmo salar)<br>• [1303] Lesser Horseshoe Bat (Rhinolophus hipposideros)<br>• [1355] Otter (Lutra lutra)<br>• [1833] Slender Naiad (Najas flexilis)<br>• [6216] Slender Green Feather-moss (Hamatocaulis vernicosus) | Fishing and shooting occur in and around the lake. Introduction of exotic crayfish species or the crayfish fungal plague (*Aphanomyces astaci*) could have a serious impact on the native crayfish population.<br><br>The bat roost is susceptible to disturbance or development. |
| Lough Corrib SPA | Partially within study area | Designated for E.U. Birds Directive species (population estimate): | Various threats, including water quality, pollution and invasive species and effects to forage quality. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | • Greenland White-fronted Goose (160)<br>• Gadwall (48)<br>• Shoveler (90)<br>• Pochard (10107) internationally important in itself<br>• Tufted Duck (5486)<br>• Common Scoter (30 pairs)<br>• Hen Harrier (8)<br>• Coot (14426)<br>• Golden Plover (1727)<br>• Black-Headed Gull (431 pairs)<br>• Common Gull (186 pairs)<br>• Common Tern (37 pairs)<br>• Arctic Tern (60 pairs) | Please note that this SPA overlaps with Lough Corrib SAC (000297) and is adjacent to Maumturk Mountains SAC (002008). The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.<br><br>Barriers limiting the population's access to this SPA or ecologically important sites outside the SPA will ultimately affect the achievement of targets for population trend and/or spatial distribution.<br>Foraging habitats include a range of wetlands, such as marshes, flooded areas, lakes, estuaries and lagoons, as well as grasslands.<br>The national population of over-wintering pochard in Ireland has declined by 79% from 1994/95 to 2019/20, as monitored via the Irish Wetland Bird Survey (I-WeBS; Kennedy et al., 2022). Roosting is a critical ecological requirement for the over-wintering population. When roosting overnight, pochard utilise open waterbodies (see foraging habitats).<br>Disturbance (or habitat quality deterioration) contributes to increased energetic expenditure which can result in increased likelihood of reduced recruitment, over-winter mortality or reduced fitness (if energy expenditure is greater than energy gain) and, in turn, negatively impact population trends. Water levels are another factor recorded as related to breeding success of species listed. |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | | |
| Maumturk Mountains SAC | 23.3km northwest | Designated for:<br>• [3110] Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)<br>• [4010] Northern Atlantic wet heaths with Erica tetralix<br>• [4060] Alpine and Boreal heaths<br>• [7130] Blanket bogs (* if active bog)<br>• [7150] Depressions on peat substrates of the Rhynchosporion<br>• [8220] Siliceous rocky slopes with chasmophytic vegetation<br>• [1106] Salmon *Salmo salar*<br>• [1833] Slender Naiad *Najas flexilis* | Preservation of oligotrophic lakes and blanket bogs (hydrological sensitivity). Sensitivity to climate change, groundwater and rainfall, Invasive species effects on internationally vulnerable species or assemblages many of which as red data book listed for Ireland including Arctic Charr.<br>The main damaging activities and threats to the Maumturk Mountains are overgrazing, peat cutting and afforestation activities, but other threats and potentially damaging activities include land drainage and reclamation, fertilization.<br><br>Adjacent Lough Corrib. Consideration of the sites together is included in Cis.<br><br>Specified activities for notification include: Works on, or alterations to, the banks, bed or flow of a drain, watercourse or waterbody. Drainage works including digging, deepening, widening or blocking a drain, watercourse or waterbody. Water abstraction, sinking of boreholes and wells. |
| Monivea Bog SAC | 4.6km northeast | Designated for three Annex I/II habitats, one of which is priority (*):<br>• [7110] Raised Bog (Active)*<br>• [7120] Degraded Raised Bog<br>• [7150] Rhynchosporion Vegetation | Active Raised Bog (ARB) habitat was mapped at 7.0ha (2014). There is an area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 25.8ha. it is estimated that only 12.9ha of this is potentially restorable to ARB by drain blocking. Eco-hydrological assessments of the cutover estimates that an additional 12.1ha of bog forming habitats could be |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | | restored. The long-term target for ARB is therefore 32.0ha. ARB habitat at Monivea Bog is central, sub-central ecotopes and active flush only, and occurs mainly on the western part of the bog. DRB occurs on both the western, south-eastern and north-eastern parts of the bog, which will require restoration measures. Hydrological influences of groundwater at the site are therefore of primary importance.<br>There is extensive mechanical peat cutting to the north, east and south of the site, and some hand-cutting in the south-west.<br>Burning events have occurred on the bog in the past and in places the peat remains unvegetated.<br><br>Drying is changing bog flora. Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding, and burning evidence.<br>Some of the high bog drains are new and others have been deepened.<br>Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs.<br>Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). Within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and runoff |

| European Site | Distance to study area | Details | Threats and pressures |
|---|---|---|---|
| | | | from surrounding mineral lands) producing a direct influence of water quality from surrounding lands. |
| Ross Lake and Woods SAC | 1.7km northwest | Designated for one Annex I habitat and one Annex II species:<br>• [3140] Hard Water Lakes<br>• [1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*) | Ross Lake includes a limestone bed covered by precipitated marl. pH and nutrients are required in balance to not produce overgrowths of algae disrupting WQ and trophic webs. Limestones support fen vegetation. The main land uses within the site are angling, commercial forestry, and grazing of the woodland and wetland areas. Threats include climate change e.g. through deoxygenation, temperature range and through algae, radiant light. Also invasive species, fertilization, or encroachment. Breeding Lesser Horseshoe bat is sensitive to habitat quality changes with lakeside foraging essential to this colony. This vegetation, including shoreline is fringed by wetland vegetation of reedswamp, freshwater marsh, fen, wet woodland and wet grassland is sensitive to nutrient input and pH. Otter is also noted, also listed on Annex II of the E.U. Habitats Directive, a species also listed in Annex II of the Regulations. |

# Appendix C – Screening Table – European Sites directly linked as within the GWS area or sharing an intersecting sub-catchment or marine waterbody (11 sites)

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| Black Head-Poulsallagh Complex SAC<br>IE0000020 | 10.4km southwest | Designated for Limestone pavements in intimate association with other Annex I habitats including the below with Atlantic hazel woodland, an internationally rare woodland type.<br>• [8330] Submerged or partially submerged sea caves<br>• [8420] Limestone pavements<br>• [4060] Alpine and Boreal heaths<br>• [5130] Juniperus communis formations on heaths or calcareous grasslands<br>• [6210] Semi-natural dry grasslands and scrubland | Connected by sea directly to Galway Bay e.g. dependency on excellent WQ, nutrient balances and radiant light appropriate to flora and fauna of the intertidal and sub-tidal. Estuary interface with Qualifying feature chalk stream interaction supporting ecosystem richness and fish migration.<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | Screen in:<br>• [8330] Submerged or partially submerged sea caves<br>• [1170] Reefs<br><br>• [1170] Reefs<br>vegetation |

[6] The Screening Decision at this time follows the Precautionary Principle (European Commission, 2000) and will respond to further development of the Study.

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | facies on calcareous substrates<br>• [722o] Petrifying springs with tufa formation (Cratoneurion)<br>• [6510] Lowland hay meadows *( Alopecurus pratensis, Sanguisorba*<br>• Petalwort *Petalophyllum ralfsii*<br>• [1170] Reefs<br>• [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation | | |
| Connemara Bog Complex SAC<br><br>IE0002034 | 1.6km west | Designated for four Annex I/II species and 14 Annex I/II habitats, two of which are priority (*):<br>• [1150] Coastal Lagoons<br>• [1170] Reefs<br>• [3110] Oligotrophic Waters containing very few minerals | Connemara Bog Complex features include many water-quality sensitive habitats and species, with response to fluctuations associated to drainage, competition for water use, or nutrient input.<br><br>Drainage and eutrophication are the major threats to turlough systems in general. | Screened in:<br>• Coastal LagoonsReefsOligotrophic Waters containing very few minerals<br>• Oligotrophic to Mesotrophic Standing Waters |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | • [3130] Oligotrophic to Mesotrophic Standing Waters<br>• [3160] Dystrophic Lakes<br>• [3260] Floating River Vegetation<br>• [4010] Wet Heath<br>• [4030] Dry Heath<br>• [6410] *Molinia* Meadows<br>• [7130] Blanket Bogs (Active)<br>• [7140] Transition Mires<br>• [7150] Rhynchosporion Vegetation<br>• [7230] Alkaline Fens<br>• [91A0] Old Oak Woodlands<br>• [1065] Marsh Fritillary (*Euphydryas aurinia*)<br>• [1106] Atlantic Salmon (*Salmo salar*)<br>• [1355] Otter (*Lutra lutra*)<br>• [1833] Slender Naiad (*Najas flexilis*) | Land drainage and reclamation are cited as main sources of impact to the SAC. Operational effect changes to groundwater level would be likely deleterious to water-dependent habitats and species including floating river vegetation, wet heath, blanket bogs, *rhynchosporion* vegetation and alkaline fens.<br><br>Competing demands in future for water associated to discharge or treatment and abstraction, potentially giving rise to turbidity, altered river hydromorphology and sedimentation, mineral availability, pollution and nutrient loading, imbalance, hormonal burden, assemblage change, and groundwater level change. Potential for loss of spawning habitat or lifecycle requirements /prey availability or quality for aquatic species, including sea lamprey, brook lamprey, Atlantic salmon, and Otter.<br><br>As the detailed in the report construction and operational effects of the Plan are currently unknown, giving due regard to the precautionary principle, likely significant effects cannot be discounted. | • Dystrophic Lakes<br>• Floating River Vegetation<br>• Wet Heath<br>• Dry Heath<br>• *Molinia* Meadows<br>• Blanket Bogs (Active)<br>• Transition Mires<br>• Rhynchosporion Vegetation<br>• Alkaline Fens<br>• Old Oak Woodlands<br>• Marsh Fritillary (*Euphydryas aurinia*)<br>• Atlantic Salmon (*Salmo salar*)<br>• Otter (*Lutra lutra*)<br>• Slender Naiad (*Najas flexilis*) |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | | In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | |
| Cregganna Marsh SPA<br><br>IE0004142 | Partially within study area | Designated for E.U. Birds Directive species:<br>• Greenland White-fronted Goose | Flow from study boundary to site within a shared sub-catchment with the GWS area.<br><br>Due to the reliance of Greenland white-footed goose on water-dependent habitat, the population may be affected by the Plan due to the location of the GWS area during the construction stage, through water quality deterioration and loss and/or fragmentation of habitat for which Greenland white-footed goose rely.<br><br>Synergistic effects of growth trajectories that the study supports in operational time horizons give rise to further effects of noise, light and disturbance. Displacement to or from site during construction phases require further evaluation when GWS options are further developed.<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for | Screened in:<br>• Greenland White-fronted Goose |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | | recreation, transportation, and include associated infrastructure | |
| Galway Bay Complex SAC<br><br>IE0000268 | Partially within study area | Designated for two Annex I/II species and 15 Annex I/II habitats, five of which are priority (*):<br>• [1140] Tidal Mudflats and Sandflats<br>• [1150] Coastal Lagoons<br>• [1160] Large Shallow Inlets and Bays<br>• [1170] Reefs<br>• [1220] Perennial Vegetation of Stony Banks<br>• [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts<br>• [1310] *Salicornia* Mud<br>• [1330] Atlantic Salt Meadows<br>• [1410] Mediterranean Salt Meadows<br>• [3180] Turloughs<br>• [5130] Juniper Scrub<br>• [6210] Orchid-rich Calcareous Grassland* | Flow from study boundary to site within a sub-catchment shared with the GWS area.<br><br>Land drainage and reclamation are cited as main sources of impact to the SAC. Potential changes in groundwater level or water quality may affect each of the habitats and species through decline of quality.<br><br>Sewage effluent and catchment management effects could be deleterious to benthic communities or to water dependent communities either directly or through altered balances. Further detail is required in relation to the operational stage in order to assess the LSE.<br><br>Sources of impact to features include construction runoff into waterbodies and groundwater level changes. Reef and sediment communities are vulnerable to disturbance or compaction from heavy vehicle/plant movement.<br><br>Shoreline and terrestrial habitats are under pressure from urban expansion and recreational activities. Thus, site | Screened in:<br>• Tidal Mudflats and Sandflats<br>• Coastal Lagoons<br>• Large Shallow Inlets and Bays<br>• Reefs<br>• Perennial Vegetation of Stony Banks<br>• Vegetated sea cliffs of the Atlantic and Baltic coasts<br>• *Salicornia* Mud<br>• Atlantic Salt Meadows<br>• Mediterranean Salt Meadows<br>• Turloughs<br>• Juniper Scrub<br>• Orchid-rich Calcareous Grassland<br>• *Cladium* Fens |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | • [7210] *Cladium* Fens<br>• [7230] Alkaline Fens<br>• [8240] Limestone Pavement<br>• [1355] Otter (*Lutra lutra*)<br>• [1365] Common (Harbour) Seal (*Phoca vitulina*) | management and infrastructure may affect these features.<br>Sources of impact to turloughs include construction runoff or displacement of waters i.e. change to water quality.<br>WQ may directly affect trophic webs causing indirect impacts for species such as Common Seal and Otter,<br>Hormonal imbalances may alter dynamics, alongside nutrient changes or pH change.<br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | • Alkaline Fens<br>• Limestone Pavement<br>• Otter (*Lutra lutra*)<br>• Common (Harbour) Seal (*Phoca vitulina*) |
| Gortnandarragh Limestone Pavement SAC<br>IE0001271 | 5.8km northwest | Designated for one Annex I/II habitats, which is also a priority habitat (*):<br>• [8240] Limestone Pavement | Potential functional connectivity between this site and the GWS area.<br>Site elements comprise water sensitive habitat and features.<br>Sources may include direct impact, construction runoff into waterbodies and groundwater level changes.<br>As the detailed of construction and operational effects of the Plan are | Screened in:<br>• Limestone Pavement |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | | currently unknown, giving due regard to the precautionary principle, likely significant effects cannot be discounted.<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | |
| Inner Galway Bay SPA<br><br>IE0004031 | Partially within study area | Designated for E.U. Birds Directive species (population estimate):<br>• Black-throated Diver<br>• Great Northern Diver<br>• Cormorant<br>• Grey Heron<br>• Light-bellied Brent Goose<br>• Wigeon<br>• Teal<br>• Red-breasted Merganser<br>• Ringed Plover<br>• Golden Plover<br>• Lapwing | Flow from study boundary to site within a sub-catchment shared with the GWS area and surrounds.<br><br>Loss and/or fragmentation of habitats, and/or through water quality deterioration which may have a cascading effect on food resources. Catchment management effects<br><br>The species for which the sites are designated for may be affected through disturbance during construction stage (through plant movement, etc.),<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for | Screened in:<br>• Black-throated Diver<br>• Great Northern Diver<br>• Cormorant<br>• Grey Heron<br>• Light-bellied Brent Goose<br>• Wigeon<br>• Teal<br>• Red-breasted Merganser<br>• Ringed Plover<br>• Golden Plover<br>• Lapwing<br>• Dunlin<br>• Bar-tailed Godwit |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | • Dunlin<br>• Bar-tailed Godwit<br>• Curlew<br>• Redshank<br>• Turnstone<br>• Black-headed Gull<br>• Common Gull<br>• Sandwich Tern<br>• Common Tern | recreation, transportation, and include associated infrastructure | • Curlew<br>• Redshank<br>• Turnstone<br>• Black-headed Gull<br>• Common Gull<br>• Sandwich Tern<br>• Common Tern |
| Lough Corrib SAC<br>IE0000297 | Partially within study area | Designated for nine Annex I/II species and 15 Annex I/II habitats, five of which are priority (*):<br>• [3110] Oligotrophic Waters containing very few minerals<br>• [3130] Oligotrophic to Mesotrophic Standing Waters<br>• [3140] Hard Water Lakes<br>• [3260] Floating River Vegetation<br>• [6210] Orchid-rich Calcareous Grassland* | Flow from study boundary to site within a sub-catchment shared with the GWS area.<br>Peat cutting, drainage and other land use activities have created areas of degraded bog, which are more susceptible to drying and burning damage.<br>The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localised eutrophication of the lake, and housing and boating development, which is | Screened in:<br>• Oligotrophic Waters containing very few minerals<br>• Oligotrophic to Mesotrophic Standing Waters<br>• Hard Water Lakes<br>• Floating River Vegetation<br>• Orchid-rich Calcareous Grassland<br>• *Molinia* Meadows |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | • [6410] *Molinia* Meadows<br>• [7110] Raised Bog (Active)<br>• [7120] Degraded Raised Bog<br>• [7150] Rhynchosporion Vegetation<br>• [7210] *Cladium* Fens<br>• [7220] Petrifying Springs<br>• [7230] Alkaline Fens<br>• [8240] Limestone Pavement<br>• [91A0] Old Oak Woodlands<br>• [91D0] Bog Woodland<br>• [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)<br>• [1092] White-clawed Crayfish (*Austropotamobius pallipes*)<br>• [1095] Sea Lamprey (*Petromyzon marinus*)<br>• [1096] Brook Lamprey (*Lampetra planeri*)<br>• [1106] Atlantic Salmon (*Salmo salar*) | causing the loss of native lakeshore vegetation.<br>Potential changes in groundwater level may affect features through decline or loss of water-dependent habitats and species. The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning.<br>In addition, change in groundwater level in operational horizons may cause indirect effects such as to affect spawning of aquatic species, including Atlantic salmon and to affect the quality of resources for otter. This may be further exacerbated by growth trajectories, and population increase – factors that require evaluation.<br>The construction stage may also cause changes to water quality through construction runoff. This may directly affect individuals and population and/or cause indirect impacts to food recourses for aquatic species such as sea lamprey, brook lamprey, Atlantic salmon, and otter.<br>Introduction of exotic crayfish species or the crayfish fungal plague (*Aphanomyces* | • Raised Bog (Active)<br>• Degraded Raised Bog<br>• Rhynchosporion Vegetation<br>• *Cladium* Fens<br>• Petrifying Springs<br>• Alkaline Fens<br>• Limestone Pavement<br>• Old Oak Woodlands<br>• Bog Woodland<br>• Freshwater Pearl Mussel (*Margaritifera margaritifera*)<br>• White-clawed Crayfish (*Austropotamobius pallipes*)<br>• Sea Lamprey (*Petromyzon marinus*)<br>• Brook Lamprey (*Lampetra planeri*)<br>• Atlantic Salmon (*Salmo salar*) |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | • [1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)<br>• [1355] Otter (*Lutra lutra*)<br>• [1833] Slender Naiad (*Najas flexilis*)<br>• [6216] Slender Green Feather-moss (*Hamatocaulis vernicosus*) | *astaci*) could have a serious impact on the native crayfish population. Introduction and/or spread of these species may be caused by plant usage from different sites during construction or to favour competitor species in operational phases.<br>The construction stage may cause disturbance to commuting, foraging and roosting bats through lighting, plant movement, noise pollution, construction traffic, and habitat loss through construction site management and physical development.<br>As the detailed in the report construction and operational effects of the Plan are currently unknown, giving due regard to the precautionary principle, likely significant effects cannot be discounted.<br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure. | • Lesser Horseshoe Bat (*Rhinolophus hipposideros*)<br>• Otter (*Lutra lutra*)<br>• Slender Naiad (*Najas flexilis*)<br>• Slender Green Feather-moss (*Hamatocaulis vernicosus*) |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| Lough Corrib SPA<br>IE0004042 | Partially within study area | Designated for E.U. Birds Directive species (population estimate):<br>• Greenland White-fronted Goose<br>• Gadwall<br>• Shoveler<br>• Pochard<br>• Tufted Duck<br>• Common Scoter<br>• Hen Harrier<br>• Coot<br>• Golden Plover<br>• Black-Headed Gull<br>• Common Gull<br>• Common Tern<br>• Arctic Tern | The species for which the sites are designated for may be affected through loss and/or fragmentation of habitats, and/or through water quality deterioration which may have a cascading effect on food resources.<br>As the detailed in the report operational effects of the Plan are currently unknown, giving due regard to the precautionary principle, likely significant effects cannot be discounted.<br>Disturbance during construction stage (through plant movement, etc.) is also to be avoided.<br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | Screened in:<br>• Greenland White-fronted Goose<br>• Gadwall<br>• Shoveler<br>• Pochard<br>• Tufted Duck<br>• Common Scoter<br>• Hen Harrier<br>• Coot<br>• Golden Plover<br>• Black-Headed Gull<br>• Common Gull<br>• Common Tern<br>• Arctic Tern |
| Maumturk Mountains SAC<br>IE0002008 | 23.3 | Designated for mountain lowlands/lake habitats/WQ on flow toward study area<br>• [3110] Oligotrophic waters containing very few minerals of sandy | Within sub -catchment shared by study area and SAC (e.g. pressured through competing water demand contributed through drainage requirements in time horizons applied) | Screen in:<br>• Atlantic salmon Salmo salar |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | plains (Littorelletalia uniflorae)<br>• [4010] Northern Atlantic wet heaths with Erica tetralix<br>• [4060] Alpine and Boreal heaths<br>• [7130] Blanket bogs (* if active bog)<br>• [7150] Depressions on peat substrates of the Rhynchosporion<br>• [8220] Siliceous rocky slopes with chasmophytic vegetation<br>• [1106] Salmon Salmo *salar*<br>• [1833] Slender Naiad Najas *flexilis* | Dependency on flow toward study area. Subject to competing demand for water, e.g. in association to water treatment and discharge.<br><br>Also spawning grounds may be downstream of SAC (within study area).<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | |
| Monivea Bog SAC | 4.6km northeast | Designated for three Annex I/II habitats, one of which is priority (*):<br>• [7110] Raised Bog (Active)<br>• [7120] Degraded Raised Bog | SAC shares sub-catchment with GWS area. Dependency on flow toward study area. Subject to competing demand for water, e.g. in association to water treatment and discharge.<br>Highly sensitive to groundwater change, and associated rare species assemblages to nutrient input, pH and mineral | Screened in:<br>• Raised Bog (Active)<br>• Degraded Raised Bog<br>• Rhynchosporion Vegetation |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | • [7150] Rhynchosporion Vegetation | changes. Exacerbations through drying, disturbance.<br><br>The operational stage of the Plan may cause changes in groundwater level, siltation, or pollutant load, therefore affecting the three features for which the site is designated.<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure | |
| Ross Lake and Woods SAC<br><br>IE0001312 | 1.7km northwest | Designated for one Annex I/II species and one Annex I/II habitats:<br>• [3140] Hard Water Lakes<br>• [1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*) | As the metapopulation of Lesser horseshoe bats overlaps with the shared catchment between the SAC and the GWS area, fragmentation, alteration of habitat, or reduction of foraging quality is possible leading to loss of carrying capacity and reduced recruitment success, associated to elevated energy expenditure.<br><br>The construction stage may cause disturbance to commuting, foraging and roosting bats through lighting, plant movement, noise pollution, construction traffic, and habitat loss through | Screened in:<br>• Hard Water Lakes<br>• Lesser Horseshoe Bat (*Rhinolophus hipposideros*) |

| Site name | Distance from study area | Qualifying feature / Receptor | Potential effects / Source & Pathway | Stage 1 screening decision[6] |
|---|---|---|---|---|
| | | | construction site management and physical development.<br><br>Dependency on flow toward study area. Subject to competing demand for water, through time horizons and climate change effects. e.g. in association to water treatment and discharge.<br><br>Further data is required to determine the detail of developing plans, and further assess the pathways for potential LSE to hard water lakes giving rise to operational effects of habitat decline and species response.<br><br>In combination effects of plans over 60year+ time horizon may give rise to greater disturbance and resource use for recreation, transportation, and include associated infrastructure. | |

# Appendix B - Re-screening matrix of European Designated Sites in relation to GWS

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| Black Head Poulsallagh Complex SAC<br><br>(10.4km Southwest) | Construction activities relating to marine outfall infrastructure within Galway Bay and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes | Hydrologically connected to the GWS Study Area by Outer Galway Bay costal waterbody.<br><br>Coastal QIs (including reefs and submerged or partially submerged sea caves) may be affected by changes in water quality, hydrology and/or hydrogeology through construction activities and operational discharge relating to marine outfalls. The hydraulic modelling found that discharges from the marine outfall in within the Outer Galway Bay coastal waterbody can achieve the required dilution with an outfall 500–600 metres long. Therefore, pathways of effect relating to habitat degradation can be excluded for marine habitats >10.4km from the GWS Study Area.<br><br>No feasible pathways of effect have been deemed plausible for remaining QIs given the distance from the GWS | **Screened out:**<br>• Limestone pavements<br>• Alpine and boreal heaths<br>• Juniperus communis formations on heaths or calcareous grasslands<br>• Semi-natural dry grasslands and scrubland facies on calcareous substrates<br>• Petrifying springs with tufa formation (*Cratoneurion*)<br>• Lowland hay meadows *Alopecurus pratensis, Sanguisorb*<br>• Submerged or partially submerged sea caves<br>• Reefs<br>• Petalwort *Petalophyllum ralfsii*<br>• Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation |

[48] Including distance and direction relative to the GWS Study Area.

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | Study Area, nature of the works and non-mobile nature of the QI habitats. | |
| Cliff of Moher SPA<br><br>(30.7km Southwest) | Construction activities relating to marine outfall infrastructure within Galway Bay and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | Hydrologically connected to the GWS Study Area by the following coastal waterbodies: Outer Galway Bay; Aran Islands, Galway Bay, Connemara; and Shannon Plume. While not immediately adjacent to the GWS Study Area, the functional connectivity of the coastal waterbodies provides a pathway of effect for QI species utilising supporting habitat within the GWS Study Area, and therefore potentially subject to habitat loss (permanent or temporary), habitat degradation (water or air quality), disturbance and/or mortality.<br><br>Fulmar have been found to have mean foraging distances of approximately 135km (with a mean max of 542km) [49]. Fulmar rely on sea cliffs for breeding, but will nest on level ground, on buildings and in burrows and crevasses. Fulmar will use both steep rocky cliffs, grassy cliffs, and steep | **Screened out:**<br>• Fulmar *Fulmarus glacialis*<br>• Kittiwake *Rissa tridactyla*<br>• Guillemot *Uria aalge*<br>• Razorbill *Alca torda*<br>• Puffin *Fratercula arctica*<br>• Chough *Pyrrhocorax pyrrhocorax* |

[49] https://www.bto.org/sites/default/files/bto-research-report-724-web.pdf

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | slopes above cliffs.[50] Studies found that the highest densities of fulmar performing these behaviours occurred within 2km of the breeding colony (McSorley et al., 2003).<br><br>Kittiwake have been found to have mean foraging distances of approximately 55km (with a mean max of 156km). Kittiwake is a cliff-nester on ledges of offshore islands, sea stacks, or inaccessible areas of coastal mainland (Hatch, *et al*., 2020). Kittiwakes utilise ledges on sea cliffs and sloping island surfaces (Ainley, *et al*., 2021). Studies found that the highest densities of Kittiwake performing these behaviours in waters adjacent to the breeding colony (McSorley et al., 2003).<br><br>Guillemot have been found to have mean foraging distances of approximately 33km (with a mean max of 73km). Guillemots utilise ledges on sea cliffs and sloping island surfaces (Ainley, *et al*., 2021). Studies found that | |

[50] https://birdwatchireland.ie/birds/fulmar/

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | the highest densities of guillemot performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003).<br><br>Razorbill have been found to have mean foraging distances of approximately 61km (with a mean max of 88km). Razorbill breed in rocky coastal regions on steep mainland cliffs and rocky offshore islands (Lavers et al., 2020). Studies found that the highest densities of razorbill performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003).<br><br>Puffin have been found to have mean foraging distances of approximately 62km (with a mean max of 137km). Puffin is a highly colonial species with pairs typically nesting underground in burrows dug in the soil of offshore islands. If such habitat is lacking, puffin can nest among boulder screes, or at low densities in cracks in sheer cliffs (Mitchell, *et al*., 2004). Studies found that the highest densities of puffin performing these behaviours occurred | |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | within 1km of the breeding colony (McSorley et al., 2003).<br><br>Chough utilises grazed habitats with short swards of <5cm typically and areas of bare ground, where soils are easier to probe (e.g. paths, along with earth banks and stone banks). Coastal vegetation on cliffs, is also favoured, especially in spring. Chough breeding pairs tend to commute along the coast from breeding sites, rather than inland and were found to spend up to 80% of their time within 350m of the nest site (Truby, *et al*., 2006).<br><br>Despite being mobile species and dispersing for foraging opportunities, seabirds require regular and efficient access to marine waters ecologically connected to the colony in order to forage and undertake maintenance behaviours, particularly during breeding. Since the GWS Study Area is located >30km from the breeding colonies of these seabird populations, LSE can be discounted based on functional connectivity to the site. | |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| Connemara Bog Complex SAC<br><br>(1.6km West) | Construction activities relating to network improvements, WWTP and marine outfall infrastructure installation within Galway Bay, and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | QI habitats and non-mobile species (i.e. plants) are sensitive within the boundary of their designated site. Given the designated site is outside and upstream of the GWS Study Area (i.e. no hydrological linkage), LSE to Annex I habitats of the European Site can be excluded on the basis that there is no plausible pathway of effect.<br><br>Marsh fritillary utilises grassland habitat, laying eggs within grass tussocks or amongst dead leaves. There is supporting habitat for marsh fritillary within the GWS Study Area. Marsh fritillaries form close-knit colonies on discrete patches of habitat (typically 5 - 20 ha). Adults rarely disperse more than 50-100m (Butterfly Conservation, n.d.). While this distance varies by site and landscape, a distance of 1.6km from the European Site has been deemed acceptable to exclude a plausible pathway of LSE for marsh fritillary LSE based on dispersal distance alone.<br><br>Atlantic salmon occur in many of the rivers and lakes within Connemara Bog | **Screened in:**<br>• Atlantic salmon<br>• Otter<br>**Screened out:**<br>• Coastal lagoons<br>• Reefs<br>• Oligotrophic waters containing very few minerals<br>• Oligotrophic to mesotrophic Standing waters<br>• Dystrophic Lakes<br>• Floating river vegetation<br>• Wet heath<br>• Dry heath<br>• Molinia meadows<br>• Blanket bogs (Active)<br>• Transition mires<br>• Rhynchosporion vegetation<br>• Alkaline fens<br>• Old oak woodlands<br>• Slender naiad *Najas flexilis*<br>• Marsh fritillary *Euphydryas Aurinia* |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | Complex SAC. Adult Atlantic salmon migrate upstream to waterbodies within Connemara Bog Complex SAC to spawn, with some hydrologically connected migratory routes located within Outer Galway Bay coastal waterbody. Out-migrating smolt also utilise the same waterbodies to migrate downstream. While there is no potential for LSE with regards to permanent habitat loss, marine outfall installation may result in localised habitat loss (within migratory routes), habitat degradation (with potential indirect food resource impacts), disturbance and mortality during construction in the absence of mitigation measures. As such, LSE cannot be excluded.<br><br>Otters are semi-aquatic mammal, which occurs in a wide range of ecological conditions, including inland freshwater and coastal areas51. Otters utilise coastline to commute to freshwater rivers and lakes and commute via the coastline west of the | |

[51] https://www.npws.ie/sites/default/files/publications/pdf/Otter_leaflet.pdf

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | GWS Study Area. Connemara Bog Complex SAC is documented to be used by otter to forage and comprises hydrologically connected potential commuting routes along the coastline located within Outer Galway Bay coastal waterbody. While there is no potential for LSE anticipated with regards to permanent habitat loss, marine outfall installation may result in localised habitat loss (within migratory routes), habitat degradation (with potential indirect food resource impacts), disturbance and mortality during construction in the absence of mitigation measures. As such, LSE cannot be excluded. | |
| Connemara Bog Complex SPA<br><br>(6.4km West) | Construction activities relating to network improvements, WWTP and marine outfall infrastructure installation within Galway Bay, and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – Permanent<br>• Habitat loss – temporary | Connemara Bog Complex SPA is hydrologically connected the GWS Study Area through Outer Galway Bay coastal waterbody and Galway Bay North surface water catchment. Given Connemara Bog Complex SPA is located outside and upstream of the GWS Study Area (i.e. no hydrological linkage), LSE to supporting habitats within the European Site can be excluded on the basis that there is no plausible pathway of effect. | **Screened in:**<br>• Cormorant<br>• Golden plover<br>• Merlin<br>• Common gull |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | • Habitat degradation – hydrological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their European Site, the core ranges of cormorant, golden plover, merlin, and common gull are estimated to be approximately 7km, 3-11km, 5km, and 50km, respectively (Woodward, *et al*., 2019); while this distance varies by site, species and landscape, a distance of 6.4 km falls within the core range and therefore presence of the aforementioned species within the GWS Study Area cannot be discounted. Therefore, in the absence of mitigation, there is a potential for LSE relating to direct impacts via habitat loss, disturbance, and/or mortality, in addition to direct impacts via habitat degradation (e.g. impacting food resources). | |
| Coole Garryland SPA<br><br>(16.6km Southeast) | Construction activities relating to network improvements, WWTP and marine outfall infrastructure installation within Galway Bay, and operational discharges from the marine outfall. | While Coole Garryland SPA is outside the GWS Study Area, whooper swan is a mobile Annex II species and therefore may be affected whilst utilising supporting habitat outside of the boundary of the European Site. | **Screened out:**<br>• Whooper swan *Cygnus cygnus* |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | Potentially LSE through the following pathways:<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | Whooper swan is supported by various habitats, including grasslands, arable land, winter cereals cropland, rivers, lakes, turloughs and other wetland habitats for foraging. Additionally, suitable wintering population roost habitats consist primarily of permanent waterbodies, such as rivers, lakes, turloughs, lagoons and other open waterbodies52. Many of these habitats occur within the GWS Study Area.<br><br>While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site, the core range of whooper swan is estimated to be less than 5km53; while this distance varies by site and landscape, a distance of 16.6km from the European Site has been deemed acceptable to exclude LSE based on dispersal distance alone. | |

[52] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004107.pdf

[53] https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| Corofin Wetlands SPA<br><br>(30.7km South) | Construction activities relating to network improvements, WWTP and marine outfall infrastructure installation within Galway Bay, and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | There is no hydrological pathway from the GWS Study Area to Corofin Wetlands SPA. Therefore, LSE to supporting habitats within the European Site can be excluded on the basis that there is no plausible pathway of effect.<br><br>While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site, the core foraging ranges of little grebe, teal, whooper swan, black-tailed godwit and wigeon are estimated to be <1km, 5km, 5km, 5km, and 5-8km, respectively (Johnson, et al., 2014); while this distance varies by site and landscape, a distance of 30.7km from the European Site has been deemed acceptable to exclude LSE based on dispersal distance alone. | **Screened out:**<br>• Black-tailed godwit<br>• Little grebe<br>• Teal<br>• Whooper swan<br>• Wigeon |
| Cregganna Marsh SPA<br><br>(Partially within GWS Study Area) | Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay, in addition to operational discharges from the marine outfall. | QI species are sensitive to habitat loss (temporary or permanent), habitat degradation (various pathways), disturbance, and mortality within the boundary of their designated site (in supporting habitat). | **Screened in:**<br>• Greenland white-fronted goose |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | Given that the GWS does not detail the specific locations and construction methodologies of projects arising from the strategy, in line with the precautionary principle, LSE cannot be excluded. | |
| Galway Bay Complex SAC<br><br>(Partially within GWS Study Area) | Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay, in addition to operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent | QI species are sensitive to habitat loss (temporary or permanent), habitat degradation (various pathways), disturbance, and mortality within the boundary of their designated site (in supporting habitat).<br><br>Additionally, QI habitats are sensitive to loss (temporary or permanent) and | **Screened in:**<br>• Tidal mudflats and sandflats<br>• Coastal lagoons<br>• Large shallow inlets and bays<br>• Reefs<br>• Perennial vegetation of stony Banks<br>• Vegetated sea cliffs of the Atlantic and Baltic coasts |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | • Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | degradation (various sources) within the boundary of their designated site. Given that the GWS does not detail the specific locations and construction methodologies of projects arising from the strategy, in line with the precautionary principle, LSE cannot be excluded. | • Salicornia mud<br>• Atlantic salt meadows<br>• Mediterranean salt meadows<br>• Turloughs<br>• Juniper scrub<br>• Orchid-rich calcareous grassland<br>• Cladium fens<br>• Alkaline fens<br>• Limestone pavement<br>• Otter<br>• Common (harbour) seal |
| Gortnandarragh Limestone Pavement SAC<br><br>(5.8km Northwest) | Construction activities relating network improvements and WWTP and marine outfall infrastructure installation within GWS Study Area, in addition to operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes | QI habitats are sensitive within the boundary of their designated site. While the European Site falls within a shared catchment (Corrib) and sub-catchment (Corrib_SC_010) of the GWS Study Area, Gortnandarragh Limestone Pavement SAC is outside and upstream of the GWS Study Area (i.e. no hydrological linkage), LSE to Annex I habitats of the European Site can be excluded on the basis that there is no plausible pathway of effect. | **Screened out:**<br>• Limestone Pavement |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | • Habitat degradation – changes in water quality | | |
| Inner Galway Bay SPA<br><br>(Partially within GWS Study Area) | Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay, in addition to operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | QI species are sensitive to habitat loss (temporary or permanent), habitat degradation (various pathways), disturbance, and mortality within the boundary of their designated site (in supporting habitat).<br><br>Given that the GWS does not detail the specific locations and construction methodologies of projects arising from the strategy, in line with the precautionary principle, LSE cannot be excluded. | **Screened in:**<br>• Black-throated diver<br>• Great northern diver<br>• Cormorant<br>• Grey heron<br>• Light-bellied brent goose<br>• Wigeon<br>• Teal<br>• Red-breasted merganser<br>• Ringed plover<br>• Golden plover<br>• Lapwing<br>• Dunlin<br>• Bar-tailed godwit<br>• Curlew<br>• Redshank<br>• Turnstone<br>• Black-headed gull<br>• Common gull<br>• Sandwich tern<br>• Common tern |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| Lough Corrib SAC<br><br>(Within GWS Study Area) | Construction activities relating to network improvements, marine outfall installation and WWTP installation and associated infrastructure installation within GWS Study Area.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | QI species are sensitive to habitat loss (temporary or permanent), habitat degradation (various pathways), disturbance, and mortality within the boundary of their designated site (in supporting habitat).<br>Additionally, QI habitats are sensitive to loss (temporary or permanent) and degradation (various sources) within the boundary of their designated site.<br>Given that the GWS does not detail the specific locations and construction methodologies of projects arising from the strategy, in line with the precautionary principle, LSE cannot be excluded. | **Screened in:**<br>• Oligotrophic waters containing very few minerals<br>• Oligotrophic to mesotrophic standing waters<br>• Hard water lakes<br>• Floating river vegetation<br>• Orchid-rich calcareous grassland<br>• Molinia meadows<br>• Raised bog (active)<br>• Degraded raised bog<br>• Rhynchosporion vegetation<br>• Cladium fens<br>• Petrifying springs<br>• Alkaline fens<br>• Limestone pavement<br>• Old oak woodlands<br>• Bog woodland<br>• Freshwater pearl mussel<br>• White-clawed crayfish<br>• Sea lamprey<br>• Brook lamprey<br>• Atlantic salmon<br>• Lesser horseshoe bat<br>• Otter<br>• Slender naiad<br>• Slender green fea*thermoss* |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| Lough Corrib SPA<br><br>(Within GWS Study Area) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Habitat degradation – spread of INNS<br>• Disturbance of species<br>• Mortality | QI species are sensitive to habitat loss (temporary or permanent), habitat degradation (various pathways), disturbance, and mortality within the boundary of their designated site (in supporting habitat).<br><br>Given that the GWS does not detail the specific locations and construction methodologies of projects arising from the strategy, in line with the precautionary principle, LSE cannot be excluded. | **Screened in:**<br>• Greenland white-fronted goose<br>• Gadwall<br>• Shoveler<br>• Pochard<br>• Tufted duck<br>• Common scoter<br>• Hen harrier<br>• Coot<br>• Golden plover<br>• Black-headed gull<br>• Common gull<br>• Common tern<br>• Arctic tern |
| Lough Cutra SPA<br><br>(23.9km Southeast) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area and operational discharges from the marine outfall. | While Lough Cutra SPA is outside the GWS Study Area, cormorant is a mobile Annex II species and therefore may be affected whilst utilising supporting habitat outside of the boundary of the European Site. | **Screened out:**<br>• Cormorant |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | Potentially LSE through the following pathways:<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | Cormorant is supported primarily by waterbodies, including marine and freshwater environments (e.g. rivers and lakes. Cormorants rely on aquatic habitats for foraging and breed in cliffs or trees, if inland.<br>While Lough Cutra SPA shares a catchment with GWS Study Area (Galway Bay South East), it does not share a sub-catchment, and it is hydrologically connected downstream - meaning no functional linkage for habitat degradation within the European Site itself.<br><br>While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their European Site, the core range of cormorant is estimated to be approximately 7km[54]; while this distance varies by site and landscape, a distance of 23.9km from the European Site has been deemed acceptable to exclude LSE based on dispersal distance alone. Therefore, there is no pathway of effect for Lough | |

[54] https://www.bto.org/sites/default/files/bto-research-report-724-web.pdf

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | Cutra SPA anticipated as a result of the GWS. | |
| Lough Mask SPA<br><br>(25.2km North) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | Lough Mask SPA is hydrologically connected the GWS Study Area through the Corrib surface waterbody. Given Lough Mask SPA is located outside and upstream of the GWS Study Area (i.e. no downstream hydrological linkage), LSE to supporting habitats within the European Site can be excluded on the basis that there is no plausible pathway of effect.<br><br>While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site, the core ranges of back-headed gull, common tern, and Greenland white-fronted goose are estimated to be 7-19km, 6-18km, and 5-8km, respectively; while this distance varies by species, site and landscape, a distance of 25.2km from the European Site has been deemed acceptable to exclude LSE based on core range restricting plausible pathways of effect. | **Screened in:**<br>• Tufted duck *Aythya fuligula*<br>• Common gull *Larus canus*<br>• Lesser black-backed gull *Larus fuscus*<br>**Screened out:**<br>• Black-headed gull<br>• Common tern<br>• Greenland white-fronted goose |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | Common gull has no mean foraging range reported; however, a maximum foraging range of approximately 50km has been documented. Common gull breeding inland can nest in a variety of habitats such as grassy/heather moorland, near lakes, pools, in bogs, on open ground away from water, and cultivated grain fields (Moskoff, *et al*., 2021).<br><br>Tufted duck utilise habitats include lakes, rivers, ponds, reservoirs, marshes, estuaries, lagoons, and (less so) coastal areas. Tufted duck can utilise supporting habitat outside of the areas that were designated based on their presence. No core range was noted within the literature. Therefore, given the presence of supporting habitats within the GWS Study Area, and the functional connectivity noted above, and in line with the precautionary principle, LSE cannot be excluded for tufted duck with regards to direct impacts via habitat loss, disturbance and/or mortality, in addition to direct impacts via habitat degradation (e.g. impacting food resources). | |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | Lesser black-backed gull has a mean foraging range of approximately 43km (with a mean max range of 127km). Inland breeding gulls require regular and efficient access to freshwater and terrestrial habitats ecologically connected to the colony in order to forage as well as to engage in other maintenance behaviours.<br><br>Given the presence of supporting habitats within the core ranges for common gull and lesser black-backed gull within the GWS Study Area and the functional connectivity noted above, LSE cannot be excluded for these species with regards to direct impacts via habitat loss, disturbance and/or mortality, in addition to direct impacts via habitat degradation (e.g. impacting food resources). | |
| Lough Rea SPA<br><br>(11.6km East) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area and operational discharges from the marine outfall. | While Lough Rea SPA shares a catchment with GWS Study Area (Galway Bay South East), it is located outside and upstream of the GWS Study Area (i.e. no downstream hydrological linkage), LSE to supporting habitats within the | **Screened out:**<br>• Coot<br>• Shoveler |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | European Site can be excluded on the basis that there is no plausible pathway of effect.<br><br>While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site, the core foraging ranges of coot and shoveler are estimated to be <1km and 1-5km[55], respectively; while this distance varies by species, site and landscape, a distance of 11.6km from the European Site has been deemed acceptable to exclude LSE based on core range restricting plausible pathways of effect. | |
| Maumturk Mountains SAC<br><br>(23.3km Northwest) | Construction activities relating to network improvements and installation of marine outfall infrastructure within Galway Bay and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways: | While the European Site falls within a shared catchment (Corrib), it is outside the sub-catchment shared with GWS Study Area.<br><br>QI habitats are sensitive within the boundary of their designated site. Given the designated site is outside and upstream of the GWS Study Area | **Screened in:**<br>• Atlantic salmon<br>**Screened out:**<br>• Oligotrophic waters containing very few minerals of sandy plains *Littorelletalia uniflorae*<br>• Northern Atlantic wet heaths with *Erica tetralix* |

[55] https://birdsoftheworld.org/bow/species/norsho/cur/movement#:~:text=Initial%20dispersal%20from%20natal%20site,Close%20.

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | • Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Disturbance of species<br>• Mortality | (i.e. no hydrological linkage), LSE to Annex I habitats of the European Site can be excluded on the basis that there is no plausible pathway of effect.<br><br>Atlantic salmon occur in many of the rivers and lakes within Maumturk Mountains SAC. Adult Atlantic salmon migrate upstream to waterbodies within Maumturk Mountains SAC to spawn (in particular Bealnabrack river system), with some hydrologically connected migratory routes located within Outer Galway Bay coastal waterbody and via various surface waterbody sub-catchments within Corrib catchment within the GWS Study Area. Out-migrating smolt also utilise the same waterbodies to migrate downstream. While there is no potential for LSE with regards to permanent habitat loss, the construction works relating to the projects arising from the GWS may result in localised temporary habitat loss (within migratory routes), habitat degradation (with potential indirect food resource impacts), disturbance and mortality during construction in the absence of mitigation measures. | • Alpine and boreal heaths<br>• Blanket bogs<br>• Depressions on peat substrates of the Rhynchosporion<br>• Siliceous rocky slopes with chasmophytic vegetation<br>• Slender naiad |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | As such, LSE cannot be excluded for Atlantic salmon. | |
| Monivea Bog SAC<br><br>(4.6km East) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area.<br><br>Potentially LSE through the following pathways:<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality | QI habitats and non-mobile species (i.e. plants) are sensitive within the boundary of their designated site. Given Monivea Bog SAC is located outside and upstream of the GWS Study Area (i.e. no downstream hydrological linkage), LSE to Annex I habitats of the European Site can be excluded on the basis that there is no plausible pathway of effect. | **Screened out:**<br>• Raised bog (active)<br>• Degraded raised bog<br>• Rhynchosporion vegetation |
| Rahasane Turlough SPA<br><br>(4.4km East) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways: | While Rahasane Turlough SPA shares a catchment with GWS Study Area (Galway Bay South East), it does not share a sub-catchment, and it is hydrologically connected downstream. Therefore, despite functional connectivity for species, there is plausible pathway of effect for habitat | **Screened in:**<br>• Golden plover<br>• Black-tailed godwit<br>• Wigeon<br>**Screened out:**<br>• Whooper swan<br>• Greenland white-fronted goose |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | • Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | loss and/or degradation within the European Site itself.<br><br>Functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site. The core ranges of golden plover, black-tailed godwit, and wigeon are estimated to be 3-11km, 5km, and 5-8km, respectively. Given the presence of supporting habitats within the core ranges for golden plover, black-tailed godwit and wigeon within the GWS Study Area and the functional connectivity noted above, LSE cannot be excluded for these species with regards to direct impacts via habitat loss, disturbance and/or mortality, in addition to direct impacts via habitat degradation (e.g. impacting food resources).<br><br>The core ranges of whooper swan and Greenland white-fronted goose are estimated to be less than 5km and between 5-8km, respectively; while this distance varies by site and landscape, a distance of 4.4km from the European | |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | Site has been deemed acceptable to exclude LSE based on dispersal distance restricting a pathway of effect. | |
| River Suck Callows SPA<br><br>(30.2km Northeast) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area and operational discharges from the marine outfall.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site, the core ranges of golden plover, whooper swan, Greenland white-fronted goose, lapwing and wigeon are estimated to be 3-11km, 5km, 5-8km, 1.5km and 5-8km, respectively (Cevenini, et al., 2025); while this distance varies by site and landscape, a distance of 30.2km from the European Site has been deemed acceptable to exclude LSE based on dispersal distance alone. | **Screened out:**<br>• Golden plover<br>• Greenland white-fronted goose<br>• Lapwing<br>• Whooper swan<br>• Wigeon |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| Ross Lake and Woods SAC<br><br>(1.7km North) | Construction activities relating to network improvements and WWTP installation and associated infrastructure within GWS Study Area.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – hydrological changes<br>• Habitat degradation– hydrogeological changes<br>• Habitat degradation – changes in water quality<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | QI habitats are sensitive within the boundary of their designated site. While the European Site falls within a shared catchment (Corrib) and sub-catchment (Ballycuirke Lough Stream) of the GWS Study Area, Ross Lake and Woods SAC is outside and upstream of the GWS Study Area (i.e. no hydrological linkage), LSE to Annex I habitats of the European Site can be excluded on the basis that there is no plausible pathway of effect.<br><br>While functionally linked habitats of QI species are sensitive where suitable habitat is present within the range of the QI species from their designated site, lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008), with a core sustenance zone of 2km (Collins, *et al*., 2023). The woodlands and lakeside vegetation on the site provide foraging habitat within a small radius of the roost site. The woodlands in particular are very important to this species in providing shelter to reach foraging | **Screened in:**<br>• Lesser horseshoe bat<br>**Screened out:**<br>• Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | habitats and seasonal roosts as it does not fly across open areas.<br><br>While the foraging distance varies by site and landscape, LSE cannot be excluded for potential affects within functionally linked habitats within 2.5km of the European Site. | |
| Slieve Aughty Mountains SPA<br><br>(12.1km Southeast) | Construction activities relating to network improvements, WWTP and outfall installation and associated infrastructure within GWS Study Area.<br><br>Potentially LSE through the following pathways:<br>• Habitat loss – permanent<br>• Habitat loss – temporary<br>• Habitat degradation – changes in air quality<br>• Disturbance of species<br>• Mortality | Both Annex II species are classified as upland birds. Most commonly nesting in the early stages of new and second-rotation conifer plantations, though some pairs may still nest in tall heather of unplanted bogs and heat. These species will often forage in openings and gaps within forests.<br><br>While there is supporting habitat for both merlin and hen harrier within the GWS Study Area, the core ranges for merlin and hen harrier are 5km and 2km, respectively (though hen harrier have a documented maximum range of 10km). Therefore, while this distance varies by site and landscape, a distance of 12.1km from the European Site has been deemed | **Screened out:**<br>• Hen harrier<br>• Merlin |

| European Site[48] | Source-Pathway | LSE assessment | Stage 1 Screening Outcome |
|---|---|---|---|
| | | acceptable to exclude LSE based on core range alone. | |

## Appendix C – Qualifying Interests of each European Site[56] considered within Appropriate Assessment[57]

| Qualifying Interest/Special Conservation Interest | Connemara Bog Complex SAC | Connemara Complex SPA | Cregganna Marsh SPA | Galway Bay Complex SAC | Inner Galway Bay SPA | Lough Corrib SAC | Lough Corrib SPA | Lough Mask SPA | Maumturk Mountains SAC | Rahasane Turlough SPA | Ross Lake and Woods SAC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkaline fens | | | | x | | x | | | | | |
| Alpine and subalpine heaths | | | | | | | | | x | | |
| Arctic tern | | | | | | | x | | | | |
| Atlantic salmon | | | | | | x | | | x | | |
| Atlantic salt meadows *Glauco-Puccinellietalia maritimae* | | | | x | | | | | | | |
| Bar-tailed godwit | | | | | x | | | | | | |
| Black-headed gull | | | | | x | | x | x | | | |
| Black-tailed godwit | | | | | | | | | | x | |
| Black-throated diver | | | | | x | | | | | | |
| Blanket bogs (active) | x | | | | | | | | x | | |
| Bog woodland | | | | | | x | | | | | |
| Brook lamprey | | | | | | x | | | | | |
| *Cladium* fens | | | | x | | x | | | | | |
| Coastal lagoons | x | | | x | | | | | | | |
| Common (harbour) seal | | | | x | | | | | | | |
| Common gull | | x | | | x | | x | x | | | |
| Common scoter | | | | | | | x | | | | |
| Common tern | | | | | x | | x | x | | | |
| Coot | | | | | | | x | | | | |

[56] https://www.npws.ie/protected-sites

[57] Demarcated with 'x' if listed as Qualifying Interest for each European Site.

| Qualifying Interest/Special Conservation Interest | Connemara Bog Complex SAC | Connemara Complex SPA | Cregganna Marsh SPA | Galway Bay Complex SAC | Inner Galway Bay SPA | Lough Corrib SAC | Lough Corrib SPA | Lough Mask SPA | Maumturk Mountains SAC | Rahasane Turlough SPA | Ross Lake and Woods SAC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cormorant | | x | | | x | | | | | | |
| Curlew | | | | | x | | | | | | |
| Degraded raised bog | | | | | | x | | | | | |
| Depressions on peat substrates of the *Rhynchosporion* | | | | | | | | | x | | |
| Dry heath | x | | | | | | | | | | |
| Dunlin | | | | | x | | | | | | |
| Dystrophic lakes, pools | x | | | | | | | | | | |
| Floating river vegetation | x | | | | | x | | | | | |
| Freshwater pearl mussel | | | | | | x | | | | | |
| Gadwall | | | | | | | x | | | | |
| Golden plover | | x | | | x | | x | | | x | |
| Great northern diver | | | | | x | | | | | | |
| Greenland white-fronted goose | | | x | | | | x | x | | x | |
| Grey heron | | | | | x | | | | | | |
| Hard water lakes | | | | | | x | | | | | X |
| Hen harrier | | | | | | | x | | | | |
| Juniper scrub | | | | x | | | | | | | |
| Lapwing | | | | | x | | | | | | |
| Large shallow inlets and bays | | | | x | | | | | | | |
| Lesser black-backed gull | | | | | | | | x | | | |
| Lesser horseshoe bat | | | | | | x | | | | | X |
| Light-bellied brent goose | | | | | x | | | | | | |

| Qualifying Interest/Special Conservation Interest | Connemara Bog Complex SAC | Connemara Complex SPA | Cregganna Marsh SPA | Galway Bay Complex SAC | Inner Galway Bay SPA | Lough Corrib SAC | Lough Corrib SPA | Lough Mask SPA | Maumturk Mountains SAC | Rahasane Turlough SPA | Ross Lake and Woods SAC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Limestone pavements | | | | x | | x | | | | | |
| Mediterranean salt meadows | | | | x | | | | | | | |
| Merlin | | x | | | | | | | | | |
| *Molinia* meadows | x | | | | | x | | | | | |
| Northern Atlantic wet heaths with *Erica tetralix* | | | | | | | | | x | | |
| Old oak woodlands | | | | | | x | | | | | |
| Oligotrophic to mesotrophic standing waters | x | | | | | x | | | | | |
| Oligotrophic waters containing very few minerals | x | | | | | x | | | | | |
| Oligotrophic waters containing very few minerals of sandy plains *Littorelletalia uniflorae* | | | | | | | | | x | | |
| Orchid-rich calcareous grassland* | | | | x | | x | | | | | |
| Otter | | | | x | | x | | | | | |
| Perennial vegetation of stony banks | | | | x | | | | | | | |
| Petrifying springs | | | | | | x | | | | | |
| Pochard | | | | | | | x | | | | |
| Raised bog (active) | | | | | | x | | | | | |
| Red-breasted merganser | | | | | x | | | | | | |
| Redshank | | | | | x | | | | | | |
| Reefs | x | | | x | | | | | | | |
| *Rhynchosporion* vegetation | | | | | | x | | | | | |
| Ringed plover | | | | | x | | | | | | |
| Salicornia mud | | | | x | | | | | | | |

| Qualifying Interest/Special Conservation Interest | Connemara Bog Complex SAC | Connemara Complex SPA | Cregganna Marsh SPA | Galway Bay Complex SAC | Inner Galway Bay SPA | Lough Corrib SAC | Lough Corrib SPA | Lough Mask SPA | Maumturk Mountains SAC | Rahasane Turlough SPA | Ross Lake and Woods SAC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sandwich tern | | | | | x | | | | | | |
| Sea lamprey | | | | | | x | | | | | |
| Shoveler | | | | | x | | x | | | | |
| Siliceous rocky slopes with *chasmophytic* vegetation | | | | | | | | | x | | |
| Slender green feathermoss | | | | | | x | | | | | |
| Slender naiad | | | | | | x | | | x | | |
| Teal | | | | | x | | | | | | |
| Tidal mudflats and sandflats | | | | x | | | | | | | |
| Tufted duck | | | | | | | x | x | | | |
| Turloughs | | | | x | | | | | | | |
| Turnstone | | | | | x | | | | | | |
| Vegetated sea cliffs of the Atlantic and Baltic coasts | | | | x | | | | | | | |
| Wet heath | x | | | | | | | | | | |
| Wetland and waterbirds | | | | | x | | | x | | x | |
| White-clawed crayfish | | | | | | x | | | | | |
| Whooper swan | | | | | | | | | | x | |
| Wigeon | | | | | x | | | | | x | |

# Appendix D – Conservation Status of QIs of European Sites[58][59][60]

| Qualifying Interest (QI) | Conservation status |
|---|---|
| Alkaline fens | Bad |
| Alpine and subalpine heaths | Bad |
| Atlantic salmon | Bad |
| Atlantic salt meadows Glauco-Puccinellietalia maritimae | Bad |
| Blanket bogs (Active) | Bad |
| Bog woodland | Bad |
| Brook lamprey | Favourable |
| Cladium fens | Bad |
| Coastal lagoons | Bad |
| Common (harbour) seal | Favourable |
| Degraded raised bog | Bad |
| Depressions on peat substrates of the *Rhynchosporion* | Inadequate |
| Dry heath | Bad |
| Natural dystrophic lakes and ponds | Inadequate |
| Freshwater pearl mussel | Bad |
| Hard water lakes | Bad |
| Large shallow inlets and bays | Bad |
| Lesser horseshoe bat | Inadequate |
| Limestone pavements | Inadequate |
| Mediterranean salt meadows | Inadequate |
| Molinia meadows | Bad |
| Northern Atlantic wet heaths with *Erica tetralix* (wet heath) | Bad |
| Old oak woodlands | Bad |
| Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* (Slender Naiad-type lakes) | Bad |

[58] NPWS (2025). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview

[59] NPWS (2025). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments

[60] NPWS (2025). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments

| Qualifying Interest (QI) | Conservation status |
|---|---|
| Oligotrophic waters containing very few minerals of sandy plains *Littorelletalia uniflorae* | Inadequate |
| Otter | Favourable |
| Perennial vegetation of stony banks | Inadequate |
| Petrifying springs with tufa formation *Cratoneurion* | Inadequate |
| Raised bog (active) | Bad |
| Reefs | Bad |
| Salicornia mud | Bad |
| Sea lamprey | Bad |
| Siliceous rocky slopes with chasmophytic vegetation | Inadequate |
| Slender green feathermoss | Favourable |
| Slender naiad | Bad |
| Tidal mudflats and sandflats | Inadequate |
| Turloughs | Inadequate |
| Vegetated sea cliffs of the Atlantic and Baltic coasts | Inadequate |
| White-clawed crayfish | Bad |

# Appendix E – Species Status of Birds of Conservation Concern in Ireland 2020-2026[61]

| Qualifying Interest | Species status |
|---|---|
| Arctic tern | Amber |
| Bar-tailed godwit | Red |
| Black-headed gull | Amber |
| Black-tailed godwit | Red |
| Black-throated diver | Amber |
| Chough | Amber |
| Common gull | Amber |
| Common scoter | Red |
| Common tern | Amber |
| Coot | Amber |
| Cormorant | Amber |
| Curlew | Red |
| Dunlin | Red |
| Fulmar | Amber |
| Gadwall | Amber |
| Golden plover | Red |
| Great northern diver | Amber |
| Greenland white-fronted goose | Green |
| Grey heron | Green |
| Guillemot | Amber |
| Hen harrier | Amber |
| Kittiwake | Red |
| Lapwing | Red |
| Lesser black-backed gull | Amber |
| Light-bellied brent goose | Amber |
| Little grebe | Green |
| Merlin | Amber |

[61] https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland/

| Qualifying Interest | Species status |
|---|---|
| Pochard | Red |
| Puffin | Red |
| Razorbill | Red |
| Red-breasted merganser | Amber |
| Redshank | Red |
| Ringed plover | Amber |
| Sandwich tern | Amber |
| Shoveler | Red |
| Teal | Amber |
| Tufted duck | Amber |
| Turnstone | Amber |
| Whooper swan | Amber |
| Wigeon | Amber |