Appropriate Assessment Screening and Nature Impact Report

Meath County Development Plan
Proposed Variation No.6

Variation No. 6

Meath County Council

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Acronyms and Abbreviations

Acronym	Definition
AA	Appropriate Assessment
ACP	An Coimisiún Pleanála
cSAC	Candidate Special Area of Conservation
cSPA	Candidate Special Protection Area
DHLGH	Department of Housing, Local Government and Heritage
SAC	Special Area of Conservation
SPA	Special Protection Area
NHA	Natural Heritage Area
pNHA	Proposed Natural Heritage Area
ECOW	Ecological Clerk of Works
EcIA	Ecological Impact Assessment
EPA	Environmental Protection Agency
IROPI	Imperative Reasons of Overriding Public Interest
NIS	Natura Impact Statement
SCI	Special Conservation Interest
SCIm	Site of Community Importance
SHD	Strategic Housing Development
SID	Strategic Infrastructure Development
S-P-R	Source-Pathway-Receptor
ZoI	Zone of Influence
EIS	Environmental Impact Statement
IFI	Inland Fisheries Ireland
IWDG	Irish Whale and Dolphin Group
CEMP	Construction Environmental Management Plan
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
QI	Qualifying Interest
QF	Qualifying Feature (QIs and SCIs)
LSE	Likely Significant Effect

1.0 Introduction

1.1 Background

SLR Environmental Consulting (Ireland) Ltd was commissioned by Meath County Council to support the Appropriate Assessment (AA) process and produce the necessary reports for the Proposed Variation No. 6 to the Meath County Development Plan 2021-2030 (as varied), (hereafter referred to as Variation No. 6) under the Planning and Development Act 2024 (as amended).

Variation No. 6 includes amendments to section 6.15.4.2 and the addition of sections 6.15.4.1 (b) Substations and 6.15.4.3 Green Energy Parks, Energy Park Objectives 1-6, Section 11.8.7 LEU OBJ 1-2 and Section 11.14.6 relating to strategic energy infrastructure and Green Energy Parks. While these policy amendments apply at a county-wide level, they form part of the existing County Development Plan which has already been subject to Appropriate Assessment, and do not in themselves facilitate new development beyond that already provided for under the Plan. Variation No. 6 proposes an amendment to the Transport and Utility zoning objective and associated Green Energy Park provisions to a 136.66ha site at Woodland, County Meath (hereafter referred to as the "Plan Area").

Therefore, this assessment focuses on the Plan Area (Figure D-1) and considers whether the Variation No. 6 introduces any potential effects on European sites that were not previously considered through the previous AA screening of the Meath County Development Plan 2021-2030.

1.2 Relevant Legislation and Policy

The requirement for Appropriate Assessment (AA) Screening and Appropriate Assessment is established under Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive). In Ireland, the Habitats Directive is primarily transposed through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended (the Birds and Natural Habitats Regulations), together with the Planning and Development Act 2000, as amended. Further details are provided in Appendix A.

The Habitats Directive, together with Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive), provides legal protection for habitats and species of European importance. These protections apply to Special Areas of Conservation (SACs), designated under the Habitats Directive, and Special Protection Areas (SPAs), classified under the Birds Directive. Collectively, SACs and SPAs are referred to as *European sites*, the statutory term defined in Regulation 2 of the Birds and Natural Habitats Regulations. Under the Birds and Natural Habitats Regulations, candidate SACs and candidate SPAs are afforded the same level of protection as designated or classified European sites until a formal decision on designation or classification has been made.

Article 6(3) of the Habitats Directive requires that any plan or project not directly connected with, or necessary to, the management of a European site, but which is likely to have a significant effect on that site, either alone or in combination with other plans or projects, must be subject to an Appropriate Assessment of its implications for The Plan Area in view of its Conservation Objectives. Article 6(3) states:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the 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."

Under the Birds and Natural Habitats Regulations, the competent authority is required to undertake an AA Screening to determine, in view of objective scientific information and the best available scientific knowledge, whether a plan or project, either alone or in combination with other plans or projects, is likely to have a significant effect on a European site. Where likely significant effects cannot be excluded at screening, an Appropriate Assessment is required. The AA must examine the implications of the proposed project for the European site(s) in view of their Conservation Objectives and may only conclude that the project will not adversely affect the integrity of a European site where this can be established beyond reasonable scientific doubt. Where an AA is undertaken, the competent authority must make an AA determination before deciding whether to approve the proposed plan or project. The provisions of Article 6(3) do not apply to plans or projects that are directly connected with or necessary to the management of a European site.

The species to be considered in Appropriate Assessment are not confined to the Qualifying Features for which a European site was designated or classified. In *Holohan and Others* (C-461/17), the Court of Justice of the European Union (CJEU) held that an Appropriate Assessment must catalogue the entirety of habitat types and species for which a site is protected, and must also identify and examine the implications of a project for species present on The Plan Area for which it has not been listed, and for habitats and species outside The Plan Area boundary, provided those implications are liable to affect the conservation objectives of The Plan Area.

In *Elliniki Ornithologiki Etaireia and Others* (C-66/23), the CJEU held that the conservation objectives of an SPA must be defined having regard not only to the species for which The Plan Area was classified, but also to other species protected under Article 4 of the Birds Directive (Annex I species and regularly occurring migratory species) that are present in the SPA in a significant manner. In *Knocknamona and Massey* (joined cases C-27/25 and C-356/25), the CJEU held that site-specific conservation objectives are a prerequisite for a valid Stage 2 Appropriate Assessment, which must be carried out on the basis of the objectives specific to The Plan Area concerned, and that such objectives cannot be inferred from other sources such as the Standard Data Form. Screening does not require the same depth of analysis, and likely significant effects may be excluded without reference to site-specific objectives where, for example, distance or the absence of a plausible pathway allows this.

The Site-Specific Conservation Objectives (SSCOs) published by NPWS for SPAs relate to the SCIs for which each site was classified. To address the above, this report identifies, for each SPA within the ZoI, any Annex I or regularly occurring migratory bird species that are present in a significant manner but are not SCIs, using the Natura 2000 Standard Data Form (SDF) and current monitoring data. These species are considered alongside the SCIs (Section 3.4). As no site-specific conservation objectives have been set for them, any assessment of these species is informed by the attributes and targets set for the SCIs of the same SPA, and the absence of objectives is identified to NPWS. Further detail is provided in Appendix A.

1.3 Report Purpose

This report presents an examination of whether Variation No. 6 is likely to have a significant effect on a European Site (either alone or in combination with other plans or projects) and is based on best available scientific knowledge. The report also contains a Natura Impact Statement (Section 4.0) to inform the competent authority's Appropriate Assessment. This report has been prepared to inform the competent authority in completing its statutory obligations in relation to Appropriate Assessment, as required by Article 6(3) under Council Directive 92/43/EEC (Habitats Directive).

The information presented will allow the competent authority to make its determination regarding likely significant effects on European Sites and, where an NIS is included, the

Appropriate Assessment resulting from Variation No. 6, in accordance with and fulfilment of the requirements of Article 6 of the Habitats Directive and derived Regulations.

1.4 Guidance

The assessment was conducted in accordance with the following guidance:

- 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 (EC, 2021);
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DoEHLG, 2010);
- Managing Natura 2000 sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC (EC, 2019);
- Interpretation Manual of European Union Habitats, EUR 28 (EC, 2013);
- Appropriate Assessment Screening for Development Management, Practice Note PN01 (OPR, 2021); and
- Assessing Connectivity with Special Protection Areas (SPAs) (SNH, 2016).

1.5 Sources of Information

Sources of information for the assessment of the Variation No. 6 ‘alone’ and in combination with other plans and projects include the following:

- Environmental Protection Agency (EPA) (online map-viewer including the Appropriate Assessment Tool) (EPA 2026, last accessed November 2026);
- Geological Survey Ireland (GSI) Spatial Resources (GSI 2026, last accessed November 2026);
- Department of Housing, Local Government and Heritage: EIA Portal (DHLGH 2026b, last accessed November 2026);
- National Planning Application Database for information on other projects and plans (DHLGH, 2026b last accessed November 2026);
- National Parks and Wildlife Service – online European Site network information, including site conservation objectives (NPWS, 2026a last accessed November 2026);
- National Parks and Wildlife Service – Information on the status of EU protected habitats and species in Ireland (including Article 17 and Article 12 Reports) (NPWS, 2026b last accessed November 2026);
- Natura 2000 Standard Data Forms for each European site (EEA, 2026 last accessed November 2026);
- NPWS data request for records of rare and sensitive species, where applicable; and
- National Biodiversity Data Centre (NBDC, 2026 last accessed November 2026).

1.6 Assessment Process

The process of determining the likelihood of significant effects from a proposed project on European Sites is centred around a Source-Pathway-Receptor model. For an effect to be established, all three elements of this mechanism must be in place. The absence of one of the elements of the mechanism is sufficient to conclude that a potential effect cannot occur.

- Source(s) – e.g., pollutant run-off, noise, removal of vegetation, etc.;

- Pathway(s) – functional link, or ecological pathway e.g., groundwater connecting to nearby qualifying wetland habitats; and,
- Receptor(s) – the qualifying habitats and species of European Sites and ecological resources supporting those habitats/species.

In the context of this report, a source is any identifiable element of the Variation No. 6 that is known to interact with the receiving environment.

A receptor is the Qualifying Interests (QI)[1] for an SAC or Special Conservation Interests (SCI)[2] for an SPA, or an ecological feature that is known to be utilised by the QI/SCI. The term Qualifying Feature (QF) is used to collectively refer to QIs and SCIs within this report.

A pathway is any connection or link between the source and the receptor.

The assessment commences with a description of Variation No. 6, along with a description of the receiving environment and the associated sources for impacts to the receiving environment. All elements of Variation No. 6 are presented including The Plan Area location and existing baseline environment. The type of impacts that are likely due to the Variation No. 6 (Source) are identified having regard to the spatial and temporal scale of Variation No. 6, resource requirements and likely emissions. These sources are then used to define the Zone of Influence (ZoI) of Variation No. 6 as detailed in Section 3.3.

The European Commission Notice (2021) on the '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', states that in identifying European Sites (Natura 2000 sites), which may be affected by the project, the following should be identified:

- Any European Sites geographically overlapping with any of the actions or aspects of the plan or project in any of its phases, or adjacent to them;
- Any European Sites within the likely ZoI of the plan or project. European Sites located in the surroundings of the plan or project (or at some distance) that could still be indirectly affected by aspects of the project, including as regards the use of natural resources (e.g., water) and various types of waste, discharge or emissions of substances or energy; and
- European Sites whose connectivity or ecological continuity can be affected by the plan or project.

The ZoI of a proposed project is the geographical area over which it could affect the receiving environment in a way that could have potential effects on the Qualifying Features of a European Site. The OPR (2021) practice note states that the ZoI must be established on a case-by-case basis using the Source-Pathway-Receptor (S-P-R) framework. While the OPR guidance is directed towards development management, its S-P-R approach has been applied by analogy in this assessment of a plan variation to identify potential pathways between the proposed amendments of Variation No. 6 and European sites.

The 15 km distance suggested for plans in DoEHLG (2010) was used as an initial search area to compile a list of European sites. The ZoI was then defined using the S-P-R model (Section 3.3), and sites beyond 15 km were included where a pathway exists, for example hydrological connectivity or the foraging ranges of mobile SCI species. Subsequently, an assessment is

[1] SACs are areas designated under the Habitats Directive to conserve habitats listed in Annex I of the Directive and plant and animal species listed in Annex II. Collectively these are referred to as the 'Qualifying Interests' or 'QIs' of the SAC.

[2] SPAs are sites classified under the Birds Directive to protect rare or vulnerable bird species listed in Annex I to the Directive as well as regularly occurring migratory species and wetlands. Wetland habitats that support internationally important populations of migratory birds may be coastal or inland. Collectively, these species and habitats are referred to as the 'Special Conservation Interests' or 'SCIs' of the SPA.

undertaken with respect to potential connectivity (Pathways) to European sites and their Qualifying Features are identified.

The potential for in combination effects with other plans and projects is examined in Section 3.5, having regard to the potential impacts of Variation No. 6 and the source-pathway-receptor links to European Sites identified in Section 3.3.

In Section 0 the likelihood of significant effects on the European sites within the ZoI is examined, having regard to the sensitivity of each European site with pathways for impacts from Variation No. 6, on its own and in combination with other plans and projects.

Having regard to the European Commission Communication on the Precautionary Principle (EC, 2000) the:

> "*absence of scientific evidence on the significant negative effect of an action cannot be used as justification for approval of this action. When applied to Article 6(3) procedure, the precautionary principle implies that the absence of a negative effect on Natura 2000 sites has to be demonstrated before a plan or project can be authorised. In other words, if there is a lack of certainty as to whether there will be any negative effects, then the plan or project cannot be approved.*"

Where significant effects are determined to be likely, or where there is uncertainty regarding the likelihood of significant effects, the project is required under law to be subjected to Appropriate Assessment.

This report is based on best scientific knowledge and has utilised ecological expertise. In addition, a detailed online review of published scientific literature was conducted. This included a detailed review of the National Parks and Wildlife Service website including mapping and available reports for relevant sites and, in particular, sensitive Qualifying Features described along with their conservation objectives.

1.7 Statement of Scientific Competency

Jared holds an MSc in Environmental Science from UCD and has four years of experience in ecological consultancy. He has undertaken protected species surveys for major road and infrastructure projects, including bat, wintering bird and marsh fritillary surveys, as well as habitat (Fossitt and Annex I) and invasive species surveys. Jared has extensive experience preparing Ecological Impact Assessment (EcIA) reports, Appropriate Assessment (AA) Screening reports and Natura Impact Statements (NIS). He has managed a diverse range of projects, from residential developments to large-scale linear infrastructure schemes.

Jonathon holds a PhD in avian ecology from Newcastle University, an MSc in Ecology, Evolution and Conservation from Imperial College London and an MA (Cantab.) from the University of Cambridge. He has extensive experience in preparing and reviewing AA screening reports and NIS for many different project types, with a particular focus on onshore wind farms. Jonathon has over ten years of experience in the environmental sector and is a full member of CIEEM.

Andrew Torsney (PhD, MRes, BSc, ACIEEM) is the Technical Director of Ecology and Biodiversity at SLR, with over 12 years of experience leading projects from local to national scales. He has successfully managed high-impact initiatives, including the National Grid Implementation Plan for EirGrid and Fáilte Ireland's National Tourism Monitoring Programme. Andrew has undertaken the AA process for a range of national plans and national infrastructure projects such as EirGrids National Grid Implementation plan and the Platform for Growth Shared Facilities 19m capital investment project for Failte Ireland. Andrew has also provided training to several county councils - including Kilkenny, Dun Laoghaire Rathdown and Galway count councils - on their role in the AA process and provided ongoing mentoring services in this regard. Furthermore, he has undertaken technical reviews for a range of competent authorities including the Departmental of Public Expenditure and Reform, most

notable the Enniscorthy flood relief scheme. He has served as an expert witness and an advisor in legal challenges, providing strategic environmental guidance that aligns with regulatory frameworks and stakeholder expectations

2.0 Project Description and Receiving Environment

2.1 Overview of the Variation No. 6

Variation No. 6 introduces amendments to Chapters 6 and 11 of the Meath County Development Plan 2021-2030 to support strategic energy infrastructure and the development of a Green Energy Park at The Plan Area. The amendments include new provisions under Sections 6.15.4.1(b), 6.15.4.2 and 6.15.4.3, Energy Objectives EP OBJ 1-6, Large Energy User Objectives LEU OBJ 1-2, and updates to the Transport, Utility and Energy Infrastructure zoning objective.

These provisions facilitate strategic energy infrastructure, including substations, battery energy storage systems, synchronous condensers, renewable energy generation and associated infrastructure, as well as large energy user development, including data centres and other energy-intensive industries, together with associated water, wastewater, digital and transport infrastructure.

For the purposes of this AA Screening, the reasonable worst-case scenario has been assessed under two broad categories: (i) strategic energy infrastructure and (ii) large energy user development. The location-specific development opportunity introduced by Variation No. 6 is the proposed Green Energy Park. Therefore, this assessment focuses on whether the development facilitated at The Plan Area could result in effects on European sites that were not previously considered through the AA of the Meath County Development Plan 2021-2030.

2.2 Existing Environment

A desk study was carried out to collate available information on the existing natural environment within and around the subject lands. This section is based on an ecological desk study comprising an online search for:

(i) Statutory designated sites (SACs and SPAs) within the receiving environment;

(ii) Annex I habitats within 2 km of the Variation No. 6;

(iii) Watercourses and groundwater / surface water bodies with potential hydrological connectivity to the Variation No. 6;

(iv) Records of Annex I bird species and Annex II and IV (non-bird) species from the 2 km squares N94N, N94P intersecting the Variation No. 6;

(v) Annex I and regularly occurring migratory bird species listed in Section 3.2 of the SDF for each SPA within the ZoI that are not SCIs of that SPA, together with current records of those species; and

(vi) Records of non-native invasive species from the same 2 km squares

The desktop assessment gathered data from the sources of information stated in Section 1.5 which were identified to be relevant to the Variation No. 6.

An ecological walkover of the Variation No. 6 was undertaken by an AWN ecologist on 19 June 2024, with verification surveys conducted in 2025 and 2026. The focus of The Plan Area walkover was to:

- Identify and characterise habitats within the subject lands;
- Identify non-native invasive species;
- Identify potential links to European Sites; and
- Identify the suitability of the key ecological resources which could support Qualifying Feature species of European Sites with potential links to the subject lands.

Surveys for breeding and wintering birds were conducted between 2022 and 2025 by Moore Group on behalf of AWN Consulting Ltd. Table 2.1 below provides an overview of the ecological surveys performed.

Table 2.1 Overview of Ecological Surveys

Survey Type	Survey Date(s)	Methodology	Surveyor
Baseline Ecology Survey (Habitats, Otter, Invasive Species)	19/06/2024, with verification surveys performed on 20/08/2025 and 20/05/2026	Fossitt (2000)[5] for habitat classification	AWN Consulting Ltd
Breeding Bird Surveys	Spring 2022; Spring-Summer 2023; Spring-Summer 2024; Spring-Summer 2025; Summer 2026	SNH (2017)[3] for survey methodology, Collins Bird[4] guide (3rd ed.) for species identification.	Moore Group
Winter Bird Surveys	17/11/2022; 30/11/2022; 21/12/2022; 31/01/2023; 10/02/2023; 21/03/2023; 11/11/2023; 14/12/2023; 07/02/2024; 11/03/2024; 21/12/2024; 22/01/2025; 18/02/2025; 13/11/2025	SNH (2017)[3] for survey methodology, Collins Bird guide (3rd ed.)[4] for species identification.	Moore Group

2.2.1 Limitations

The ecological baseline survey for habitats, otter, and invasive species were performed by AWN Consulting Ltd and breeding and wintering bird surveys were performed by Moore Group. While these surveys provide a strong baseline, some limitations are present. The methodology and survey effort for habitat classification is not clearly stated. In addition, for breeding birds the survey dates are not provided, only the seasons is stated. For wintering bird surveys the count effort, observer information and survey duration are not provided, with results presented largely as species observations rather than standardised count data.

2.2.2 Overview

The proposed Variation concerns a rural site in County Meath extending to approximately 135.66 ha including the existing 400kV substation and Portan Converter Station, comprising mainly improved agricultural grassland and arable land. The Plan Area has been designated for the future development of a Green Energy Park.

[3] SNH (2017) Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farm

[4] Svensson, L., Mullarney, K., Zetterström, D., & Grant, P. J. (2011). Collins bird guide (3d ed.). HarperCollins.

2.2.3 Habitats Summary

A habitat survey of The Plan Area was undertaken by AWN Consulting Ltd on 19 June 2024 and verified on 20 August 2025 and 20 May 2026. All habitat types were classified using the Guide to Habitats in Ireland[5], and recording any species of conservation interest.

Non-Designated Habitats

The Plan Area comprises a large area of farmland, which is laid out in fields of improved agricultural grassland (GA1) and arable land (BC1). Field boundaries comprise a mix of hedgerows (WL1) and treelines (WL2), with several drainage ditches and minor streams (FW2).

The habitat types recorded along the footprint of The Plan Area, are as follows:

Arable Crops (BC1)

Several large fields within the southern section of The Plan Area comprise arable cropland. Crops under cultivation included oilseed rape.

Woodland Stream and Moyleggan Stream (FW2)[6]

This habitat comprises two watercourses within The Plan Area. The Woodland Stream forms part of the southern site boundary and follows a largely natural channel. The stream bed consists primarily of gravel and mud. Water levels are generally shallow, and the channel is heavily shaded by trees and dense bankside vegetation. Given its limited depth and habitat structure, the stream is considered to have low fisheries value.

The Moyleggan Stream traverses the northern portion of The Plan Area and is substantially modified, having been straightened and channelised with steep, uniform banks. Aquatic and marginal vegetation is present in less-shaded sections and includes branched bur-reed (*Sparganium erectum*), floating sweet-grass (*Glyceria fluitans*), fool's watercress (*Helosciadium nodiflorum*) and watercress (*Nasturtium sp.*). However, much of the stream corridor within The Plan Area is heavily overgrown by bramble (*Rubus fruticosus* agg.), hawthorn (*Crataegus monogyna*) and Irish ivy (*Hedera hibernica*).

Drainage Ditches (FW4)

A network of drainage ditches occurs intermittently throughout The Plan Area, often associated with hedgerows. These ditches vary in condition, with some remaining dry while others contain shallow standing water or muddy substrates.

Improved Agricultural Grassland (GA1)

Improved agricultural grassland represents the dominant habitat across much of The Plan Area, particularly within the northern sections. The sward is characterised by common agricultural grassland species including perennial ryegrass (*Lolium perenne*), cocksfoot (*Dactylis glomerata*), red fescue (*Festuca rubra*), curled dock (*Rumex crispus*), creeping thistle (*Cirsium arvense*), nettle (*Urtica dioica*), oxeye daisy (*Leucanthemum vulgare*), ribwort plantain (*Plantago lanceolata*) and bird's-foot-trefoil (*Lotus corniculatus*).

Dry Meadows and Grassy Verges (GS2)

[5] Fossitt, J.A. (2000) A Guide to Habitats in Ireland. Heritage Council, Kilkenny.

[6] The baseline ecology report (AWN, 2025) classified the watercourses as FW1 - Eroding/upland rivers. However, based on the survey findings and site context, it has been reclassified as FW2 -Depositing/lowland rivers. The watercourse is located within a lowland landscape and is heavily canalised, aligning with the Fossitt description of FW2 habitats.

Several small and scattered areas of unmanaged grassland occur throughout The Plan Area, including around farm buildings, along tracks and in association with scrub habitats. These areas exhibit a more semi-natural character than the surrounding improved grassland and support a wider diversity of grassland species, although evidence of nutrient enrichment from adjacent agricultural land is apparent. Species recorded include cocksfoot (*Dactylis glomerata*), knapweed (*Centaurea* spp.), yarrow (*Achillea millefolium*), red fescue (*Festuca rubra*) and Yorkshire-fog (*Holcus lanatus*).

Mixed Broadleaved Woodland (WD1)

Mixed broadleaved woodland occurs along the Woodland Stream and within a smaller parcel near the northern site boundary. The canopy is composed primarily of ash (*Fraxinus excelsior*), hawthorn (*Crataegus monogyna*), grey willow (*Salix cinerea*) and beech (*Fagus sylvatica*). Irish ivy (*Hedera hibernica*) and bramble (*Rubus fruticosus* agg.) are abundant throughout the woodland. Ground flora species include primrose (*Primula vulgaris*), hart's-tongue fern (*Asplenium scolopendrium*), nettle (*Urtica dioica*), hogweed (*Heracleum sphondylium*), docks (*Rumex* spp.), germander speedwell (*Veronica chamaedrys*) and great willowherb (*Epilobium hirsutum*).

Hedgerows (WL1) and Treelines (WL2)

Hedgerows and treelines form a prominent feature throughout The Plan Area, with most field boundaries defined by dense, well-established hedgerows and several mature treelines. Most hedgerows are structurally intact and well maintained, with few gaps, and often associated with drainage ditches.

Hawthorn (*Crataegus monogyna*) is the dominant species, while ash (*Fraxinus excelsior*) and elder (*Sambucus nigra*) are also widespread. Blackthorn (*Prunus spinosa*), spindle (*Euonymus europaeus*), hazel (*Corylus avellana*), gorse (*Ulex europaeus*), grey willow (*Salix cinerea*) and goat willow (*Salix caprea*) occur locally. Bramble (*Rubus fruticosus* agg.) and Irish ivy (*Hedera hibernica*) are ubiquitous throughout the hedgerow network.

Several mature treelines are also present and include beech (*Fagus sylvatica*), oak (*Quercus* spp.), horse-chestnut (*Aesculus hippocastanum*) and ash (*Fraxinus excelsior*), contributing significantly to The Plan Area's landscape character and ecological connectivity.

Scrub (WS1)

This habitat comprises a dense stand of bramble-dominated scrub associated with a circular ringfort located in the south-central part of The Plan Area. The scrub community is interspersed with tall herbs and coarse grasses, with species including cleavers (*Galium aparine*), bindweed (*Calystegia sepium*), nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*) and false oatgrass (*Arrhenatherum elatius*).

None of the recorded habitats on The Plan Area correspond with Annex I habitats as per the Interpretation manual of European Union Habitats[7]. There are no records of non-native invasive species, and none were identified during surveys.

2.2.4 Species Summary

Terrestrial Mammals (excluding bats)

Surveys for terrestrial mammals were performed in conjunction with the habitat surveys listed above. No evidence of terrestrial mammals was recorded during the surveys. There were no signs of otter in the study area. The nearest NBDC records refer to records of roadkill approximately 5 km northwest (2018) as well as a record from the River Tolka (2004)

[7] CEC (2013) Interpretation manual of European Union Habitats EUR28. European Commission, DG Environment.

approximately 7 km downstream near the confluence of the Moyleggan Stream and the River Tolka.

Breeding Birds

The following presents a summary of birds recorded during breeding bird surveys by Moore Group during fieldwork in Spring 2022, Spring-Summer 2023, Spring/Summer 2024, Spring/Summer 2025 and Summer 2026.

The NBDC records for the 2 km square N94P in which the landbank site is located, includes the following species which were not recorded during fieldwork, but may be present: great tit (*Parus major*), peregrine falcon (*Falco peregrinus*) and song thrush (*Turdus philomelos*).

The breeding bird assemblage recorded at The Plan Area is typical of an agricultural landscape comprising improved grassland, hedgerows, and treelines. Species recorded include blackbird (*Turdus merula*), song thrush (*Turdus philomelos*), robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes*), chaffinch (*Fringilla coelebs*), goldfinch (*Carduelis carduelis*), blue tit (*Cyanistes caeruleus*), great tit (*Parus major*), coal tit (*Periparus ater*), woodpigeon (*Columba palumbus*), pied wagtail (*Motacilla alba yarrellii*), swallow (*Hirundo rustica*), house sparrow (*Passer domesticus*) and yellowhammer (*Emberiza citrinella*). Small, loose groups of jackdaws (*Coloeus monedula*) and rooks *(Corvus frugilegus)* were frequently observed, while larger groups of starlings (*Sturnus vulgaris*) and house sparrows were associated with farmyard habitats. Buzzard (*Buteo buteo*) was also recorded.

One SCI species was observed at The Plan Area during breeding bird surveys, namely mallard (*Anas platyrhynchos).*

Wintering Birds

The desk study and field surveys identified a limited assemblage of wintering and notable bird species within The Plan Area, with generally low levels of activity recorded.

A large flock of redwing (*Turdus iliacus*), a common wintering species, and a flock of linnet (*Linaria cannabina*) were each recorded on a single occasion. Black-headed gull (*Chroicocephalus ridibundus*) and herring gull (*Larus argentatus*) were recorded occasionally during surveys, while mallard (*Anas platyrhynchos*) was the only species observed utilising on-site waterbodies, having been flushed from the Moyleggan Stream. Other notable records included buzzard (*Buteo buteo*), which was associated with nearby woodland habitats, a small flock of five lapwing (*Vanellus vanellus*) recorded over adjacent arable land, and yellowhammer (*Emberiza citrinella*) recorded adjacent to the Moyleggan Stream.

Of the species recorded, black-headed gull (*Chroicocephalus ridibundus*), cormorant (*Phalacrocorax carbo*), herring gull (*Larus argentatus*) and lapwing (*Vanellus vanellus*) are SCI species designated for wintering bird populations.

2.3 Sources for Potential Impacts from the Variation No. 6 on the Receiving Environment

This section identifies the sources of potential impact generated by the Variation No. 6, irrespective of whether they have the potential to affect a European site. The purpose of this stage is solely to identify the activities and processes associated with the Variation No. 6 that could give rise to ecological effects within the receiving environment.

The identification of impact sources (set out in Table 2.2) follows the European Commission (2021) guidance and the OPR (2021) Practice Note and considers the principal mechanisms by which the Variation No. 6 could affect the environment at source, including:

- Habitat destruction, fragmentation or deterioration;
- Surface water run-off carrying suspended solids or contaminants to receiving waters;

- Changes to groundwater quality, yield or flow paths;
- Project-related activities (e.g. noise, vibration, lighting, human presence and structures) causing disturbance or displacement of species;
- Project-related activities leading to injury or mortality of species, or reductions in population size or density;
- Air pollution, including dust and other airborne emissions; and
- The introduction or spread of invasive alien species during construction or operation.

The identification of an impact source at this stage does not imply that a likely significant effect on a European site will occur. The relevance of each source is subsequently considered through the Source–Pathway–Receptor assessment (Sections 1.6 and 3.3), where it is determined whether a credible pathway exists between the Variation No. 6 and any European site. Only those sources for which a source–pathway–receptor linkage exists are carried forward to the assessment of likely significant effects.

Table 2.2 Identification and characterisation[8] of sources for impacts arising from the Variation No. 6 that have potential for interactions with the receiving environment[9]

Impact Source Type	Project Phase	Impact Source Description
Habitat destruction / fragmentation / deterioration	Construction Phase	The Plan Area does not lie within or overlap with the boundary of any European site. Therefore, there are no European sites at risk of direct habitat loss impacts. As The Plan Area does not traverse any European sites there is no potential for habitat fragmentation to occur. There is no potential for loss of *ex-situ* inland feeding sites used by SCI wintering bird species for the duration of the construction works.
	Operational Phase	There are no European sites at risk of habitat loss or fragmentation during the operation phase.
	Decommissioning Phase	There are no European sites at risk of habitat loss or fragmentation during the decommissioning phase.
Surface water run-off carrying suspended silt and contaminants, into local watercourses.	Construction Phase	The Woodland and Moyleggan Streams intersect The Plan Area and are tributaries of the River Tolka, which discharges into Dublin Bay. Habitats and species downstream are potentially at risk of hydrological effects arising from contaminated surface water runoff and/or an accidental spillage or pollution event with the construction phase. Such a pollution event may include the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids and the accidental spillage and/or leaks of contaminants.
	Operational Phase	Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay. Habitats and species downstream are potentially at risk of hydrological effects arising from contaminated surface water run-off associated with the operational phase.

[8] As per the CIEEM (2018) guidelines on ecological impact assessment the sources for impacts are considered with reference to the following criteria (where relevant); positive or negative, extent, magnitude, duration, timing, frequency, and reversibility. However, it is recognised that some of these criteria are more easily assessed later on in the assessment process when the sensitive receptors are known.

[9] Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC', (European Commission, 2021), the likely impacts of the project are set out relative to the following project features: size (e.g. in relation to direct land-take); overall affected area including the area affected by indirect impacts (e.g. noise, turbidity, vibrations); physical changes in the environment (e.g. modification of riverbeds or morphology of other water bodies, changes in the density of forest cover); changes in the intensity of an existing pressure (e.g. increase in noise, pollution or traffic); resource requirements (e.g. water abstraction, mineral extraction); emissions (e.g. nitrogen deposition) and waste (and whether they are disposed of on land, water or in the air); transportation requirements (e.g. access roads); duration of construction, operation, decommissioning, etc.; temporal aspects (timing of the different stages of a plan or project)

Impact Source Type	Project Phase	Impact Source Description
	Decommissioning Phase	The Woodland and Moyleggan Streams intersect The Plan Area and are tributaries of the River Tolka, which discharges into Dublin Bay. Habitats and species downstream are potentially at risk of hydrological effects arising from surface water run-off and pollution associated with the decommissioning phase. Such a pollution event may include the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids and the accidental spillage and/or leaks of contaminants.
Changes to groundwater quality, yield and/or flow paths.	Construction Phase	As no European sites containing groundwater-dependent qualifying habitats are located within 5 km of The Plan Area, there is no identifiable hydrogeological pathway by which The Plan Area could affect a European site at any stage of development.
	Operational Phase	
	Decommissioning Phase	
Air pollution due to dust and other airborne emissions.	Construction Phase	The nearest European site is beyond the distance accepted for air quality impacts from dust[10,11], therefore no air quality impacts are predicted at the construction phase.
	Operational Phase	The proposed Variation could facilitate large energy users requiring dispatchable generation, including gas-fired backup plant. Associated combustion emissions could increase NOx concentrations and nitrogen deposition, creating a potential impact pathway to air pollution-sensitive European sites.
	Decommissioning Phase	The nearest European site is beyond the distance accepted for air quality impacts from dust[10,11] therefore no air quality impacts are predicted at the decommissioning phase.
Collision of birds or bats with structures (e.g. turbines, overhead lines, masts) leading to injury or mortality.	Construction Phase	The proposed Variation does not facilitate the development of structures that would present a collision or mortality risk to birds or bats.
	Operational Phase	
	Decommissioning Phase	
Related activities (noise, vibration, lighting,	Construction Phase	No terrestrial QI species were recorded during surveys, and The Plan Area is beyond the mobile range of any SACs for which otter is a QI. While it cannot be ruled out that the SCI species
	Operational Phase	

[10] IAQM (2019). A guide to the assessment of air quality impacts on designated nature conservation sites

[11] IAQM (2024). Guidance on the assessment of dust from demolition and construction

Impact Source Type	Project Phase	Impact Source Description
human presence, structures, etc) leading to disturbance / displacement of species. Related activities leading to a reduction in species populations / density.	Decommissioning Phase	recorded from surveys of The Plan Area may belong to an SPA population, none of the SCI species were recorded in numbers which would align with international significance, therefore there is no possibility of population level effects on SCI species and any phase.
Disturbance and potential spread of invasive species during the proposed works.	Construction Phase	No non-native invasive species were recorded during surveys, therefore there is no potential risk of spreading invasive species associated with The Plan Area at any phase.
	Operational Phase	
	Decommissioning Phase	

3.0 AA Screening

This section of the report examines if the Variation No. 6 is likely to have a significant effect upon European Sites, either alone or in combination with other plans or projects.

3.1 Management of any European Site

The Variation No. 6 is not directly connected with or necessary to the management of any European site.

3.2 Sources of Potential Impacts

The sources of potential impacts are identified in Table 2.2, based on the project description in Section 2.0 and a review of the planning documents. They are not repeated here.

Habitat degradation because of hydrological impacts

Due to the hydrological connectivity between The Plan Area, the River Tolka and Dublin Bay, downstream habitats and qualifying interests may be vulnerable to impacts arising from surface water runoff, sedimentation and accidental pollution events associated with the construction, operational and decommissioning phases of development facilitated by Variation No. 6.

Habitat degradation because of air quality impacts

Facilities associated with the proposed zoning may require associated dispatchable electricity generation, including gas-fired backup plant. Elevated NOx concentrations and nitrogen deposition may represent a potential impact pathway to European sites supporting air pollution-sensitive habitats. The Plan Area is located within 15 km of two SACs containing nitrogen-sensitive qualifying habitats and, therefore, a potential air quality pathway during the operational phase.

3.3 Pathways - Ecological Connections

3.3.1.1 General overview of connection rationale

Many QFs are mobile species whose home ranges, distributions, movements, and dispersal abilities vary across space and time. As a result, a population of a mobile QF associated with a European Site may also utilise habitat within, or adjacent to, the subject lands.

Where such use occurs, even intermittently, there is a functional ecological connection between the Variation No. 6 area and the relevant European Site. These connections can involve a range of taxa, including birds, mammals, migratory fish, and other mobile species that form the QFs of European Sites.

Other examples of potential ecological connections include habitat connections either directly or as ‘stepping stones’. Also, the area surrounding the subject lands may support a population of the same species as within a connected European Site which occasionally exchanges individuals. Furthermore, the subject lands may support populations of species which are prey/ food or hosts to the QFs of a European Site.

3.3.1.2 Ecological Connections – Zone of Influence (ZoI)

Ecological connectivity has been assessed following NPWS guidance (DoEHLG, 2010) and the Office of the Planning Regulator’s Practice Note PN01 (OPR, 2021). Connectivity has been evaluated on a case-by-case basis, reflecting the ecological scale, dispersal characteristics, and functional requirements of each QF, to determine whether a realistic source-receptor pathway exists between a project and European Sites.

The assessment considers only inherent ecological pathways and baseline environmental conditions and does not rely on project-specific avoidance or mitigation measures when determining the potential for connectivity. This ensures that the screening exercise addresses

whether a pathway for significant effects could exist, rather than whether such effects might be prevented.

Each QF operates at a distinct ecological scale and is influenced by different mechanisms of connectivity. For instance:

- Terrestrial habitats are influenced by factors such as seed dispersal distances, community composition dynamics, edge effects, and broader land-use changes;
- Mobile species are shaped by home-range size, population structure, dispersal ability, and the permeability of the intervening landscape; and
- Highly localised or microhabitat-specialist species (e.g. *Vertigo* snails) are dependent on habitat conditions operating at very small spatial scales (often metres) and therefore have limited potential for functional connectivity with distant European Sites.

To reflect this variability, a QF-specific distance and connectivity matrix has been developed (**Error! Reference source not found.**). This matrix summarises the relevant ecological and functional attributes of each QF assessed in this report, including typical home-range or dispersal distances, habitat requirements, sensitivity to disturbance, and any hydrological or landscape-scale influences relevant to connectivity. Spatial parameters applied in the screening assessment are therefore ecologically justified, evidence-based, and proportionate to the sensitivities of each QF.

For most non-avian QFs, an initial 2 km buffer has been adopted, as this is sufficient to capture local ecological processes such as short-range species movements, seed dispersal, edge effects, and small-scale habitat interactions. Where evidence indicates that a QF operates at a broader spatial scale, larger distances have been applied, informed by empirical evidence. Full justification and supporting references for each QF are provided in **Error! Reference source not found.**.

Screening for bird SCIs asks a single question: is there a pathway by which the Variation No. 6 could have a likely significant effect on the population for which the SPA is designated? For birds, three types of pathways are considered. Connectivity is retained if any one of them cannot be excluded on adequate evidence and is excluded only if all three are excluded.

1 **Habitat connectivity.** Whether the subject lands are, or are likely to be, used by birds from the SPA population for the ecological function relevant to the SPA (foraging, roosting or nesting). This is assessed from the species' movement ecology and the season or seasons for which the SPA is designated. For central-place foragers, which commute from a fixed nest or roost, core foraging ranges are used, following SNH (2016); where no published range exists for the species or a comparable species, the 20 km grey goose value is applied as a precautionary proxy, and as a floor rather than a ceiling, so that a larger published range for a comparable species is used in preference where available. For species that do not forage from a central place, a distribution-led assessment is used instead, based on distribution data, survey records, movement ecology and habitat continuity. Brief or incidental presence with no evident ecological function, such as a single bird grounded momentarily during otherwise continuous passage, does not by itself establish habitat connectivity; connectivity requires evidence of functional use, such as repeated, patterned or sustained foraging, roosting or nesting activity.

2 **Risk connectivity.** Where the Variation No. 6 introduces an operational risk to birds in flight, such as collision with turbines or overhead lines, whether birds from the SPA population pass through the zone of influence. This is independent of habitat use and of distance to the SPA: a recorded flight through the subject lands is direct evidence of exposure and is sufficient to establish the pathway. The judgement here is one of attribution, that is, whether a link between the birds recorded and the SPA population can be excluded on objective information, having regard to the location of the nearest

SPA nesting, roosting or wintering areas, the behaviour observed, and published dispersal and ranging distances.

3 **Cross-seasonal connectivity.** Whether birds from the SPA's qualifying-season population are subject to habitat use (Test 1) or risk exposure (Test 2) at The Plan Area outside the qualifying season, such that an effect occurring at that time could still affect the SPA population. This test extends Tests 1 and 2 across the full period the population may be present, rather than treating the qualifying season as the only relevant window. Population membership alone is not sufficient: a bird that merely transits The Plan Area, with no stopover, foraging, roosting or risk exposure while present, does not establish connectivity under this test, even where it plausibly belongs to the SPA population.

Where the evidence for any pathway is insufficient to reach a conclusion, that pathway is treated as inconclusive rather than excluded, and connectivity is retained on a precautionary basis, consistent with Article 6(3). Connectivity conclusions assume survey effort adequate to the species, season and project type, following the relevant published survey guidance (for wind energy developments, SNH, 2017); any limitations are identified in **Error! Reference source not found.**.

These three tests address the connectivity of mobile SCI birds with the subject lands. Disturbance of birds outside the subject lands, effects on the SPA's own habitats, and indirect effects through supporting wetlands or prey are identified through the source-pathway-receptor assessment in Table 3.1, so a species with no connectivity on any of the three tests can still have a pathway to the SPA through one of these routes.

3.3.1.3 Airborne Connections

Airborne emissions were considered using the approaches outlined in IAQM guidance. In accordance with IAQM (2019)[10], air quality effects associated with road traffic are generally only considered likely to be significant where sensitive ecological receptors occur within 200 m of the affected road network. For construction-related dust and pollutant deposition, the ZoI extends up to 50 m from construction activities and up to 250 m from construction compounds, where sensitive ecological receptors may be affected (IAQM, 2024)[11].

NOx concentrations and nitrogen deposition can represent a potential impact pathway for large combustion plant and other significant point-source emissions. In accordance with air quality assessment guidance (Environment Agency, 2014)[12], European sites within up to approximately 10 km for nitrogen deposition and 15 km for NOx levels are typically considered within the screening area for detailed assessment.

3.3.1.4 Hydrological and Hydrogeological Connections

Hydrological connectivity was also searched for using GIS to identify any European Sites downstream of the subject lands connected via watercourses.

The Plan Area is located within the Tolka_SC_010 Sub-catchment. According to Environmental Protection Agency (EPA) mapping, the Woodland and Moyleggan Streams (IE_EA_09T010600) flow through The Plan Area. Both streams are tributaries of the River Tolka[13], which ultimately discharges to Dublin Bay. Where potential hydrological connectivity to European sites exists via waterbodies, the Water Framework Directive (WFD) characterises the status of Irish Waterbodies. The WFD status (2019-2024) of the River Tolka (IE_EA_09T010300) is considered "Moderate" and is considered "At risk" of failing to meet

[12] Environment Agency (2014). AQTAG06: Technical Guidance on Detailed Modelling Approach for an Appropriate Assessment for Emissions to Air.

[13] The CSEA engineering report for the permitted Battery Energy Storage System refers to the streams within the Site as the River Tolka, however they are tributaries of the River Tolka and their EPA designations are used here.

environmental objectives. The WFD status of the Tolka Estuary (IE_EA_090_0200) is considered “Poor” and is considered “At risk” of failing to meet environmental objectives. Groundwater interactions considered all European Sites within the same groundwater body from the EPA map viewer data. Although all European Sites within the groundwater body were initially considered, the likelihood of a viable groundwater pathway decreases with distance. Irish aquifer characterisation studies show that for moderate-transmissivity fractured bedrock systems, groundwater flow paths from recharge to discharge zones (including those associated with groundwater-dependent terrestrial ecosystems or groundwater habitats) are typically within a range of 1–5 km (Hunter and Lee, 2013; Kilroy, *et al*., 2008). While longer flow paths may occur in karst or conduit-dominated aquifers (Schuler, *et al*., 2020) in the absence of specific hydrogeological evidence, a conservative screening radius of 5 km is considered appropriate for identifying potential groundwater pathways. This 5 km radius was therefore applied when screening for potential effects arising from groundwater interactions, with reference to the potential impact sources outlined in Table 2.2.

A 5 km radius study area centred on The Plan Area indicates that The Plan Area is located within the Dunshaughlin Groundwater Body (IE_EA_G_031) and is situated in proximity to the Moynalvy (IE_EA_G_019), Trim (IE_EA_G_002), Swords (IE_EA_G_011), Dublin (IE_EA_G_008) and Lusk–Bog of the Ring (IE_EA_G_014) groundwater bodies. No European sites occur within a 5 km radius of The Plan Area. The nearest European site designated for groundwater-dependent habitats is the Rye Water Valley/Carton SAC, located approximately 9.24 km south of The Plan Area and is situated within a separate groundwater body, namely the Dublin GWB (IE_EA_G_008).

3.4 Identification of European Sites - Sensitive Receptors

European Sites identified to have sources for impacts and pathways for effects from sections 3.2 and 3.3 above are listed in Table 3.1. Within the table each of the sensitive receptors present (if any) are discussed relative to the identified impacts and pathways. The locations of these sites, along with hydrological and hydrogeological details, are shown in Figure D-2 and Figure D-3 (Appendix D).

Table 3.1: European Sites Considered for Potential Effects using the Source – Pathway – Receptor model[14]

Site Name and Code	Qualifying features (qualifying interests and special conservation interests)	Distance relative to Project (km)	Potential Effects (Source-Pathway-Receptor)	Considered Further in Screening Y/N
North Dublin Bay SAC [000206][15]	• Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • *Salicornia* and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*glauco-puccinellietalia maritimae*) [1330] • Petalwort *petalophyllum ralfsii* [1395] • Mediterranean salt meadows (*juncetalia maritimi*) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] • Humid dune slacks [2190]	28.10 km southeast and 32 km downstream	There is potential for downstream hydrological effects associated with The Plan Area to affect European sites, which could influence habitat vegetation quality and composition, as well as the presence of flora and fauna species associated with those habitats.	**Y**
South Dublin Bay SAC [000210][16]	• Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210]	27.81 km southeast and 32 km downstream	There is potential for downstream hydrological effects associated with The Plan Area to affect European sites, which could influence habitat vegetation	**Y**

[14] The known threats and pressures for each site along with the Article 17 and Article 12 data for each QI and SCI Appendix Bare provided in Appendix B, which were used in the assessment process.

[15] NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [Accessed 19 October 2026]

[16] NPWS (2026) Conservation Objectives: South Dublin Bay SAC 000210. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. [Accessed 19 October 2026]

Site Name and Code	Qualifying features (qualifying interests and special conservation interests)	Distance relative to Project (km)	Potential Effects (Source-Pathway-Receptor)	Considered Further in Screening Y/N
	• *Salicornia* and other annuals colonising mud and sand [1310] • Embryonic shifting dunes [2110]		quality and composition, as well as the presence of flora and fauna species associated with those habitats.	
Rye Water Valley/Carton SAC [001398][17]	• Desmoulin`s whorl snail (*Vertigo moulinsiana*) [1016] • Petrifying springs with tufa formation (*Cratoneurion*) [7220] • Narrow-mouthed whorl snail (*Vertigo angustior*) [1014]	9.24 km south No hydraulic connection	There is potential for air quality effects associated with facilities facilitated by the proposed zoning to affect European sites supporting air pollution-sensitive habitats. Elevated NOx concentrations and nitrogen deposition could influence habitat vegetation quality and composition, as well as the flora and fauna species associated with those habitats.	**Y**
River Boyne and River Blackwater SAC [002299][18]	• Otter (*Lutra lutra*) [1355] • River lamprey (*Lampetra fluviatilis*) [1099] • Alkaline fens [7230] • Atlantic salmon (*Salmo salar*) [1106] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion Alnion incanae, Salicion albae*) [91E0]	13.55 km north No hydraulic connection	There is potential for air quality effects associated with facilities facilitated by the proposed zoning to affect European sites supporting air pollution-sensitive habitats. Elevated NOx concentrations and nitrogen deposition could influence habitat vegetation quality and composition, as well as the flora and fauna species associated with those habitats.	**Y**

[17] NPWS (2021) Conservation Objectives: Rye Water Valley/Carton SAC 001398. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. [Accessed 19 October 2026]

[18] NPWS (2021) Conservation Objectives: River Boyne and River Blackwater SAC 002299. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. [Accessed 19 October 2026]

Site Name and Code	Qualifying features (qualifying interests and special conservation interests)	Distance relative to Project (km)	Potential Effects (Source-Pathway-Receptor)	Considered Further in Screening Y/N
North Bull Island SPA [004006][19]	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden plover (*Pluvialis apricaria*) [A140] • Grey plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Black-tailed godwit (*Limosa limosa*) [A156] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Shoveler (*Spatula clypeata*) [A857] • Wetland and waterbirds [A999]	28.09 km southeast and 32 km downstream	There is potential for downstream hydrological effects associated with The Plan Area to affect European sites, which could influence habitat vegetation quality and composition, as well as the presence of flora and fauna species associated with those habitats.	**Y**
South Dublin Bay and River Tolka	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed plover (*Charadrius hiaticula*) [A137]	25.45 km southeast	There is potential for downstream hydrological effects associated with The Plan Area to affect European sites,	**Y**

[19] NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [Accessed 19 October 2026]

Site Name and Code	Qualifying features (qualifying interests and special conservation interests)	Distance relative to Project (km)	Potential Effects (Source-Pathway-Receptor)	Considered Further in Screening Y/N
Estuary SPA [004024][20]	• Grey plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Roseate tern (*Sterna dougallii*) [A192] • Common tern (*Sterna hirundo*) [A193] • Arctic tern (*Sterna paradisaea*) [A194] • Wetland and waterbirds [A999]	and 32 km downstream	which could influence habitat vegetation quality and composition, as well as the presence of flora and fauna species associated with those habitats.	
River Boyne and River Blackwater SPA [004232][21]	• Kingfisher (*Alcedo atthis*) [A229]	13.40 km north No hydraulic connection	This European site is within the initial 15km reference however there is no connectivity to The Plan Area.	**N**
North-West Irish Sea SPA [004236][22]	• Red-throated diver (*Gavia stellata*) [A001] • Great northern diver (*Gavia immer*) [A003] • Fulmar (*Fulmarus glacialis*) [A009]	28.42 km southeast and 32 km downstream	While there is potential for downstream hydrological connectivity between The Plan Area and the SPA, the SPA has not been designated for wetland habitats [A999] as a supporting	**N**

[20] NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht {Accessed 19 October 2026]

[21] NPWS (2024) Conservation Objectives: River Boyne and River Blackwater SPA 004232. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. [Accessed 19 October 2026]

[22] NPWS (2023) Conservation Objectives: North-west Irish Sea SPA 004236. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage. [Accessed 19 October 2026]

Site Name and Code	Qualifying features (qualifying interests and special conservation interests)	Distance relative to Project (km)	Potential Effects (Source-Pathway-Receptor)	Considered Further in Screening Y/N
	• Manx shearwater (*Puffinus puffinus*) [A013] • Cormorant (*Phalacrocorax carbo*) [A017] • Shag (*Phalacrocorax aristotelis*) [A018] • Common scoter (*Melanitta nigra*) [A065] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Common gull (*Larus canus*) [A182] • Lesser black-backed gull (*Larus fuscus*) [A183] • Herring gull (*Larus argentatus*) [A184] • Great black-backed gull (*Larus marinus*) [A187] • Kittiwake (*Rissa tridactyla*) [A188] • Roseate tern (*Sterna dougallii*) [A192] • Common tern (*Sterna hirundo*) [A193] • Arctic tern (*Sterna paradisaea*) [A194] • Guillemot (*Uria aalge*) [A199] • Razorbill (*Alca torda*) [A200] • Puffin (Fratercula arctica) [A204] • Little gull (*Hydrocoloeus minutus*) [A862] • Little tern (*Sternula albifrons*) [A885]		resource. Nevertheless, the SCI species are reliant on water quality so indirect effects may arise – however, this is an extensive hydrological pathway with considerable dilution effects. It is identified that the scale and nature of the Proposed Variation are not likely to cause significant effects. The indirect pathway Therefore, any potential changes in water quality, would not result in likely significant effects to SCI bird species in this SPA.	

3.4.1 Non-Qualifying Annex I and Migratory Bird Species of SPAs

Following *Elliniki Ornithologiki Etaireia* (C-66/23), the bird species considered for each SPA within the ZoI are not limited to its SCIs. Annex I species and regularly occurring migratory species present at an SPA in a significant manner, but for which the SPA was not classified (hereafter "non-qualifying species"), have also been identified.

The judgment does not define "present in a significant manner". The approach taken here draws on the criteria used to select and describe the Natura 2000 network and applies ornithological criteria only. It is a precautionary interpretation, not a test set by the Court or by NPWS. Each species was assessed against the following:

- **SDF site assessment.** The SDF grades each population from A to D according to The Plan Area population as a proportion of the national population (A: more than 15%; B: 2 to 15%; C: up to 2%; D: non-significant). A population graded A, B or C is treated as present in a significant manner;
- **Numbers.** Where the SDF grade is D, absent, or based on poor or out-of-date data, whether current data show that The Plan Area regularly supports 1% or more of the all-Ireland population (for wintering waterbirds, the five-year mean of peak counts);
- **Regularity.** Whether the species occurs at The Plan Area regularly, as opposed to occasionally or as a vagrant;
- **Function.** Whether The Plan Area supports an essential part of the species' life cycle (breeding, wintering, roosting, moulting or staging), as opposed to incidental use; and
- **Small populations.** For species with very small or recolonising national populations, where the 1% threshold does not discriminate, whether The Plan Area supports a regularly occupied territory or regular use for an essential function, having regard to the species' conservation status.

Where the available data were insufficient to reach a conclusion, the species was treated as present in a significant manner on a precautionary basis. Non-qualifying species present in a significant manner are subject to the same source-pathway-receptor test as the SCIs.

The published SDF forms for North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA were reviewed and indicate that none of the species recorded at The Plan Area are considered non-qualifying Annex I or migratory species for these SPAs.

No SDF is currently available for the North-west Irish Sea SPA [004236] on the EEA Natura 2000 viewer. In accordance with *Elliniki* case and *Holohan (C-461/17)*, consideration has been given to whether species other than the SCIs occur within the SPA in numbers relevant to its conservation objectives.

In the absence of an SDF, this has been based on The Plan Area synopsis and conservation objectives. The synopsis reports the results of two 2016 surveys of the western Irish Sea and identifies all species whose estimated abundance equalled or exceeded 1% of the SPA’s winter marine bird assemblage. The synopsis does not give equivalent species-level figures for the breeding season or autumn. Species such as gannet, which breeds at nearby colonies but is not an SCI, are therefore likely to use the SPA at those times. However, these are marine species with no ecological connection to The Plan Area and there is no pathway for effects on them. This screening will be reviewed if an SDF is published before determination.

3.5 Assessment of Potential Effects

3.5.1 Effects of the Variation No. 6 Alone

The sources of potential impacts (Table 2.2) that have a pathway to a European site are identified in Table 3.1, and the likelihood of significant effects is assessed in Table 3.3. They are not summarised again here.

3.5.1.1 Habitat degradation because of hydrological impacts

Due to the hydrological connection to the River Tolka, which ultimately discharges into Dublin Bay, there is a potential risk of hydrological effects arising from surface water run-off and pollution associated with the construction, operation, or decommissioning phases of any developments at The Plan Area.

3.5.1.2 Habitat degradation because of air quality impacts

Facilities associated with the proposed zoning may require associated dispatchable electricity generation, including gas-fired backup plant. Elevated NOx concentrations and nitrogen deposition may represent a potential impact pathway to European sites supporting air pollution-sensitive habitats. The Plan Area is located within 15 km of two SACs containing nitrogen-sensitive qualifying habitats and, therefore, a potential air quality pathway during the operational phase.

3.5.2 In Combination Effects

In combination effects can occur where a proposed project results in individually non-significant impacts that, when considered in combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

Other plans and projects that should be considered when establishing cumulative effects are:

- Proposals for which consent has been applied but which are awaiting determination;
- Projects which have been granted consent, but which have not yet been started, or which have been started but are not yet completed (i.e., under construction);
- Proposals which have been refused permission, but which are subject to appeal, and the appeal is undetermined;
- Constructed developments whose full environmental effects are not yet felt and therefore cannot be accounted for in the baseline; or
- Developments specifically provided for in the National Planning Framework, a Regional Spatial and Economic Strategy, or a county development plan or local area plan.

A search was performed on 20 October 2026 of recent planning applications made within the last five years for applications that may give rise to in combination effects with Variation No. 6. Older permissions that remain live were also included, including wind energy permissions (which commonly run for ten years) and any permission whose duration has been extended. Applications refused but under appeal were included. Permissions that have been implemented are considered as part of the existing environment. Table 3.2 lists the recent planning applications considered to be sufficiently significant and/or large in scale to warrant examination for in combination effects with Variation No. 6.

Full detail of recent planning applications considered to be sufficiently significant and/or large in scale to warrant examination for in combination effects with Variation No. 6 is presented in Appendix E. Pairwise assessment of plans presented in Appendix E.1 and of projects presented in Appendix E.2**Error! Reference source not found.**.

The plans assessed support infrastructure, energy, transport, water services and economic development projects that could theoretically give rise to impacts to European sites; however, all future developments are subject to statutory planning processes, environmental assessment, and Appropriate Assessment where required. No plans were identified that would act in combination with Variation No. 6 to adversely affect the integrity of any European site.

A review of recent planning applications identified several large infrastructure, industrial and residential developments, including battery energy storage facilities, electricity transmission infrastructure, road schemes, industrial expansions, waste management facilities and strategic housing developments. Several of these projects have undergone Appropriate Assessment as part of their consent processes. While some developments have the potential for cumulative hydrological impacts, the projects been assessed and are subject to mitigation measures. Consequently, no likely significant in combination effects on European sites are predicted.

Table 3.2: Planning Applications Considered for 'In Combination' Effects

Planning ref. number	Development description	In combination LSE
23136	This application seeks permission for amendments to a previously approved battery energy storage facility and synchronous condenser development at Creemore and Belshamstown, Batterstown. The proposed changes include revisions to the internal access road network, attenuation pond, drainage and ducting infrastructure, removal of a permitted earthen berm, and associated landscaping, level changes and excavation works, while retaining the approved access to the R154.	Yes – Large infrastructure project with construction phase drainage and earthworks which could contribute cumulatively to hydrological impacts
22837	The development comprises a large-scale battery energy storage facility and synchronous condenser on agricultural land, including battery storage containers, a synchronous condenser building, control building, transformers, underground cabling, wastewater treatment infrastructure, SuDS measures, attenuation ponds, internal roads, lighting, CCTV, landscaping and ancillary infrastructure, with connections to a proposed adjoining 220 kV substation.	Yes – Significant infrastructure project with substantial site works and drainage infrastructure
221550	This proposal involves the expansion and upgrading of the existing Woodland 400 kV substation through the installation of additional air-insulated switchgear, busbar extensions, lightning masts, electrical apparatus, underground cable connections and a control building extension, together with associated site clearance, drainage, access tracks, fencing, landscaping and construction compounds.	Yes – Major utility infrastructure project with substantial ground disturbance and drainage works
2561001	This application proposes modifications to a previously permitted Large-Scale Residential Development, including a realigned link road, a new bridge over the River Tolka, a pumping station and access road, together with associated footpaths, cycleways, drainage	Yes – Direct interaction with River Tolka corridor presents potential cumulative hydrological effects

Planning ref. number	Development description	In combination LSE
	infrastructure, lighting, landscaping and boundary treatments.	
2460063	The development comprises the construction of the Eastern Distributor Road between Navan Road and Station Road, including a new railway bridge, cycle lanes, footpaths, signalised junctions, drainage infrastructure, public lighting, landscaping works, temporary construction compounds and associated ancillary infrastructure.	Yes – Major road project involving extensive earthworks and drainage within catchment
2460045	This application provides for a glass recycling facility comprising a warehouse and production building, office accommodation, staff facilities, outdoor storage areas, HGV and staff parking, a weighbridge, wastewater treatment infrastructure and associated site works. The development requires a Waste Licence.	Yes – Industrial waste facility with potential water quality pathway
FW22A/0177	The proposal involves the expansion of an existing manufacturing facility through the construction of warehouse, laboratory, production and office extensions, the installation of additional chemical storage, expanded parking and access infrastructure, and associated plant and services. The development is accompanied by an EIAR and relates to a facility subject to Industrial Emissions Licensing and COMAH regulations.	Yes – Large industrial expansion with potential construction and operational emissions to water environment
FW22A/0319	The development consists of the construction of a 16,805 m² medical devices manufacturing facility incorporating production areas, ancillary warehousing, a three-storey administration building, surface parking, cycle and motorcycle facilities and associated service infrastructure.	Yes – Large-scale industrial development with substantial construction and operational surface water requirements
FW22A/0243	Alterations to existing development	No – Insufficient scale to contribute materially to cumulative effects
FW23A/0264	The development consists of a substantial extension to an existing hotel, providing 112 additional bedrooms and associated guest facilities. The proposal also includes revised parking arrangements, enhanced pedestrian and cyclist access, EV charging infrastructure, landscaping, drainage works, green and blue roofs and ancillary site development works.	Potentially Yes – Moderate-scale commercial development with increased impermeable area and drainage requirements
ACP: 309318	This Strategic Housing Development consists of 169 apartments, a crèche and associated site works including access, services, open space and landscaping.	Yes – Large residential development contributing cumulative urbanisation pressures

Planning ref. number	Development description	In combination LSE
ACP: 307656	This Strategic Housing Development consists of 725 apartments, a crèche and associated infrastructure including access roads, landscaping, drainage, public open space and ancillary site works.	Yes – Residential development contributing to cumulative urban development pressure
ACP: 306167	The proposed Strategic Housing Development comprises 435 apartments together with associated roads, services, public open space, landscaping and supporting infrastructure.	Yes – Residential development contributing to cumulative urban development pressure
4705/23	This application seeks permission for the change of use of an existing industrial unit to a waste recovery, storage and transfer facility for non-hazardous commercial, industrial and household waste, including a weighbridge and associated site services.	Yes – Waste-related development with potential water quality pathway requiring consideration
4828/22	The proposal comprises alterations to existing industrial units, including demolition and reconfiguration of office accommodation, installation of a mezzanine floor, staff welfare facilities, modifications to entrances and the provision of new external signage.	No – No significant pathway for cumulative effects identified
ACP: 310860	The development comprises a Strategic Housing Development consisting of 1,614 build-to-rent apartments and associated site infrastructure, landscaping, access arrangements and communal facilities.	Yes – Residential development contributing to cumulative urban development pressure
ACP: 308905	The development involves the demolition of an existing vacant motor vehicle showroom and adjacent buildings and the construction of 101 apartments, together with associated access arrangements, landscaping and supporting site infrastructure.	Yes – Residential development contributing to cumulative urban development pressure
3265/23	This development comprises the conversion of six permitted office units to 18 residential apartments, including private balconies, associated elevation alterations, bicycle storage facilities and ancillary works.	No – Limited scale redevelopment with negligible interaction pathway

3.5.3 Plan Level Environmental Protection Policies and Objectives

There are a number of biodiversity protection objectives and policies within the Meath County Development Plan 2021–2030, including specific provisions relating to European sites. These measures require the protection of European sites and adherence to the Appropriate Assessment process, while also ensuring that development proposals are not permitted where

they would adversely affect the integrity of a European site. Appendix F presents an assessment of each policy and the safeguards incorporated within the Meath County Development Plan to ensure the protection of European sites from potential effects associated with the rezoning proposed under Variation No. 6.

3.5.4 Summary

The in-combination assessment considered relevant national, regional and local plans, together with recent planning permissions and proposed developments within the receiving environment. While these plans and projects are generally subject to SEA and AA processes, the assessment considered whether Variation No. 6 could introduce additional sources of impact that could act in combination with other plans and projects to affect European sites.

A number of projects within the wider River Tolka catchment were identified as having the potential to contribute to cumulative hydrological and water quality pressures. The proposed Variation would facilitate the development of a Green Energy Park on a site of approximately 103.42 ha and may accommodate large energy users, including large energy user developments as a reasonable worst-case scenario. Such development has the potential to generate construction and operational impact pathways, including surface water runoff, wastewater generation, water supply demands and emissions to air, which could act in combination with other existing and planned developments.

While the Meath County Development Plan 2021-2030 contains policies and objectives relating to biodiversity protection, water quality and Appropriate Assessment, these measures constitute environmental safeguards and cannot be relied upon to exclude likely significant effects at screening stage. Furthermore, the potential for cumulative effects must consider the scale and nature any development which may be facilitated by Variation No. 6 and whether such effects have already been assessed through the existing County Development Plan AA process.

On the basis of the available information, and applying the precautionary principle, the potential for in combination effects on European sites connected via hydrological and air quality pathways cannot be excluded. Accordingly, the possibility of likely significant effects, alone and in combination with other plans and projects, should be brought forward for further consideration at Stage 2 Appropriate Assessment.

3.6 Assessment of Likely Significant Effects

This section of the report explains the metrics used when assessing if the potential effects (previously identified) are likely to result in significant implications for European Sites.

The European Sites with evident pathways for potential effects arising from the sources for impact from the Variation No. 6 either alone or in combination are:

- North Dublin Bay SAC
- South Dublin Bay SAC
- Rye Water Valley/Carton SAC
- River Boyne and River Blackwater SAC
- North Bull Island SPA
- South Dublin Bay and River Tolka Estuary SPA

The EC (2021) Guidance notes that the significance of the effects on ecological features will vary depending on factors such as the magnitude of impact, the type, extent, duration, intensity, timing, probability, in combination effects and the vulnerability of the habitats and species concerned.

For the AA process the ecological features being assessed are the QIs, SCIs and the habitats and species which these features rely on for ecosystem functioning and stability.

The European sites identified above with potential pathways for effects are now examined for the potential for likely significant effects. The EC (2021) outlines the following potential changes that may occur at a European Site, which may result in effects on the function of The Plan Area:

- Reduction of habitat area, habitat degradation or fragmentation;
- Disturbance to species, reduction in species populations and density;
- Changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species (e.g. water quality and quantity); and
- Interference with the key relationships that define the structure and function of The Plan Area.

The guidance document outlines the following criteria for assessing significance, indicators of significance, in view of the Site-specific conservation objectives e.g.:

- Degree of habitat loss (absolute, relative), changes in habitats structure;
- Risk of species populations' displacement, level of disturbance, reduction of species home range, feeding area, refuge areas, alteration of favourable condition for breeding;
- Importance of the habitats and species affected, e.g. representativeness, local variety;
- Importance of The Plan Area (e.g. limit of distribution area for certain habitats and species, stepping stone, important for ecological connectivity);
- Disruption or alteration of ecological functions; and
- Changes to key ecological features of The Plan Area (e.g. water quality).

The potential for the Variation No. 6 to have likely significant effects on the above-named European sites is examined in Table 3.3 based on the Source-Pathway-Receptor connectivity, and the sensitivity of the qualifying interests of the European sites to the effects of the impacts. This table considers the Site-Specific Conservation Objectives (SSCOs) of each of The Plan Areas with potential effects identified. Only sites with a source-pathway-receptor link ('Y' in the final column of Table 3.1) are included, and the pathway for each is cited by reference to Table 3.1 rather than described again.

For SPAs, Table 3.3 also considers the non-qualifying species identified in Section 3.4.1 as present in a significant manner. As no site-specific conservation objectives have been set for these species, the assessment of effects on them is informed by the attributes and targets that NPWS has set for the SCIs of the same SPA (typically population trend and distribution). The absence of site-specific objectives for these species is identified to NPWS.

Moreover, the known threats and pressures recorded in the Standard Data Forms have been considered in the assessment along with the known threats and pressures for each of the QIs and SCIs from the Article 17 and Article 12 data. These known threats and pressures data are provided, for reference, in Appendix B. All data contained in the appendices have been considered throughout the assessment process.

Table 3.3 Assessment of Likely Significant Effects on European Sites with a Source-Pathway-Receptor Link in Table 3.1

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
North Dublin Bay SAC [000206]	Reduction of habitat area, habitat degradation or fragmentation.	A potential indirect hydrological pathway via the River Tolka and ultimately Dublin Bay was identified. Potential water quality impacts may result in the habitat degradation and reduction in species population, as any change in water quality will result in changes in ecological function and interfere with key relationships and structures of water-dependent qualifying habitats, including mudflats and sandflats not covered by seawater at low tide [1140], *Salicornia* and other annuals colonising mud and sand [1310], Atlantic salt meadows [1330], and Mediterranean salt meadows [1410].	In view of the hydrological connection to the SAC, and the potential for cumulative effects with other developments within the River Tolka catchment, impacts on water quality cannot be excluded. Such impacts have the potential to result in habitat degradation, reductions in species populations and density, changes in ecological functions and interference with the key relationships that define the function of the SAC. Accordingly, likely significant effects cannot be excluded at this stage. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential hydrological effects associated with large energy user development within the Green Energy Park.	Likely Significant Effect
	Disturbance to species, reduction in species populations and density.			
	Changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species (e.g. water quality and quantity).			
	Interference with the key relationships that define the structure and function of The Plan Area.			

[23] Taken from the EC (2021) Guidelines

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
South Dublin Bay SAC [000210]	Reduction of habitat area, habitat degradation or fragmentation.	A potential indirect hydrological pathway via the River Tolka and ultimately Dublin Bay was identified. Potential water quality impacts may result in the habitat degradation and reduction in species population, as any change in water quality will result in changes in ecological function and interfere with key relationships and structures of water-dependent qualifying habitats, including mudflats and sandflats not covered by seawater at low tide [1140] and *Salicornia* and other annuals colonising mud and sand [1310].	In view of the hydrological connection to the SAC, and the potential for cumulative effects with other developments within the River Tolka catchment, impacts on water quality cannot be excluded. Such impacts have the potential to result in habitat degradation, reductions in species populations and density, changes in ecological functions and interference with the key relationships that define the function of the SAC. Accordingly, likely significant effects cannot be excluded at this stage. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential hydrological effects associated with large energy user developments within the Green Energy Park.	Likely Significant Effect
	Disturbance to species, reduction in species populations and density.			
	Changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species (e.g. water quality and quantity).			
	Interference with the key relationships that define the structure and function of The Plan Area.			
Rye Water Valley/Carton SAC [001398]	Reduction of habitat area, habitat degradation or fragmentation.	A potential indirect air quality pathway to European sites supporting air pollution-sensitive habitats was identified. Potential air quality impacts may result in habitat degradation for petrifying springs with tufa	In view of the potential for air quality impacts, and the potential for cumulative effects with other developments, effects on air quality cannot be excluded. Such effects have the potential to result in habitat	Likely Significant Effect

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
	Disturbance to species, reduction in species populations and density.	formation (*Cratoneurion*) [7220] which are particularly sensitive to nitrogen deposition[24]. As Tufa formation is dependent on the presence of bryophyte species, elevated nitrogen will result in reduction in bryophyte populations, resulting in changes in ecological function which are required for Tufa formation.	degradation, reductions in species populations and density, changes in ecological functions, and interference with the key relationships that define the function of the SAC. Accordingly, likely significant effects cannot be excluded at this stage. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential air quality effects associated with large energy user developments within the Green Energy Park.	
	Changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species (e.g. water quality and quantity).			
	Interference with the key relationships that define the structure and function of The Plan Area.			
River Boyne and River Blackwater SAC [002299]	Reduction of habitat area, habitat degradation or fragmentation.	A potential indirect air quality pathway to the River Boyne and River Blackwater SAC was identified. Potential air quality effects, arising from elevated NOx concentrations and nitrogen deposition, could adversely affect the ecological conditions required to maintain the SAC's qualifying interests, particularly alkaline fens [7230] and alluvial forests with *Alnus glutinosa* and *Fraxinus*	In view of the potential for air quality impacts, and the potential for cumulative effects with other developments, effects on air quality cannot be excluded. Such effects have the potential to result in habitat degradation, reductions in species populations and density, changes in ecological functions, and interference with the key relationships that define the	Likely Significant Effect
	Disturbance to species, reduction in species populations and density.			
	Changes in ecological functions and/or features			

[24] Denyer, J., Eakin, M., & Gill, M. (2023). Guidelines for the Assessment of Annex I Priority Petrifying Springs in Ireland. Irish Wildlife Manuals, No. 142. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
	that are essential for the ecological requirements of habitats and species (e.g. water quality and quantity). Interference with the key relationships that define the structure and function of The Plan Area.	*excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0*]. These habitats are sensitive to elevated nitrogen as it affects vegetation composition, which may result in habitat degradation and alterations to habitat structure and function.	function of the SAC. Accordingly, likely significant effects cannot be excluded at this stage. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential air quality effects associated with large energy user developments within the Green Energy Park.	
North Bull Island SPA [004006]	Reduction of habitat area, habitat degradation or fragmentation.	A potential indirect hydrological pathway via the River Tolka and ultimately Dublin Bay was identified. Potential water quality impacts may result in the habitat degradation of wetland habitats which support foraging for SCI bird species.	In view of the hydrological connection to the SPA, and the potential for cumulative effects with other developments within the River Tolka catchment, impacts on water quality cannot be excluded. Such impacts have the potential to result in degradation of habitats which support SCI bird species. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential hydrological effects associated with large energy user developments within the Green Energy Park.	Likely Significant Effect

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
	Disturbance to species, reduction in species populations and density.	The SPA is located at a substantial distance from the rezoning lands, and no direct impact pathway exists. The SCI species black-headed gull was recorded at The Plan Area; however, numbers were low and did not indicate significant use of The Plan Area as *ex-situ* foraging habitat. Therefore, there is no potential for population-level effects on this SCI species.	No disturbance impacts are predicted either alone or in combination with other plans or projects.	No Likely Significant Effect
	Changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species (e.g. water quality and quantity).	A potential indirect hydrological pathway via the River Tolka and ultimately Dublin Bay was identified. Potential water quality impacts may result in the habitat degradation of wetland habitats which support foraging for SCI species.	In view of the hydrological connection to the SPA, and the potential for cumulative effects with other developments within the River Tolka catchment, impacts on water quality cannot be excluded. Such effects have the potential to result in habitat degradation, and due to the potential reducing in foraging area, changes in ecological function and key relationships that define the function of the SAC. Accordingly, likely significant effects cannot be excluded at this stage. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential hydrological effects associated with large energy user developments within the Green Energy Park.	Likely Significant Effect
	Interference with the key relationships that define the structure and function of The Plan Area.			

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
South Dublin Bay and River Tolka Estuary SPA [004024]	Reduction of habitat area, habitat degradation or fragmentation.	A potential indirect hydrological pathway via the River Tolka and ultimately Dublin Bay was identified. Potential water quality impacts may result in the habitat degradation of wetland habitats which support foraging for SCI bird species.	In view of the hydrological connection to the SPA, and the potential for cumulative effects with other developments within the River Tolka catchment, impacts on water quality cannot be excluded. Such impacts have the potential to result in degradation of habitats which support SCI bird species. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential hydrological effects associated with large energy user developments within the Green Energy Park.	Likely Significant Effect
	Disturbance to species, reduction in species populations and density.	The SPA is located at a substantial distance from the rezoning lands, and no direct impact pathway exists. The SCI species black-headed gull was recorded at The Plan Area; however, numbers were low and did not indicate significant use of The Plan Area as *ex-situ* foraging habitat. Therefore, there is no potential for population-level effects on this SCI species.	No disturbance impacts are predicted either alone or in combination with other plans or projects.	No Likely Significant Effect
	Changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species (e.g.	A potential indirect hydrological pathway via the River Tolka and ultimately Dublin Bay was identified. Potential water quality impacts may result in the habitat	In view of the hydrological connection to the SPA, and the potential for cumulative effects with other developments within the River Tolka catchment, impacts on water quality cannot be excluded. Such effects	Likely Significant Effect

Site Name and Code	Criteria For Assessing Potential Changes That May Occur at a European site Which May Result in Effects on the Function of The Plan Area[23]	Assessment Of Effects on the European sites' Functionality	Assessment of the Significance of Effects Either Alone and in Combination with Other Plans or Projects	Likely Significant Effect
	water quality and quantity). Interference with the key relationships that define the structure and function of The Plan Area.	degradation of wetland habitats which support foraging for SCI species.	have the potential to result in habitat degradation, and due to the potential reducing in foraging area, changes in ecological function and key relationships that define the function of the SAC. Accordingly, likely significant effects cannot be excluded at this stage. While future developments facilitated by Variation No. 6 would be subject to Appropriate Assessment requirements, the environmental protection policies of the Meath County Development Plan do not provide sufficient certainty to rule out potential hydrological effects associated with large energy user developments within the Green Energy Park.	

3.7 AA Screening Conclusion

Based on the Source–Pathway–Receptor assessment and objective scientific information, the Variation No. 6 has been assessed and one or more credible pathways for significant effects on European sites have been identified. The analysis has taken account of the characteristics of the Variation No. 6, the ecological sensitivities of the qualifying interests and special conservation interests, the relevant site-specific Conservation Objectives, the known threats and pressures identified in Article 17 and Article 12 reporting, and potential in combination effects with other plans and projects.

Having regard to the identified pathways for effect, and applying the precautionary principle in accordance with Article 6(3) of the Habitats Directive, it cannot be excluded that the Variation No. 6, individually or in combination with other plans or projects, is likely to have a significant effect on the following European site(s) in view of their Conservation Objectives:

- North Dublin Bay SAC
- South Dublin Bay SAC
- Rye Water Valley/Carton SAC
- River Boyne and River Blackwater SAC
- North Bull Island SPA
- South Dublin Bay and River Tolka Estuary SPA

This information is presented in this report to allow the competent authority to determine whether an Appropriate Assessment is required in respect of the Variation No. 6, in accordance with and fulfilment of the requirements of Article 6 of the Habitats Directive and derived Regulations.

4.0 Natura Impact Statement

The AA Screening presented in Section 3.0 identified the European sites and associated Qualifying Features for which Likely Significant Effects (LSEs) arising from the Variation No. 6, either alone or in combination with other plans or projects, could not be excluded based on objective scientific information.

This Natura Impact Statement (NIS) therefore takes forward only those European sites, Qualifying Features and impact pathways identified through the screening assessment as requiring further consideration. European sites and Qualifying Features for which LSEs were excluded at the screening stage are not reassessed within the NIS.

Following an examination, analysis and evaluation of all relevant information with regard to the best scientific knowledge, and applying the precautionary principle, the AA Screening (Section 3.0) concluded that significant effects could not be excluded for the following European sites:

- North Dublin Bay SAC
- South Dublin Bay SAC
- Rye Water Valley/Carton SAC
- River Boyne and River Blackwater SAC
- North Bull Island SPA
- South Dublin Bay and River Tolka Estuary SPA

Accordingly, these impact pathways and associated European sites are subject to further assessment within this NIS.

The assessment below examines the potential effects identified at screening in greater detail, having regard to the ecological requirements and sensitivities of the relevant Qualifying Features (QIs and SCIs) and the Site-Specific Conservation Objectives (SSCOs) of the European sites concerned. The assessment considers whether these effects could undermine the achievement of the relevant Conservation Objectives and, consequently, result in an adverse effect on the integrity of a European site. Where necessary, avoidance and mitigation measures are identified and their effectiveness assessed.

The purpose of the NIS is to provide the Competent Authority with the scientific information necessary to undertake Appropriate Assessment and determine, in view of the relevant Conservation Objectives and beyond reasonable scientific doubt, whether the Variation No. 6, either alone or in combination with other plans or projects, would adversely affect the integrity of any European site.

4.1 Potential Effects on the Conservation Objectives of European Sites

Table 4.1, Table 4.2, Table 4.3, Table 4.4, Table 4.5, and Table 4.6 assesses whether the effects identified through the AA Screening have the potential to undermine the achievement of any relevant Conservation Objective attribute or target. Effects arising from Variation No. 6 alone and in combination with other plans and projects are considered separately. The effects carried forward are those identified in Table 3.3. Each is assessed against the relevant attributes and targets of each site in **Error! Reference source not found.**, which is the single record of the NIS assessment.

Only those effects for which LSEs could not be excluded at the AA Screening stage are considered further below. At this stage, the assessment is undertaken in the absence of project-specific mitigation measures. Where the risk of undermining a Conservation Objective cannot be excluded, this is identified in Table 4.1 North Dublin Bay SAC [000206]: Assessment

of the Potential to Undermine the Conservation ObjectivesTable 4.1, Table 4.2, Table 4.3, Table 4.4, Table 4.5, and Table 4.6 with details of the effects provided. Each such effect is carried forward to the mitigation measures in Section 4.2.

In combination effects are assessed for each attribute and target in the in-combination column of Table 4.1, Table 4.2, Table 4.3, Table 4.4, Table 4.5, and Table 4.6, before mitigation. Where an effect is significant only in combination, it is mitigated, and its residual effect recorded, in the same way as an effect of the Variation alone.

The plans and projects considered, the search period and sources, and the reasons each was included or excluded are set out in Appendix E. The search covered applications made within the last five years, together with older permissions that remain live (including wind energy permissions, which commonly run for ten years, and permissions whose duration has been extended) and applications refused but under appeal.

Table 4.1 North Dublin Bay SAC [000206]: Assessment of the Potential to Undermine the Conservation Objectives

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
North Dublin Bay SAC [000206]. Distances and pathways: see Table 3.1. Conservation Objectives document (Version 1, published 06 Nov 2013, accessed 19 Oct 2026) and Standard Data Form date: see Appendix B.4.				
[1140] Mudflats and sandflats not covered by seawater at low tide *To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets*	Habitat area (Hectares)	The permanent habitat area is stable or increasing	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach North Dublin Bay SAC via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality within downstream estuarine and coastal habitats. Such impacts could adversely affect the extent and condition of the Zostera-dominated community within the SAC through habitat degradation. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). Elevated pollution loading and deterioration in water quality have the potential to adversely affect estuarine and coastal habitats, including the Zostera-dominated community, through habitat degradation and reductions in ecological condition. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Community extent (Hectares)	Maintain the extent of the Zostera-dominated community, subject to natural processes		
	Community structure: *Zostera* density (Shoots/m²)	Conserve the high quality of the Zostera-dominated community, subject to natural processes		
[1310] *Salicornia* and other annuals colonising mud and sand *To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:*	Habitat area / Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach North Dublin Bay SAC via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality and increased sedimentation within downstream intertidal habitats. Such impacts could result in reductions in habitat area and distribution, decreases in vegetation cover, and changes to the composition of plant communities. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). In the absence of appropriate mitigation, contaminated surface water runoff could contribute to increased pollutant loading and reduced water quality within downstream intertidal habitats. As a result, there is potential degradation of habitat quality, with adverse effects on habitat extent, distribution, vegetation cover and the maintenance of characteristic species communities. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline, or change in habitat distribution, subject to natural processes		
	Vegetation structure: vegetation cover / Percentage cover at a representative number of monitoring stops	Maintain more than 90% of area outside creeks vegetated		
	Vegetation composition: typical species and subcommunities / Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)		

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) *To maintain the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:*	Habitat area / Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach North Dublin Bay SAC via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality within downstream intertidal habitats. Such impacts could result in habitat degradation, resulting in reductions in habitat area and distribution, decreases in vegetation cover, and changes to the range and composition of characteristic saltmarsh plant communities. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). In the absence of appropriate mitigation, contaminated surface water runoff could contribute to increased pollutant loading and reduced water quality within downstream intertidal habitats. As a result, there is potential for adverse effects on habitat extent, distribution, vegetation cover, and the maintenance of the typical species that define the habitat. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline or change in habitat distribution, subject to natural processes		
	Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops / Maintain more than 90% area outside creeks vegetated		
	Vegetation composition: typical species and subcommunities / Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)		
[1410] mediterranean salt meadows (*Juncetalia maritimi*) *To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:*	Habitat area / Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach North Dublin Bay SAC via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality within downstream intertidal habitats. Such impacts could result reductions in habitat area, alterations to habitat distribution, decreases in vegetation cover, and changes to the composition of characteristic plant communities associated with the habitat. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). In the absence of appropriate mitigation, contaminated surface water runoff could contribute to increased pollutant loading and reduced water quality within downstream intertidal habitats. As a result, there is potential for degradation of Mediterranean salt meadow habitat, with adverse effects on habitat extent, distribution, vegetation cover, and the maintenance of the characteristic species and subcommunities that define the habitat. **Conclusion**: risk cannot be excluded during construction and operation without mitigation	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline or change in habitat distribution, subject to natural processes		
	Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops / Maintain more than 90% of area outside creeks vegetated		
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops / Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009)		

Table 4.2 South Dublin Bay SAC [000210]: Assessment of the Potential to Undermine the Conservation Objectives

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
South Dublin Bay SAC [000210]. Distances and pathways: see Table 3.1. Conservation Objectives document (Version 2, published 24 Apr 2026, accessed 19 Oct 2026) and Standard Data Form date: see Appendix B.4.				
[1140] Mudflats and sandflats not covered by seawater at low tide *To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets*	Habitat area (Hectares)	The permanent habitat area is stable or increasing	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach South Dublin Bay SAC via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality within downstream estuarine and coastal habitats. Such impacts could adversely affect the extent and condition of the *Zostera*-dominated community within the SAC through habitat degradation. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). Elevated pollution loading and deterioration in water quality have the potential to adversely affect estuarine and coastal habitats, including the *Zostera*-dominated community, through habitat degradation and reductions in ecological condition. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Community extent (Hectares)	Maintain the extent of the Zostera-dominated community, subject to natural processes		
	Community structure: *Zostera* density (Shoots/m²)	Conserve the high quality of the Zostera-dominated community, subject to natural processes		
[1310] *Salicornia* and other annuals colonising mud and sand *To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:*	Habitat area / Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach South Dublin Bay SAC via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality and increased sedimentation within downstream intertidal habitats. Such impacts could result in reductions in habitat area and distribution, decreases in vegetation cover, and changes to the composition of plant communities. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). In the absence of appropriate mitigation, contaminated surface water runoff could contribute to increased pollutant loading and reduced water quality within downstream intertidal habitats. As a result, there is potential degradation of habitat quality, with adverse effects on habitat extent, distribution, vegetation cover and the maintenance of characteristic species communities. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline, or change in habitat distribution, subject to natural processes		
	Vegetation structure: vegetation cover / Percentage cover at a representative number of monitoring stops	Maintain more than 90% of area outside creeks vegetated		
	Vegetation composition: typical species and subcommunities / Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)		

Table 4.3 Rye Water Valley/Carton SAC [001398]: Assessment of the Potential to Undermine the Conservation Objectives

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
Rye Water Valley/Carton SAC [001398]. Distances and pathways: see Table 3.1. Conservation Objectives document (Version 1, published 22 Dec 2021, accessed 19 Oct 2026) and Standard Data Form date: see Appendix B.4.				
[7220] Petrifying springs with tufa formation (*Cratoneurion*) *To restore the favourable conservation condition of Petrifying springs with Tufa formation (Cratoneurion)* in Rye Water Valley/Carton SAC, which is defined by the following list of attributes and targets:*	Habitat area / Square metres	Area stable or increasing, subject to natural processes	**Operation**: Emissions associated with gas-fired backup plant energy generation by potential developments facilitated by the rezoning have the potential to contribute to elevated NOx concentrations and nitrogen deposition within the SAC (Table 2.2). Increased nitrogen deposition may result in nutrient enrichment of petrifying spring habitats, adversely affecting habitat quality and ecological function. Such effects could contribute to reductions in habitat extent, contraction or fragmentation of habitat distribution, and changes in vegetation composition through the promotion of competitive species at the expense of characteristic petrifying spring communities. **Conclusion**: risk cannot be excluded during operation without mitigation.	**Operation:** In combination with the permitted battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), and large-scale industrial developments (Planning Ref FW22A/0177 and FW22A/0319), the proposed development has the potential to contribute cumulatively to increased emissions of nitrogen oxides (NOx) and associated nitrogen deposition. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline, subject to natural processes		
	Vegetation composition: community diversity / Variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes		

Table 4.4 River Boyne and River Blackwater SAC [002299]: Assessment of the Potential to Undermine the Conservation Objectives

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
River Boyne and River Blackwater SAC [002299]. Distances and pathways: see Table 3.1. Conservation Objectives document (Version 1, published 03 Dec 2021, accessed 19 Oct 2026) and Standard Data Form date: see Appendix B.4.				
[7220] Petrifying springs with tufa formation (*Cratoneurion*) *To restore the favourable conservation condition of Petrifying springs with Tufa formation (Cratoneurion)* in Rye Water Valley/Carton SAC, which is defined by the following list of attributes and targets:*	Habitat area / Square metres	Area stable or increasing, subject to natural processes	**Operation**: Emissions associated with gas-fired backup plant energy generation by potential developments facilitated by the rezoning have the potential to contribute to elevated NOx concentrations and nitrogen deposition within the SAC (Table 2.2). Increased nitrogen deposition may result in nutrient enrichment of petrifying spring habitats, adversely affecting habitat quality and ecological function. Such effects could contribute to reductions in habitat extent, contraction or fragmentation of habitat distribution, and changes in vegetation composition through the promotion of competitive species at the expense of characteristic petrifying spring communities. **Conclusion**: risk cannot be excluded during operation without mitigation.	**Operation:** In combination with the permitted battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), large-scale industrial developments (Planning Ref. 2460045, FW22A/0177 and FW22A/0319), the proposed development has the potential to contribute cumulatively to increased emissions of nitrogen oxides (NOx) and associated nitrogen deposition. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline, subject to natural processes		
	Vegetation composition: community diversity / Variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes		
[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)* *To restore the favourable conservation condition of Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* in River Boyne and River Blackwater SAC, which is defined by the following list of attributes and targets:*	Habitat area / Hectares	Area stable or increasing, subject to natural processes	**Operation**: Emissions associated with gas-fired backup plant energy generation by potential developments facilitated by the rezoning have the potential to contribute to elevated NOx concentrations and nitrogen deposition within the SAC (Table 2.2). Increased nitrogen deposition may result in nutrient enrichment of alluvial forest habitats, favouring competitive and nutrient-demanding species at the expense of characteristic alluvial woodland communities. Such effects could lead to reductions in habitat extent, declines in habitat distribution, changes in woodland structure and local distinctiveness through adverse effects on sensitive species, and shifts in vegetation composition resulting in a reduction in the abundance of positive indicator species. **Conclusion**: risk cannot be excluded during operation without mitigation.	**Operation:** In combination with the permitted battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), large-scale industrial developments (Planning Ref. 2460045, FW22A/0177 and FW22A/0319), the proposed development has the potential to contribute cumulatively to increased emissions of nitrogen oxides (NOx) and associated nitrogen deposition. **Conclusion**: risk cannot be excluded in combination.
	Habitat distribution / Occurrence	No decline, subject to natural processes		
	Woodland structure: indicators of local distinctiveness / Occurrence; population size	No decline in distribution and, in the case of red listed and other rare or localised species, population size		
	Vegetation composition: typical species / Occurrence	At least 1 target species for 91E0* woodlands present; at least 6 positive indicator species for 91E0* woodlands present		

Table 4.5 North Bull Island SPA [004006]: Assessment of the Potential to Undermine the Conservation Objectives

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
North Bull Island SPA [004006]. Distances and pathways: see Table 3.1. Conservation Objectives document (Version 1, published 09 Mar 2015, accessed 19 Oct 2026) and Standard Data Form date: see Appendix B.4.				
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] **Shelduck (*Tadorna tadorna*) [A048]** **Teal (*Anas crecca*) [A052]** **Pintail (*Anas acuta*) [A054]** **Oystercatcher (*Haematopus ostralegus*) [A130]** **Golden plover (*Pluvialis apricaria*) [A140]** **Grey plover (*Pluvialis squatarola*) [A141]** **Knot (*Calidris canutus*) [A143]** **Sanderling (*Calidris alba*) [A144]** **Dunlin (*Calidris alpina*) [A149]** **Black-tailed godwit (*Limosa limosa*) [A156]** **Bar-tailed godwit (*Limosa lapponica*) [A157]** **Curlew (*Numenius arquata*) [A160]** **Redshank (*Tringa totanus*) [A162]** **Turnstone (*Arenaria interpres*) [A169]** **Black-headed gull (*Chroicocephalus ridibundus*) [A179]** **Shoveler (*Spatula clypeata*) [A857]** *To maintain the favourable conservation condition of SCI in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and target*	Population trend - Percentage change	Long term population trend stable or increasing	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach North Bull Island SPA via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality within downstream estuarine and coastal habitats. Such impacts could lead to degradation of wetland habitats that support SCI bird species, resulting in a reduction in the quality and extent of wetland habitat available for foraging and roosting. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). Elevated pollutant loading and deterioration in water quality have the potential to adversely affect downstream wetland habitats within the SPA. Such impacts could reduce the quality and extent of wetland habitat available and undermine the function of the wetland habitat as a resource for SCI bird species. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Distribution - Range, timing and intensity of use of areas	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		
Wetland Habitat [A999] *To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:*	Habitat area / Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation		

Table 4.6 South Dublin Bay and River Tolka Estuary SPA [004024]: Assessment of the Potential to Undermine the Conservation Objectives

Conservation Objective	Attribute (and measure)	Target	Risk of undermining the target: Variation No. 6 alone (before mitigation)	Risk of undermining the target: in combination with other plans and projects (before mitigation)
South Dublin Bay and River Tolka Estuary SPA [004024]. Distances and pathways: see Table 3.1. Conservation Objectives document (Version 1, published 09 Mar 2015, accessed 19 Oct 2026) and Standard Data Form date: see Appendix B.4.				
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] **Oystercatcher (*Haematopus ostralegus*) [A130]** **Ringed plover (*Charadrius hiaticula*) [A137]** **Grey plover (*Pluvialis squatarola*) [A141]** **Knot (*Calidris canutus*) [A143]** **Sanderling (*Calidris alba*) [A144]** **Dunlin (*Calidris alpina*) [A149]** **Bar-tailed godwit (*Limosa lapponica*) [A157]** **Redshank (*Tringa totanus*) [A162]** **Black-headed gull (*Chroicocephalus ridibundus*) [A179]** **Roseate tern (*Sterna dougallii*) [A192]** **Common tern (*Sterna hirundo*) [A193]** **Arctic tern (*Sterna paradisaea*) [A194]** *To maintain the favourable conservation condition of SCI in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and target*	Population trend - Percentage change	Long term population trend stable or increasing	**Construction**: The release of sediment to receiving waters and the accidental spillage or leakage of contaminants during construction (Table 2.2) could reach South Dublin Bay and River Tolka Estuary SPA via the Woodland and Moyleggan Streams and the River Tolka. As a result, there is potential for deterioration in water quality within downstream estuarine and coastal habitats. Such impacts could lead to degradation of wetland habitats that support SCI waterbirds, resulting in a reduction in the quality and extent of wetland habitat available for foraging and roosting. **Operation**: Surface water will discharge into to the River Tolka via Woodland stream, which ultimately discharges into Dublin Bay (Table 2.2). Elevated pollutant loading and deterioration in water quality have the potential to adversely affect downstream wetland habitats within the SPA. Such impacts could reduce the quality and extent of wetland habitat available to SCI waterbirds and undermine the function of the wetland habitat as a resource for SCI bird species. **Conclusion**: risk cannot be excluded during construction and operation without mitigation.	**Construction**: Several major infrastructure projects, including the battery energy storage and synchronous condenser developments (Planning Ref. 22837 and 23136), the Woodland 400 kV Substation expansion (Planning Ref. 221550), the Eastern Distributor Road (Planning Ref. 2460063), and the River Tolka bridge and link road development (Planning Ref. 2561001), involve extensive earthworks, excavation, and installation of surface water drainage infrastructure. **Operation**: Residential developments including SHDs listed in Appendix E, together with commercial and industrial developments within the catchment, have the potential to contribute to increased surface water runoff and additional pollutant loading to receiving waters. **Conclusion**: risk cannot be excluded in combination.
	Distribution - Range, timing and intensity of use of areas	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		
Wetland Habitat [A999] *To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:*	Habitat area / Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation		

4.2 Mitigation Measures

Error! Reference source not found. identifies the specific Conservation Objective attributes and targets for which a risk of being undermined by Variation No. 6, either alone or in combination with other plans or projects, cannot be excluded in the absence of mitigation.

For the purposes of identifying appropriate mitigation, the effects requiring mitigation have been grouped according to their principal impact pathway or mechanism. The key effect groupings identified for Variation No. 6;

- **Hydrological interactions; and**
- **Air quality / deposition**

Mitigation is required where the assessment identified a potential risk of undermining the Conservation Objectives of a European site. The measures set out below have been developed specifically in response to the effects and impact pathways identified in **Error! Reference source not found.**. Where multiple effects operate through the same pathway or can be effectively addressed through the same intervention, these have been considered together as a mitigation package.

For each identified effect grouping, the mitigation measures are described with sufficient detail to establish what is required, how and when the measures will be implemented, who will be responsible for their implementation, and the scientific or technical basis for concluding that the measures will be effective. Monitoring and reporting requirements are also identified where necessary to ensure implementation and/or demonstrate effectiveness.

Following the identification of mitigation measures, **Error! Reference source not found.** summarises each measure against the EC (2021) criteria and records the residual effect with it in place. This considers the effectiveness of the mitigation and whether any residual effect remains that could undermine the relevant Conservation Objective attributes or targets.

The findings of the residual effects assessment are subsequently used to determine whether, in view of the relevant Conservation Objectives and beyond reasonable scientific doubt, Variation No. 6, either alone or in combination with other plans or projects, would adversely affect the integrity of any European site.

4.2.1 Mitigation through integrating environmental considerations into the Variation

The preparation of Variation No. 6 was undertaken in parallel with the SEA and AA processes, ensuring that environmental considerations informed the Variation from the outset. Environmental assessment identified potential environmental effects arising from the scale and nature of the proposed Green Energy Park.

Potential hydrological and air quality impact pathways were identified, as well as the potential for in combination effects with other existing and planned developments within the wider catchment. While future developments facilitated by Variation No. 6 will be subject to Appropriate Assessment and the environmental protection objectives of the Meath County Development Plan, it was recognised that these measures alone were not sufficient to rule out potential effects on European sites at plan level.

Accordingly, additional environmental protection measures were developed to be incorporated into the planning framework. These measures were informed by the findings of the SEA and AA processes.

The mitigation therefore comprises both the established environmental protection policies and objectives contained within the Meath County Development Plan and additional measures incorporated through Variation No. 6, ensuring that appropriate safeguards are embedded within the plan to protect European sites.

The policy and objectives to avoid potential adverse effects on European Sites from large energy user developments are presented in Table 4.7.

Table 4.7 Mitigation measures to address significant effects associated with development facilitated by the rezoning under Variation No. 6.

Reference	Description	Role in Preventing Likely Significant Effects on European Sites
Policy LEU POL 1	To ensure that large energy user development, including extensions and intensification of existing facilities, achieves high standards of energy and water efficiency, environmental protection and resource management.	Establishes an overarching plan-led framework which integrates high environmental, energy, and water standards at the strategic level, ensuring sustainable development principles are embedded into the land-use policy tier in compliance with the EU Habitats Directive (Council Directive 92/43/EEC). Furthermore, existing policies within the CDP must also be complied with which further strengthen the environmental resilience of such an objective; particularly HER POL 31[25] and HER POL 28[26].
LEU OBJ 3a	To require energy-efficient design and operation, including cooling and associated plant, and demonstration of anticipated annual and peak electricity demand and energy-efficiency performance	The energy efficiencies system has indirect links to climate dynamics – however, these are not a source for impact which were identified within Table 2.1 of the AASR. Therefore, this is not thought to be relevant from an AA perspective.
LEU OBJ 3b	To require 80% of annual operational electricity consumption in line with the Commission for Regulation of Utilities (Large Energy User Connection Policy, 2025) and compliance of emissions with legislation and EPA guidelines.	Energy demand and associated electricity generation are important considerations in relation to national climate targets, particularly for energy-intensive developments such as Large Energy User Developments. The requirement to source at least 80% of annual electricity demand from additional renewable electricity generation, alongside measures to minimise reliance on fossil fuels, would contribute to reducing emissions associated with electricity consumption. In the context of European Sites, this objective may contribute to reducing potential indirect

[25] HER POL 31 To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate).

[26] HER POL 28 To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate.

Reference	Description	Role in Preventing Likely Significant Effects on European Sites
		effects associated with air pollutant emissions. Furthermore, existing policies within the CDP must also be complied with which further strengthen the environmental resilience of such an objective; particularly HER POL 31[25] and HER POL 28[26].
LEU OBJ 3c	To require compliance with applicable electricity connection requirements while promoting measures, where feasible and consistent with grid operator requirements, to reduce reliance on fossil fuels and improve alignment with renewable generation, including appropriate storage and demand flexibility.	This objective supports the reduction of potential indirect effects on European Sites associated with air pollutant emissions from fossil-fuel electricity generation. Measures to minimise reliance on fossil-fuel generators and increase alignment with renewable electricity generation may reduce emissions of nitrogen oxides and associated nitrogen deposition. This is particularly relevant to European Sites supporting habitats sensitive to atmospheric nitrogen deposition, where emissions from on-site electricity generation could contribute to cumulative air quality pressures.
LEU OBJ 3d	To require demonstration of sufficient electricity, water and wastewater capacity, having regard to cumulative demand from existing, permitted and reasonably foreseeable development, and to ensure that necessary infrastructure is available before the relevant phase becomes operational via engagement with relevant authorities.	This objective supports the reduction of potential indirect effects on European Sites associated with water abstraction and wastewater discharges. Requiring sufficient infrastructure capacity prior to operation, alongside consideration of cumulative demand from existing and reasonably foreseeable developments, would reduce the potential for adverse effects on water quality, water availability and hydrological regimes. This is particularly relevant to European Sites supporting aquatic habitats and species sensitive to changes in water quality, flow regimes or water availability, where additional demand or wastewater loading could contribute to cumulative pressures on their Conservation Objectives. Furthermore, existing policies within the CDP must also be complied with which further strengthen the environmental resilience around water quality – particularly HER POL 47[27] and HER POL 48[28].

[27] HER POL 47 To protect the ecological, recreational, educational, amenity and flood alleviation potential of navigational and non-navigational waterways within the County, towpaths and adjacent wetlands.

[28] HER POL 48 To manage, enhance and protect the wetlands of the County having regard to the 'County Meath Wetland Survey 2010' and ensure that there is an appropriate level of assessment in relation to proposals which would involve draining, reclaiming or infilling of wetland habitats.

Reference	Description	Role in Preventing Likely Significant Effects on European Sites
LEU OBJ 3e	To require cooling systems that minimize freshwater consumption and water losses through efficient design, recirculation and appropriate use of harvested rainwater or reclaimed water. System selection shall address combined water and energy performance, peak demand, drought resilience and projected climate change.	Freshwater consumption and losses system has indirect links to climate dynamics – however, these are not a source for impact which were identified within Table 2.1 of the AASR. Therefore, this is not thought to be relevant from an AA perspective.
LEU OBJ 3f	To require avoidance of route potable-water use for cooling unless demonstrated necessary following assessment of practicable alternatives. Water supply, abstraction and discharge shall protect community water supplies, prevent deterioration of waterbody status and safeguard ecological flows and water-dependent habitats and species, including during drought and cumulatively with other development.	This objective supports the avoidance and reduction of potential indirect effects on European Sites associated with water abstraction and wastewater discharges. Restricting potable-water use for cooling, requiring consideration of alternative water sources and safeguarding ecological flows would reduce potential pressures on water availability, water quality and hydrological regimes. This is particularly relevant to European Sites supporting water-dependent habitats and species; where abstraction, discharge or changes in water availability, particularly during drought conditions or cumulatively with other developments, could undermine the achievement of their Conservation Objectives.
LEU OBJ 3g	To require recovery and beneficial use of waste heat where technically, environmentally and economically feasible. Where immediate use is not feasible, proposals shall demonstrate the reasons and safeguard practicable opportunities for future heat recovery and connection to heat networks.	This objective primarily relates to energy efficiency and the reduction of greenhouse gas emissions. No specific source–pathway–receptor linkage relevant to European Sites was identified in Table 2.1 of the AASR. Therefore, this objective is not considered to have direct relevance to the AA assessment.
LEU OBJ 3g	To require recovery and beneficial use of waste heat where technically, environmentally and economically feasible. Where immediate use is not feasible, proposals shall demonstrate the reasons and safeguard	This objective supports the reduction of greenhouse gas emissions, resource consumption and waste generation throughout the development lifecycle. While these measures provide broader environmental benefits, no specific impact pathways relevant to European Sites were identified in Table 2.1 of the AASR. Therefore, this objective is not

Reference	Description	Role in Preventing Likely Significant Effects on European Sites
	practicable opportunities for future heat recovery and connection to heat networks.	considered to have direct relevance to the AA assessment.
LEU OBJ 3h	To require measures to minimise whole-life greenhouse-gas emissions and resource consumption, including sustainable construction, equipment repair and reuse, responsible waste management, and appropriate decommissioning and site reuse or restoration.	This objective supports the avoidance and reduction of potential effects on European Sites associated with air emissions, noise, vibration, lighting and pollution from fuel storage and discharges. Requirements to assess these pressures individually and cumulatively, including during generator testing and emergency operation, would help address potential effects on nitrogen-sensitive Qualifying Interest habitats and disturbance of Special Conservation Interest species, including within functionally linked *ex-situ* supporting habitats. Furthermore, existing policies within the CDP must also be complied with, providing additional environmental safeguards in relation to biodiversity protection, ecological assessment and lighting impacts, particularly HER POL 28[26], HER POL 31[25] and INF OBJ 74[29].
LEU OBJ 3i	To require demonstration that noise, vibration, lighting, air emissions, fuel storage and discharges will not give rise to unacceptable environmental or amenity effects, individually or cumulatively, including during generator testing and emergency operation.	This objective supports the avoidance and reduction of potential effects on European Sites associated with air emissions, noise, vibration, lighting and pollution from fuel storage and discharges. Requirements to assess these pressures individually and cumulatively, including during generator testing and emergency operation, would help address potential effects on nitrogen-sensitive Qualifying Interest habitats and disturbance of Special Conservation Interest species, including within functionally linked *ex-situ* supporting habitats. Furthermore, existing policies within the CDP must also be complied with, providing additional environmental safeguards in relation to biodiversity protection, ecological assessment and lighting impacts, particularly HER POL 28[26], HER POL 31[25]and INF OBJ 74[29].
LEU OBJ 3j	To require measurable commitments and arrangements for monitoring electricity	This objective supports the implementation and monitoring of the preceding objectives, particularly those relating to renewable electricity, water consumption and greenhouse

Reference	Description	Role in Preventing Likely Significant Effects on European Sites
	consumption, renewable electricity matching, greenhouse-gas emissions, water consumption and losses, and useful heat recovery, with implementation and proportionate reporting.	gas emissions. While it does not directly address specific impact pathways to European Sites, requirements for measurable commitments and ongoing monitoring would support the implementation of objectives intended to reduce potential environmental pressures. Furthermore, the existing biodiversity protection and ecological assessment requirements of the CDP, particularly HER POL 28[26] and HER POL 31[25], provide complementary safeguards relevant to the assessment of potential effects on European Sites.

4.3 Summary of Mitigation Measures

The SEA and AA processes undertaken for the preparation of Variation No. 6, identified potential hydrological and air quality impact pathways, including the potential for in-combination effects on European sites arising from Large Energy User Developments that may be facilitated within the proposed Green Energy Park. Additional plan-level safeguards were considered necessary to provide prevent significant effects on European sites. Accordingly, targeted policies and objectives were developed for integration into Variation No. 6 to address the potential impact pathways identified through the assessment process.

These measures, when applied alongside the existing environmental protection objectives of the Meath County Development Plan, provide a robust mitigation framework that prevents potential hydrological and air quality effects associated with Large Energy User Development and ensures the protection of European sites.

5.0 Conclusion

This report presents a detailed AA Screening (Section 3.0) and NIS (Section 4.0), together with all supporting information, to inform the competent authority in making its own complete, precise and definitive findings in respect of the potential effects of Variation No. 6 on the integrity of European sites.

The assessment has examined, based on best available scientific knowledge, those impact pathways identified as having the potential to affect conservation objectives, including habitat degradation because of changes in hydrological condition and air quality, both alone and in combination with other plans and projects.

The assessment demonstrates that, with the implementation of additional environmentally protective policies, to be integrated into the Meath County Development Plan 2021 – 2030, Variation No. 6 will not result in habitat degradation of qualifying features within any European site. The protective policies and objectives have been specifically designed to avoid or reduce effects associated with identified pathways.

On this basis, and subject to the competent authority's independent assessment, it is concluded that no reasonable scientific doubt remains as to the absence of adverse effects on the integrity of any European Site arising from Variation No. 6, either alone or in combination with other plans or projects, in view of the sites' conservation objectives. Variation No. 6 will not undermine the ability of those sites to maintain or restore their QIs or SCIs to favourable conservation condition.

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References supporting the zone of influence matrix are given in the reference columns of **Table C-1** and **Table C-2** (**Error! Reference source not found.**).

Appendix A Relevant Legislation and Policy

Appropriate Assessment Screening and Nature Impact Report

Meath County Development Plan **Proposed Variation No.6**

Variation No. 6

Meath County Council

SLR Project No.: 425.069056.00001

17 November 2026

A.1 Relevant Legislation and Policy

A.1.1 Habitats and Birds Directives

The Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) forms the basis for the designation of Special Areas of Conservation (SACs) and a precursor designation Sites of Community Importance (SCIm). Similarly, Special Protection Areas (SPAs) are classified under the Birds Directive (Directive 2009/147/EC on the Conservation of Wild Birds). Collectively, SACs, SCIs and SPAs are referred to as the Natura 2000 network. The Natura 2000 Network is the minimum required to conserve certain habitats and species which are listed in the Directives.

Under Article 6(3) of the Habitats Directive, an Appropriate Assessment (AA) must be undertaken for any plan or project that is not directly connected with or necessary to the management of a Natura 2000 site but is likely to have a significant effect thereon, either alone or in combination with other plans or projects. An AA is an evaluation of the adverse effects of a plan or project, alone or in combination with other plans or projects, on the integrity of a Natura 2000 site, and the identification, where necessary, of avoidance or mitigation measures to preclude adverse effects on the integrity of the site.

Article 6, paragraph 3 the Habitats Directive states that:

"*Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the [Natura 2000] site in view of the site's conservation objectives. In the 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, paragraph 4 goes on to deal with the special circumstances for the granting of consent for plans and projects which would have an adverse effect the integrity of the site(s) concerned.

A.1.2 European Communities (Birds and Natural Habitats) Regulations 2011

Pursuant to the Habitats Directive, Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, similarly sets out the requirements for screening assessments, the circumstances under which an AA is required and the further implementation of Article 6(3) and 6(4) of the Habitats Directive.

It defines a "European Site" as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. European Sites may therefore include sites which may be intended to become part of the Natura 2000 network as well as those already within that network.

Regulation 42 has 22 paragraphs, with selected text provided below.

Regulation 42(1) requires that '*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 42(2) expands on this, stipulating that a public authority must carry out a screening for AA before consent for a plan or project is given, or a decision to undertake or adopt a plan or project is taken.

Regulation 42(6) requires 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*'.

Regulation 42(3)(a) gives the public authority the power to direct a third party to provide a Natura Impact Statement (NIS) and Regulation 42(3)(b) allows it to request any additional information that it needs to complete the screening assessment or AA. Regulation 42(5) goes on to make clear that the NIS should include such information as the public authority considers necessary to enable it to undertake the AA and to ascertain if a project or plan will affect the integrity of a Natura 2000 site. In addition to the information, Regulation 2(1) provides a definition of a Natura Impact Statement as "*a report comprising the scientific examination of a plan or project and the relevant European Site or European Sites, to identify and characterise any possible implications of the plan or project individually or in combination with other plans or projects in view of the conservation objectives of the site or sites, and any further information including, but not limited to, any plans, maps or drawings, scientific information or data required to enable the carrying out of an Appropriate Assessment*".

Regulation 42(11) makes clear that the AA must be carried out by the public authority and that it must include its conclusion as to whether the project or plan would adversely affect the integrity of a Natura 2000 site, and that this must be done prior to consenting the project. Regulation 42 (12) makes clear that the competent authority should, *inter alia*, consider the Natura Impact Statement when undertaking the AA.

Regulations 43 and 45 then go on to deal with Article 6(4) of the Habitats Directive.

A.1.3 Planning and Development Act 2000 (as amended)

These processes have been further enshrined in the Planning and Development Act 2000 (as amended), in sections 177T, 177U and 177V.

177T states that:

(1) (a) A Natura impact report means a statement for the purposes of Article 6 of the Habitats Directive, of the implications of a Land use plan, on its own or in combination with other plans or projects, for one or more than one European Site, in view of the conservation objectives of the site or sites.

(b) A Natura impact statement means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed project, on its own or in combination with other plans or projects, for one or more than one European Site, in view of the conservation objectives of the site or sites.

(2) Without prejudice to the generality of subsection (1), a Natura impact report or a Natura impact statement, as the case may be, shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European Site in view of the conservation objectives of the site or sites.

(3) …..

(4) The applicant for consent for proposed project may, or if directed in accordance with subsection (5) by a competent authority, shall furnish a Natura impact statement to the competent authority in relation to the proposed project.

(5) At any time following an application for consent for proposed project a competent authority may give a notice in writing to the applicant concerned, directing him or her to furnish a Natura impact statement.

(6) ….

(7) a) …… a Natura impact report or a Natura impact statement shall include all information prescribed by regulations under section 177AD.

(b) Where appropriate, a Natura impact report or a Natura impact statement shall include such other information or data as the competent authority considers necessary to enable it to ascertain if the draft Land use plan or proposed project will not affect the integrity of the site.

177U states that:

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

(2)….

(3) in carrying out screening for appropriate assessment of a proposed project a competent authority may request such information from the applicant as it may consider necessary to enable it to carry out that screening….

(4) The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed project, 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 project, individually or in combination with other plans or projects, will have a significant effect on a European Site.

(5) [the vice versa of (4)]

(6) ….

(7) ….

(8) ….

(9) ….

(10) ….

177V. states that:

(1) 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 project 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 project

(2) 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)….

(3) ……a competent authority shall make a Land use plan or give consent for proposed project only after having determined that the Land use plan or proposed project shall not adversely affect the integrity of a European Site

(4)

(5)

(6)

The Act then goes on to deal with Article 6(4) of the Habitats Directive.

A.1.4 Relevant Case Law

Waddenzee (C-127/02). A plan or project may be authorised only where no reasonable scientific doubt remains as to the absence of adverse effects on the integrity of the site.

Kelly v An Bord Pleanála [2014] IEHC 400. An Appropriate Assessment must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the European site.

People Over Wind and Sweetman (C-323/17). Measures intended to avoid or reduce harmful effects on a European site may not be taken into account at the screening stage.

Grace and Sweetman (C-164/17). Measures whose benefits are not certain when the assessment is made, including those to be agreed later or managed adaptively, cannot be relied on to conclude that there will be no adverse effect on integrity.

Briels (C-521/12). Measures that create new habitat to make up for loss or damage within a European site are compensatory, not mitigation, and cannot be relied on under Article 6(3).

Eco Advocacy (C-721/21). At screening, features of a plan or project that reduce harmful effects may be taken into account where they are standard features inherent to that type of project, irrespective of any effect on a European site.

Holohan and Others (C-461/17). An Appropriate Assessment must identify and examine the implications of a project for species present on the site for which it has not been listed, and for habitats and species outside the site, where those implications are liable to affect the site's conservation objectives.

Elliniki Ornithologiki Etaireia and Others (C-66/23). The conservation objectives of an SPA must take account of other Article 4 species present in a significant manner, as well as the species for which the site was classified.

Knocknamona and Massey (C-27/25 and C-356/25). Site-specific conservation objectives are a prerequisite for a valid Stage 2 Appropriate Assessment and cannot be inferred from other sources such as the Standard Data Form. Screening may exclude likely significant effects without them where, for example, distance or the absence of a plausible pathway allows this.

A.1.5 National Planning Framework

National Policy Objective 59 Enhance the conservation status and improve the management of protected areas and protected species by

- Implementing relevant EU Directives to protect Ireland’s environment and wildlife;
- Integrating policies and objectives for the protection and restoration of biodiversity in statutory development plans;
- Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites;

- Continued research, survey programmes and monitoring of habitats and species.

Appendix B European Site Data

Appropriate Assessment Screening and Nature Impact Report

Meath County Development Plan **Proposed Variation No.6**

Variation No. 6

Meath County Council

SLR Project No.: 425.069056.00001

17 November 2026

B.1 Further information on the SACs and SPAs that have undergone assessment

European Sites with functional connectivity (ecological pathways) to the area including their Qualifying Interests and Special Conservation Interests, known threats and pressures.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Narrow-mouthed whorl snail (Vertigo angustior) [1014]	1014	A06, A10, F07, F05	Abandonment of grassland management (e.g. cessation of grazing or of mowing), Extensive grazing or undergrazing by livestock, Sports, tourism and leisure activities, Creation or development of sports, tourism and leisure infrastructure (outside the urban or recreational areas)	Pressures facing this species are associated with land abandonment, undergrazing and the creation of toursism and leisure infrastructure such as caravan sites and golf courses.	Changes to ground vegetation condition, groundwater dependent and is highly sensitive to hydrological changes.
Desmoulin`s whorl snail (Vertigo moulinsiana) [1016]	1016	L02, L01, A07, A10	Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices), Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Abandonment of management/use of other agricultural and agroforestry systems (all except grassland), Extensive grazing or undergrazing by livestock	The main pressures are associated with natural succession resulting in species composition change and drying out of the habitat.	Changes to ground vegetation condition, groundwater dependent and is highly sensitive to hydrological changes.
River lamprey (Lampetra fluviatilis) [1099]	1099	D02, N03, A19, A20, A31, E03, N01, N02	Hydropower (dams, weirs, run-off-the-river), including infrastructure, Increases or changes in precipitation due to climate change, Application of natural fertilisers on agricultural land, Application of synthetic (mineral) fertilisers on agricultural land, Drainage for use as agricultural land, Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging), Temperature changes (e.g. rise of	The main pressures on River Lampreys are associated with hydropower infrastructure and changes in rainfall due to climate change. The use of synthetic and natural fertilisers, drainage and also infrastructure related to shipping are also condidered to be pressures on the species.	Surface water dependent. Highly sensitive to hydrological change. Availability of suitable spawning ground is a considerable issue for the species.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			temperature & extremes) due to climate change		
Atlantic salmon (Salmo salar) [1106]	1106	A26, G19, K05, J01, A25, B23, D02, G11, G20, L06, N01, F12, F28, I02	Agricultural activities generating diffuse pollution to surface or ground waters, Other impacts from marine aquaculture, including infrastructure, Physical alteration of water bodies, Mixed source pollution to surface and ground waters (limnic and terrestrial), Agricultural activities generating point source pollution to surface or ground waters, Forestry activities generating pollution to surface or ground waters, Hydropower (dams, weirs, run-off-the-river), including infrastructure, Illegal harvesting, collecting and taking, Abstraction of water, flow diversion, dams and other modifications of hydrological conditions for freshwater aquaculture, Interspecific relations (competition, predation, parasitism, pathogens), Temperature changes (e.g. rise of temperature & extremes) due to climate change, Discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water, Modification of flooding regimes, flood protection for residential or recreational development, Other invasive alien species (other than species of Union concern)	Known pressures include exploitation at sea in commercial fisheries, interceptory fisheries in coastal waters, aquaculture and predation. In addition, the negative incfluence of climate change on prey structure as well as alterations in habitat and water quality are also pressures on the species.	Disease, parasites and barriers to movement.
Estuaries [1130]	1130	F20, A28, G16, I02, XU	Residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular	Most of the pressures on estuaries come from various sources of pollution,including domestic	Inappropriate development, changes in turbidity

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			pollution, Agricultural activities generating marine pollution, Marine aquaculture generating marine pollution, Other invasive alien species (other than species of Union concern), Unknown pressure	wastewater, agriculture and marine aquaculture. Alien invasice species such as the naturalised Pacific oyster (Magalana gigas) are also recognised as a significant pressure	
Mudflats and sandflats not covered by seawater at low tide [1140]	1140	F20, A28, G16	Residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular pollution, Agricultural activities generating marine pollution, Marine aquaculture generating marine pollution	Pressures on mudflats and sandflats are partly caused by pollution ffrom agricultural, forestry and wastewater sources, as well as impacts associated with marine aquaculture, particularly the Pacific oyster (Magallana gigas).	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Changes to salinity and tidal regime. Coastal development.
Reefs [1170]	1170	G01, G03	Marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats	The main pressures on reefs come from fishing methods that damage the seafloor.	Sensitive to disturbance and pollution.
Annual vegetation of drift lines [1210]	1210	F08, C01, F01, F06, F07	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions), Development and	Most of the pressures on drift lines are associated with activites such as recreation and coastal defences, which can interfere with sediment dynamics.	Overgrazing and erosion. Changes in management.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning, Sports, tourism and leisure activities		
Perennial vegetation of stony banks [1220]	1220	F08, C01, E01, F07, F09, I02	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels), Sports, tourism and leisure activities, Deposition and treatment of waste/garbage from household/recreational facilities, Other invasive alien species (other than species of Union concern)	The main pressures on this habitat are associated with coastal defences (which can interfere with sediment dynamics), recreation and shingle removal.	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.
Vegetated sea cliffs of the Atlantic and Baltic Coasts [1230]	1230	C01, E01, F07, F08, I02, N03, N04	Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels), Sports, tourism and leisure activities, Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Other invasive alien species (other than species of Union concern), Increases or changes in precipitation due to climate change, Sea-	A number of significant pressures were indentified,including trampling by walkers, invasive non-native species, gravel extraction, and sea-level and wave exposure changes due to climate change.	Land use activities such as tourism and/or agricultural practices. Direct alteration to the habitat or effects such as burning or drainage.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			level and wave exposure changes due to climate change		
Salicornia and other annuals colonising mud and sand [1310]	1310	I02, A09	Other invasive alien species (other than species of Union concern), Intensive grazing or overgrazing by livestock	Pressures on salicornia mud are caused by alien species and overgrazing by livestock	Marine water dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species.
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	1330	A09, F07, A33, A36, F08, I02	Intensive grazing or overgrazing by livestock, Sports, tourism and leisure activities, Modification of hydrological flow or physical alternation of water bodies for agriculture (excluding development and operation of dams), Agriculture activities not referred to above, Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Other invasive alien species (other than species of Union concern)	The main pressures on Atlantic salt meadows are from agriculture, including ecologically unstable grazing regimes and land reclamation, and the invasive non-native species common cord-grass (Spartina anglica).	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.
Harbour porpoise (Phocoena phocoena) [1351]	1351	C09, G01	Geotechnical surveying, Marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species	Pressures acting on this species in Irish waters mainly involve commercial vessel-based activities such as impacts arising from geophysical seismic exploration or from local/regional prey removal by fisheries.	Sensitive to disturbance, prey availability and pollution.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Otter (Lutra lutra) [1355]	1355	Xxp, Xxt	No pressures, No threats	There are no pressures facing this species	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivity to pollution.
Petalwort (Petalophyllum ralfsii) [1395]	1395	Xxp, Xxt	No pressures, No threats	There are no pressures facing this species.	None identified.
Mediterranean salt meadows (Juncetalia maritimi) [1410]	1410	A09, A33, A36, A10	Intensive grazing or overgrazing by livestock, Modification of hydrological flow or physical alternation of water bodies for agriculture (excluding development and operation of dams), Agriculture activities not referred to above, Extensive grazing or undergrazing by livestock	Most of the pressures on Mediterranean salt meadows are associated with agriculture, including overgrazing, undergrazing and land reclamation.	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.
Embryonic shifting dunes [2110]	2110	F07, F08, L01, C01, E03, F01, F06, L02	Sports, tourism and leisure activities, Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging), Conversion from other land uses to housing, settlement or recreational areas	The majority of pressures on this habitat are associated with recreation and coastal defences, which can interfere with sediment dynamics.	Overgrazing, and erosion. Changes in management.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			(excluding drainage and modification of coastline, estuary and coastal conditions), Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning, Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)		
Shifting dunes along the shoreline with Ammophila arenaria - white dunes [2120]	2120	F07, F08, L01, E01, E03, F01, F06, I02	Sports, tourism and leisure activities, Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels), Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging), Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions), Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning, Other invasive alien species (other than species of Union concern)	Most of the pressures on marram dunes are caused by the interference on sediment dynamics due to recreation and coastal defences.	Overgrazing, and erosion. Changes in management.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Fixed coastal dunes with herbaceous vegetation - grey dunes [2130]	2130	A10, I02, A02, A09, F07, F08, L02	Extensive grazing or undergrazing by livestock, Other invasive alien species (other than species of Union concern), Conversion from one type of agricultural land use to another (excluding drainage and burning), Intensive grazing or overgrazing by livestock, Sports, tourism and leisure activities, Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	Pressures on fixed dunes are associated with recreation and ecologically unsuitable grazing practices.	Overgrazing, and erosion. Changes in management.
Humid dune slacks [2190]	2190	A19, A31, F07, I02, L02	Application of natural fertilisers on agricultural land, Drainage for use as agricultural land, Sports, tourism and leisure activities, Other invasive alien species (other than species of Union concern), Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	Pressures on the habitat come from a number of sources. Including agricultural fertilisers, sports and leisure activities (e.g. walking, off-road driving and golf courses) and drainage. Succession to scrub is also a problem, particularly where it is linked to desiccation of the slack.	Overgrazing, and erosion. Changes in management. Sensitive to hydrological change.
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]	3110	A26, B23, C05, A31, B27, F12	Agricultural activities generating diffuse pollution to surface or ground waters, Forestry activities generating pollution to surface or ground waters, Peat extraction, Drainage for use as agricultural land, Modification of hydrological conditions, or	This habitat is under significant pressure from eutrophication, and from drainage and other damage to peatland. Damage to peatland can result in hydrological chnages in lakes, increased organic matter, water	Surface and groundwater dependant. Highly sensitive to hydrological changes.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			physical alteration of water bodies and drainage for forestry (including dams), Discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water	colour and turbidity, changes in sediment characteristics, acidification and enrichment.	Highly sensitive to pollution.
Natural dystrophic lakes and ponds [3160]	3160	B23, C05, A26, B27, A31, D08	Forestry activities generating pollution to surface or ground waters, Peat extraction, Agricultural activities generating diffuse pollution to surface or ground waters, Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams), Drainage for use as agricultural land, Energy production and transmission activities generating pollution to surface or ground waters	The pressures on this habitat are associated with pollution from agricultural and forestry activities and also from drainage.	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution
Northern Atlantic wet heaths with Erica tetralix [4010]	4010	A09, A11, B01, A27, D01, L01, N01, N02	Intensive grazing or overgrazing by livestock, Burning for agriculture, Conversion to forest from other land uses, or afforestation (excluding drainage), Agricultural activities generating air pollution, Wind, wave and tidal power, including infrastructure, Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Temperature changes (e.g. rise of temperature & extremes) due to climate change	Overgrazing,burning, wind farm development and erosion are the main pressures associated with this habitat, along with nitrogen deposition from agricultural activities that generate air pollution.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management.
European dry heaths [4030]	4030	A09, A11, B01, D01, N01, N02	Intensive grazing or overgrazing by livestock, Burning for agriculture, Conversion to forest from other land uses, or afforestation (excluding drainage), Wind, wave and tidal power, including	A number of significant pressures were recorded for this habitat in the current reporting period, particularlty overgrazing by sheep and burning for agriculture with afforestation and wind	Moderately sensitive to hydrological change. Changes in

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			infrastructure, Temperature changes (e.g. rise of temperature & extremes) due to climate change	farms also being recognised as pressures.	management. Changes in nutrient status.
Alpine and Boreal heaths [4060]	4060	A09, A27, F07, N01, N02	Intensive grazing or overgrazing by livestock, Agricultural activities generating air pollution, Sports, tourism and leisure activities, Temperature changes (e.g. rise of temperature & extremes) due to climate change	Overgrazing by livestock, tourism (hill walking) and agricultural activities that cause air pollution are considered significant pressures for this habitat.	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change.
Calaminarian grasslands of the Violetalia calaminariae [6130]	6130	L01, L02, F07	Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices), Sports, tourism and leisure activities	Pressures on this habitat are associated with abiotic natural processes (leaching of metals) and succession, as well as impacts from recreational activities (walking/hiking).	Changes in management such as grazing regime. Changes in nutrient or base status. Changes to vegetation composition. Introduction of alien species.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) * important orchid sites [6210]	6210	A02, A10, C01, A09, I02, I04	Conversion from one type of agricultural land use to another (excluding drainage and burning), Extensive grazing or undergrazing by livestock, Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Intensive grazing or overgrazing by livestock, Other invasive alien species (other than species of Union concern), Problematic native species	The significant pressures related to this habitat are mainly associated wit agricultural intensifictaion causing loss of species-rich communities, or abandonment of farmland resulting in succession to scrub.	Changes in management such as grazing regime. Changes in nutrient or base status. Changes to vegetation composition. Introduction of alien species.
Species-rich Nardus grasslands, on siliceous substrates in mountain areas - and submountain areas in	6230	I04, L02	Problematic native species, Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	The main pressures on this habitat are due to bracken encroachment and succession.	Changes in management such as grazing regime. Changes in nutrient or base status. Changes

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Continental Europe [6230]					to vegetation composition. Introduction of alien species.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]	6410	A02, A06, A10, B01, A14, A31	Conversion from one type of agricultural land use to another (excluding drainage and burning), Abandonment of grassland management (e.g. cessation of grazing or of mowing), Extensive grazing or undergrazing by livestock, Conversion to forest from other land uses, or afforestation (excluding drainage), Livestock farming (without grazing), Drainage for use as agricultural land	The main pessures on the habitat are associated with agricultural intensification (e.g. land drainage, fertiliser application), undergrazing and forestry.	Changes in management such as grazing regime. Changes in nutrient or base status. Changes to vegetation composition. Introduction of alien species.
Blanket bogs * if active bog [7130]	7130	A09, A11, A27, B01, C05, L01, D01, K02, N01, N02	Intensive grazing or overgrazing by livestock, Burning for agriculture, Agricultural activities generating air pollution, Conversion to forest from other land uses, or afforestation (excluding drainage), Peat extraction, Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Wind, wave and tidal power, including infrastructure, Drainage, Temperature changes (e.g. rise of temperature & extremes) due to climate change	The main pressures on blanket bogs are overgrazing, burning, afforestation, peat extraction, and agricultural activities causing nitrogen deposition. Erosion, drainage and wind farm construction are also pressures relating to this habitat.	Surface water interactions. Drainage and land use management are the key things.
Petrifying springs with tufa formation (Cratoneurion) [7220]	7220	A06, A10, E01, F07, J01, K02, K04, H08, L02	Abandonment of grassland management (e.g. cessation of grazing or of mowing), Extensive grazing or undergrazing by livestock, Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels), Sports, tourism and leisure activities, Mixed source pollution to	Pressures related to this habitat are associated with drainage, pollution to ground and surface aters, recreational activities, infrastructure, overgarzing and abandonment of grassland management.	Surface and groundwater dependant. Highly sensitive to hydrological changes.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			surface and ground waters (limnic and terrestrial), Drainage, Modification of hydrological flow, Other human intrusions and disturbance not mentioned above (Dumping, accidental and deliberate disturbance of bat roosts (e.g. caving)), Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)		Highly sensitive to pollution.
Alkaline fens [7230]	7230	A06, A09, K02, K04, L02, J01, K01, A26, N02, N03	Abandonment of grassland management (e.g. cessation of grazing or of mowing), Intensive grazing or overgrazing by livestock, Drainage, Modification of hydrological flow, Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices), Mixed source pollution to surface and ground waters (limnic and terrestrial), Abstraction from groundwater, surface water or mixed water, Agricultural activities generating diffuse pollution to surface or ground waters, Temperature changes (e.g. rise of temperature & extremes) due to climate change, Increases or changes in precipitation due to climate change	The main pressures facing this habitat are land abandonment (and associated succession), overgrazing, drainage and pollution.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management.
Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]	8110	A09, A10, L02	Intensive grazing or overgrazing by livestock, Extensive grazing or undergrazing by livestock, Natural succession resulting in species composition change (other than by direct	The main pressures on siliceous scree come from overgrazing, undergrazing and succession.	Erosion, overgrazing and recreation.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			changes of agricultural or forestry practices)		
Calcareous rocky slopes with chasmophytic vegetation [8210]	8210	A09, A27, I02	Intensive grazing or overgrazing by livestock, Agricultural activities generating air pollution, Other invasive alien species (other than species of Union concern)	The majority of pressures related to this habitat are associated with overgrazing and the non-native invasive species New Zealand willherb (Epilobium brunnescens).	Erosion, overgrazing and recreation.
Siliceous rocky slopes with chasmophytic vegetation [8220]	8220	I02	Other invasive alien species (other than species of Union concern)	Pressure on this habitat is associated with the non-native invasive species New Zeland willowherb (Epilobium brunnescens).	Erosion, overgrazing and recreation.
Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	91A0	I02, A09, I04, B09, M07	Other invasive alien species (other than species of Union concern), Intensive grazing or overgrazing by livestock, Problematic native species, Clear-cutting, removal of all trees, Storm, cyclone	The significant pressure facinng this habitat are associated with invasive non-native species such as Rhododendron ponticum, cherry laurel (Prunus laurocerasus) and beech (Fagus sylvatica) and overgrazing by deer.	Changes in management. Changes in nutrient or base status. Introduction of alien species.
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	91E0	I02, I04, B09, I05	Other invasive alien species (other than species of Union concern), Problematic native species, Clear-cutting, removal of all trees, Plant and animal diseases, pathogens and pests	No narrative summary available in the supplied data.	No sensitivity summary available in the supplied data.

B.2 Further information on the Qualifying Interests of SACs that have undergone assessment

Qualifying Interests of SACs that have undergone assessment including summaries of current threats and sensitivities

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Narrow-mouthed whorl snail (Vertigo angustior) [1014]	1014	A06, A10, F07, F05	Abandonment of grassland management (e.g. cessation of grazing or of mowing), Extensive grazing or undergrazing by livestock, Sports, tourism and leisure activities, Creation or development of sports, tourism and leisure infrastructure (outside the urban or recreational areas)	Pressures facing this species are associated with land abandonment, undergrazing and the creation of toursism and leisure infrastructure such as caravan sites and golf courses.	Changes to ground vegetation condition, groundwater dependent and is highly sensitive to hydrological changes.
Desmoulin`s whorl snail (Vertigo moulinsiana) [1016]	1016	L02, L01, A07, A10	Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices), Abiotic natural processes (e.g. erosion, silting up, drying out, submersion, salinization), Abandonment of management/use of other agricultural and agroforestry systems (all except grassland), Extensive grazing or undergrazing by livestock	The main pressures are associated with natural succession resulting in species composition change and drying out of the habitat.	Changes to ground vegetation condition, groundwater dependent and is highly sensitive to hydrological changes.
River lamprey (Lampetra fluviatilis) [1099]	1099	D02, N03, A19, A20, A31, E03, N01, N02	Hydropower (dams, weirs, run-off-the-river), including infrastructure, Increases or changes in precipitation due to climate change, Application of natural fertilisers on agricultural land, Application of synthetic (mineral) fertilisers on agricultural land, Drainage for use as agricultural land, Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging), Temperature changes (e.g. rise of temperature & extremes) due to climate change	The main pressures on River Lampreys are associated with hydropower infrastructure and changes in rainfall due to climate change. The use of synthetic and natural fertilisers, drainage and also infrastructure related to shipping are also condidered to be pressures on the species.	Surface water dependent. Highly sensitive to hydrological change. Availability of suitable spawning ground is a considerable issue for the species.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Atlantic salmon (Salmo salar) [1106]	1106	A26, G19, K05, J01, A25, B23, D02, G11, G20, L06, N01, F12, F28, I02	Agricultural activities generating diffuse pollution to surface or ground waters, Other impacts from marine aquaculture, including infrastructure, Physical alteration of water bodies, Mixed source pollution to surface and ground waters (limnic and terrestrial), Agricultural activities generating point source pollution to surface or ground waters, Forestry activities generating pollution to surface or ground waters, Hydropower (dams, weirs, run-off-the-river), including infrastructure, Illegal harvesting, collecting and taking, Abstraction of water, flow diversion, dams and other modifications of hydrological conditions for freshwater aquaculture, Interspecific relations (competition, predation, parasitism, pathogens), Temperature changes (e.g. rise of temperature & extremes) due to climate change, Discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water, Modification of flooding regimes, flood protection for residential or recreational development, Other invasive alien species (other than species of Union concern)	Known pressures include exploitation at sea in commercial fisheries, interceptory fisheries in coastal waters, aquaculture and predation. In addition, the negative incfluence of climate change on prey structure as well as alterations in habitat and water quality are also pressures on the species.	Disease, parasites and barriers to movement.
Estuaries [1130]	1130	F20, A28, G16, I02, XU	Residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular pollution, Agricultural activities generating marine pollution, Marine aquaculture generating marine pollution, Other invasive	Most of the pressures on estuaries come from various sources of pollution,including domestic wastewater, agriculture and marine aquaculture. Alien invasice species such as the naturalised Pacific oyster (Magalana gigas) are also	Inappropriate development, changes in turbidity

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
			alien species (other than species of Union concern), Unknown pressure	recognised as a significant pressure	
Mudflats and sandflats not covered by seawater at low tide [1140]	1140	F20, A28, G16	Residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular pollution, Agricultural activities generating marine pollution, Marine aquaculture generating marine pollution	Pressures on mudflats and sandflats are partly caused by pollution ffrom agricultural, forestry and wastewater sources, as well as impacts associated with marine aquaculture, particularly the Pacific oyster (Magallana gigas).	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Changes to salinity and tidal regime. Coastal development.
Reefs [1170]	1170	G01, G03	Marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats	The main pressures on reefs come from fishing methods that damage the seafloor.	Sensitive to disturbance and pollution.
Annual vegetation of drift lines [1210]	1210	F08, C01, F01, F06, F07	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions), Development and maintenance of beach areas for tourism and recreation incl. beach nourishment and beach cleaning, Sports, tourism and leisure activities	Most of the pressures on drift lines are associated with activites such as recreation and coastal defences, which can interfere with sediment dynamics.	Overgrazing and erosion. Changes in management.

Qualifying Interests	EU Code	Threats and Pressures Codes	Known Threats and Pressures	Article 17 Report Summary - Threats and Pressures	Sensitivities Summary
Perennial vegetation of stony banks [1220]	1220	F08, C01, E01, F07, F09, I02	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell), Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels), Sports, tourism and leisure activities, Deposition and treatment of waste/garbage from household/recreational facilities, Other invasive alien species (other than species of Union concern)	The main pressures on this habitat are associated with coastal defences (which can interfere with sediment dynamics), recreation and shingle removal.	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity and gravel removal.

B.3 Further information on the Special Conservation Interests of the SPAs that have undergone assessment

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
A005	Great Crested Grebe	*Podiceps cristatus*		No matching Article 12 record in the supplied data.
A009	Fulmar	*Fulmarus glacialis*	C03, F02	Renewable abiotic energy use [A009; C03], Fishing and harvesting aquatic ressources [A009; F02]
A017	Cormorant	*Phalacrocorax carbo*		No matching Article 12 record in the supplied data.
A018	Shag	*Phalacrocorax aristotelis*		No matching Article 12 record in the supplied data.
A043	Greylag Goose	*Anser anser*	A02, A11, C03, D02, F03, G01, H07	Modification of cultivation practices [A043; A02], Agriculture activities not referred to above [A043; A11], Renewable abiotic energy use [A043; C03], Utility and service lines [A043; D02], Hunting and collection of wild animals (terrestrial) [A043; F03], Outdoor sports and leisure activities, recreational activities [A043; G01], Other forms of pollution [A043; H07]
A046	Light-bellied Brent Goose	*Branta bernicla hrota*		No matching Article 12 record in the supplied data.
A048	Shelduck	*Tadorna tadorna*	F01, F02, G01, H03, M01	Marine and Freshwater Aquaculture [A048; F01], Fishing and harvesting aquatic ressources [A048; F02], Outdoor sports and leisure activities, recreational activities [A048; G01], Marine water pollution [A048; H03], Changes in abiotic conditions [A048; M01]
A052	Teal	*Anas crecca*		No matching Article 12 record in the supplied data.
A054	Pintail	*Anas acuta*	C03, F01, F03, G01, H01, H03, H07, J02	Renewable abiotic energy use [A054; C03], Marine and Freshwater Aquaculture [A054; F01], Hunting and collection of wild animals (terrestrial) [A054; F03], Outdoor sports and leisure activities, recreational activities [A054; G01], Pollution to surface waters (limnic & terrestrial, marine & brackish) [A054; H01], Marine water pollution [A054; H03], Other forms of pollution [A054; H07], Human induced changes in hydraulic conditions [A054; J02]

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
A056	Shoveler	*Anas clypeata*	C03, F03, G01, H01, H03, H07	Renewable abiotic energy use [A056; C03], Hunting and collection of wild animals (terrestrial) [A056; F03], Outdoor sports and leisure activities, recreational activities [A056; G01], Pollution to surface waters (limnic & terrestrial, marine & brackish) [A056; H01], Marine water pollution [A056; H03], Other forms of pollution [A056; H07]
A067	Goldeneye	*Bucephala clangula*	C03, F01, F03, G01, H01, H03, H07, M02	Renewable abiotic energy use [A067; C03], Marine and Freshwater Aquaculture [A067; F01], Hunting and collection of wild animals (terrestrial) [A067; F03], Outdoor sports and leisure activities, recreational activities [A067; G01], Pollution to surface waters (limnic & terrestrial, marine & brackish) [A067; H01], Marine water pollution [A067; H03], Other forms of pollution [A067; H07], Changes in biotic conditions [A067; M02]
A069	Red-breasted Merganser	*Mergus serrator*	C03, F01, F02, G01, H03	Renewable abiotic energy use [A069; C03], Marine and Freshwater Aquaculture [A069; F01], Fishing and harvesting aquatic ressources [A069; F02], Outdoor sports and leisure activities, recreational activities [A069; G01], Marine water pollution [A069; H03]
A098	Merlin	*Falco columbarius*	A02, B01, B02, C03, M02	Modification of cultivation practices [A098; A02], Forest planting on open ground [A098; B01], Forest and Plantation management & use [A098; B02], Renewable abiotic energy use [A098; C03], Changes in biotic conditions [A098; M02]
A103	Peregrine falcon	*Falco peregrinus*		No matching Article 12 record in the supplied data.
A130	Oystercatcher	*Haematopus ostralegus*	C03, F01, F02, G01, H03, J02	Renewable abiotic energy use [A130; C03], Marine and Freshwater Aquaculture [A130; F01], Fishing and harvesting aquatic ressources [A130; F02], Outdoor sports and leisure activities, recreational activities [A130; G01], Marine water pollution [A130; H03], Human induced changes in hydraulic conditions [A130; J02]
A137	Ringed Plover	*Charadrius hiaticula*	C03, F01, F02, G01, H03, J02, J03, M01	Renewable abiotic energy use [A137; C03], Marine and Freshwater Aquaculture [A137; F01], Fishing and harvesting aquatic ressources [A137; F02], Outdoor sports and leisure activities, recreational activities [A137; G01], Marine water pollution [A137; H03], Human induced changes in hydraulic conditions [A137; J02], Other Ecosystem Modifications [A137; J03], Changes in abiotic conditions [A137; M01]
A140	Golden Plover	*Pluvialis apricaria*	A02, A04, B01, C01, C03, F01,	Modification of cultivation practices [A140; A02], Grazing [A140; A04], Forest planting on open ground [A140; B01], Mining and quarrying [A140; C01], Renewable abiotic energy use [A140; C03], Marine and Freshwater Aquaculture [A140; F01],

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
			G01, H03, J01, K03, M02	Outdoor sports and leisure activities, recreational activities [A140; G01], Marine water pollution [A140; H03], Fire and Fire suppression [A140; J01], Interspecific faunal relations [A140; K03], Changes in biotic conditions [A140; M02]
A141	Grey Plover	*Pluvialis squatarola*	C03, F01, F02, G01, H03, J02, J03, M01	Renewable abiotic energy use [A141; C03], Marine and Freshwater Aquaculture [A141; F01], Fishing and harvesting aquatic ressources [A141; F02], Outdoor sports and leisure activities, recreational activities [A141; G01], Marine water pollution [A141; H03], Human induced changes in hydraulic conditions [A141; J02], Other Ecosystem Modifications [A141; J03], Changes in abiotic conditions [A141; M01]
A143	Knot	*Calidris canutus*	C03, F01, F02, G01, H03, J02, J03, M01	Renewable abiotic energy use [A143; C03], Marine and Freshwater Aquaculture [A143; F01], Fishing and harvesting aquatic ressources [A143; F02], Outdoor sports and leisure activities, recreational activities [A143; G01], Marine water pollution [A143; H03], Human induced changes in hydraulic conditions [A143; J02], Other Ecosystem Modifications [A143; J03], Changes in abiotic conditions [A143; M01]
A144	Sanderling	*Calidris alba*	C03, F01, G01, H03, M01	Renewable abiotic energy use [A144; C03], Marine and Freshwater Aquaculture [A144; F01], Outdoor sports and leisure activities, recreational activities [A144; G01], Marine water pollution [A144; H03], Changes in abiotic conditions [A144; M01]
A148	Purple Sandpiper	*Calidris maritima*		No matching Article 12 record in the supplied data.
A149	Dunlin	*Calidris alpina*	C03, F01, F02, G01, H03, J02, J03, M01	Renewable abiotic energy use [A149; C03], Marine and Freshwater Aquaculture [A149; F01], Fishing and harvesting aquatic ressources [A149; F02], Outdoor sports and leisure activities, recreational activities [A149; G01], Marine water pollution [A149; H03], Human induced changes in hydraulic conditions [A149; J02], Other Ecosystem Modifications [A149; J03], Changes in abiotic conditions [A149; M01]
A156	Black-tailed Godwit	*Limosa limosa*		No matching Article 12 record in the supplied data.
A157	Bar-tailed Godwit	*Limosa lapponica*	C03, F01, F02, G01, H03, J02, J03, M01	Renewable abiotic energy use [A157; C03], Marine and Freshwater Aquaculture [A157; F01], Fishing and harvesting aquatic ressources [A157; F02], Outdoor sports and leisure activities, recreational activities [A157; G01], Marine water pollution [A157; H03], Human induced changes in hydraulic conditions [A157; J02], Other Ecosystem Modifications [A157; J03], Changes in abiotic conditions [A157; M01]

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
A160	Curlew	*Numenius arquata*		No matching Article 12 record in the supplied data.
A162	Redshank	*Tringa totanus*	C03, F01, F02, G01, H03, J02, J03, M01	Renewable abiotic energy use [A162; C03], Marine and Freshwater Aquaculture [A162; F01], Fishing and harvesting aquatic ressources [A162; F02], Outdoor sports and leisure activities, recreational activities [A162; G01], Marine water pollution [A162; H03], Human induced changes in hydraulic conditions [A162; J02], Other Ecosystem Modifications [A162; J03], Changes in abiotic conditions [A162; M01]
A169	Turnstone	*Arenaria interpres*	C03, F01, G01, H03, J03, M01	Renewable abiotic energy use [A169; C03], Marine and Freshwater Aquaculture [A169; F01], Outdoor sports and leisure activities, recreational activities [A169; G01], Marine water pollution [A169; H03], Other Ecosystem Modifications [A169; J03], Changes in abiotic conditions [A169; M01]
A179	Black-headed Gull	*Chroicocephalus ridibundus*	A04, C03, F02, H03, J03, M01	Grazing [A179; A04], Renewable abiotic energy use [A179; C03], Fishing and harvesting aquatic ressources [A179; F02], Marine water pollution [A179; H03], Other Ecosystem Modifications [A179; J03], Changes in abiotic conditions [A179; M01]
A183	Lesser Black-backed Gull	*Larus fuscus*		No matching Article 12 record in the supplied data.
A184	Herring Gull	*Larus argentatus*	C03, F02, H03, J03	Renewable abiotic energy use [A184; C03], Fishing and harvesting aquatic ressources [A184; F02], Marine water pollution [A184; H03], Other Ecosystem Modifications [A184; J03]
A188	Kittiwake	*Rissa tridactyla*	C03, F02, H03	Renewable abiotic energy use [A188; C03], Fishing and harvesting aquatic ressources [A188; F02], Marine water pollution [A188; H03]
A192	Roseate tern, Roseate Tern	*Sterna dougallii*		No matching Article 12 record in the supplied data.
A193	Common tern, Common Tern	*Sterna hirundo*	C03, D01, D03, G01, I01	Renewable abiotic energy use [A193; C03], Roads, paths and railroads [A193; D01], Shipping lanes, ports, marine constructions [A193; D03], Outdoor sports and leisure activities, recreational activities [A193; G01], Invasive non-native species [A193; I01]
A194	Arctic tern, Arctic Tern	*Sterna paradisaea*	C03, D01, G01, I01, M01	Renewable abiotic energy use [A194; C03], Roads, paths and railroads [A194; D01], Outdoor sports and leisure activities, recreational activities [A194; G01], Invasive non-native species [A194; I01], Changes in abiotic conditions [A194; M01]

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
A199	Guillemot	*Uria aalge*		No matching Article 12 record in the supplied data.
A200	Razorbill	*Alca torda*	C03, H03	Renewable abiotic energy use [A200; C03], Marine water pollution [A200; H03]
A204	Puffin	*Fratercula arctica*	C03, H03, I01	Renewable abiotic energy use [A204; C03], Marine water pollution [A204; H03], Invasive non-native species [A204; I01]
A229	Kingfisher	*Alcedo atthis*	A11, D01, G01, H01, I01, J02	Agriculture activities not referred to above [A229; A11], Roads, paths and railroads [A229; D01], Outdoor sports and leisure activities, recreational activities [A229; G01], Pollution to surface waters (limnic & terrestrial, marine & brackish) [A229; H01], Invasive non-native species [A229; I01], Human induced changes in hydraulic conditions [A229; J02]
A999	Wetland and Waterbirds			No matching Article 12 record in the supplied data.

B.4 Reference list of Specific Conservation Objective documents and Standard Data Forms reviewed

Conservation objectives that have been considered by the assessment are included in the following NPWS/Department of Housing, Local Government and Heritage documents

- Standard Data Form: From the interactive Natura 2000 viewer for all European sites; last updated 10 November 2026.
- North Dublin Bay SAC. Accessed online at https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF000206.pdf
- South Dublin Bay SAC. Accessed online at https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF000210.pdf
- Rye Water Valley/Carton SAC. Accessed online athttps://www.npws.ie/sites/default/files/protected-sites/natura2000/NF001398.pdf
- River Boyne and River Blackwater SAC. Accessed online at https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF002299.pdf
- North Bull Island SPA. Accessed online at https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004006.pdf
- South Dublin Bay and River Tolka Estuary SPA. Accessed online at https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004024.pdf

Appendix C Distance Matrix Used for the Zone of Influence Pathway Considerations

Appropriate Assessment Screening and Nature Impact Report

Meath County Development Plan **Proposed Variation No.6**

Variation No. 6

Meath County Council

SLR Project No.: 425.069056.00001

17 November 2026

C.1 Pathway Considerations to inform the Zone of Influence for each of the Qualifying interests and Special Conservation Interests

In accordance with Article 6(3) of the Habitats Directive and national AA guidance, the following matrix identifies and evaluates potential effect pathways between the proposed project and European Sites. For each QF, the table outlines:

- the potential pathway (e.g. hydrological, airborne, disturbance);
- the scientific or regulatory basis for the spatial or functional screening distance applied; and
- a rationale supporting whether a pathway is considered likely or can be excluded.

The following matrices outline the known inherent ecological and dispersal pathways associated with each QF. These pathways represent the natural spatial and functional linkages through which ecological or environmental effects could, in principle, be transmitted between a project and a European Site.

For each QF, the matrices summarise:

- the typical ecological or physical pathways relevant to that feature (e.g. hydrological connectivity, air-borne deposition, foraging mobility, dispersal range);
- the evidence-based spatial extent over which such pathways may operate, informed by peer-reviewed literature, conservation objectives, and statutory guidance; and
- a brief rationale describing the ecological basis for these pathway distances.

These distances are not project-specific impact zones but reflect the **intrinsic ecological functioning** and **potential connectivity ranges** that exist irrespective of any proposed activity. They provide a consistent evidence base for determining whether a credible pathway for impact exists and therefore whether a European Site should be taken forward for further consideration under Article 6(3) of the Habitats Directive.

These distances are used in conjunction with the range of sources for impacts identified in Section 2.0 to ensure ecological processes are included in the zone of influence considerations for the assessment.

Table C-1: Ecological pathways for each Qualifying Interests and the associated rationale as supported by relevant literature

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
Active raised bogs [7110]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Alkaline fens [7230]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	Yes	No	Feature maintained by surface water conditions such as periodic flooding, seasonal inundation, or rainfall-driven moisture. Hydrological connectivity is relevant, but there is no known reliance on groundwater inputs. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Alpine and Boreal heaths [4060]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Annual vegetation of drift lines [1210]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Atlantic decalcified fixed dunes	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
(Calluno-Ulicetea) [2150]			penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	
Atlantic salmon (Salmo salar) [1106]	Yes	No	Species dependent on clean, well-oxygenated flowing water for spawning and juvenile development. Hydrological connectivity is critical to life cycle stages. Groundwater does not provide significant functional support. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Blanket bogs * if active bog [7130]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Bog woodland [91D0]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Bottlenose dolphin (Tursiops truncatus) [1349]	Yes	No	As there are no direct or functional connections between the proposed development and the marine environment, core dispersal metrics such as foraging range or home range are not considered relevant to this assessment for these species. However, hydrological considerations remain important, particularly in relation to localised pathways of disturbance or degradation (e.g. runoff, acoustic or sedimentation effects) which may interact with nearby estuarine or coastal systems. There are no plausible source-pathway-receptor connections that would result in fragmentation of movement patterns or impacts at the population level for these species. As such, the application of a 2 km buffer along with hydrological pathway screening is considered appropriate and precautionary in this context.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
Brook lamprey (Lampetra planeri) [1096]	Yes	No	Hydrology-dependent feature where groundwater plays no significant role. Assessment should focus on surface water connectivity and catchment-level influences. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Calaminarian grasslands of the Violetalia calaminariae [6130]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) [8120]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Calcareous rocky slopes with chasmophytic vegetation [8210]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Caves not open to the public [8310]	No	No	Subterranean feature isolated from catchment-scale hydrology. This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
			within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Coastal lagoons [1150]	Yes	No	Habitat reliant on tidal and coastal hydrological processes, including salinity gradients and sediment dynamics. No functional reliance on groundwater. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Decalcified fixed dunes with Empetrum nigrum [2140]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Degraded raised bogs still capable of natural regeneration [7120]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Depressions on peat substrates of the Rhynchosporion [7150]	Yes	Yes	Habitat in wet hollows on peat substrates, influenced by water levels. 2 km buffer provides ecological context, while hydrological and hydrogeological dependencies are considered independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Joosten, H. & Clarke, D. (2002). Wise Use of Mires and Peatlands: Background and Principles Including a Framework for Decision-making. International Mire Conservation Group and International Peat Society. NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin. Lindsay, R. (2010). Peatbogs and Carbon: A Critical Synthesis. RSPB Scotland, Edinburgh. Wheeler, B.D. & Proctor, M.C.F. (2000). Ecological gradients, subdivisions and terminology of north-west European mires. Journal of Ecology, 88(2), 187–203. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Desmoulin's whorl snail (Vertigo moulinsiana) [1016]	Yes	Yes	Species with strong dependence on high water tables, typically in fen or flush habitats; sensitive to minor hydrological change. A 2 km buffer captures local dispersal and microhabitat continuity. Hydrological and hydrogeological linkages are assessed separately.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
				Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	
Dunes with Salix repens ssp. argentea (Salicion arenariae) [2170]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Embryonic shifting dunes [2110]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Estuaries [1130]	Yes	No	Hydrology-dependent feature where groundwater plays no significant role. Assessment should focus on surface water connectivity and catchment-level influences. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
European dry heaths [4030]	Yes	No	Habitat influenced by rainfall and surface moisture availability. Hydrology plays a role in maintaining vegetation structure, but groundwater dependency is not a characteristic. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Fixed coastal dunes with herbaceous vegetation - grey dunes [2130]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Freshwater pearl mussel (Margaritifera margaritifera) [1029]	Yes	No	Species highly sensitive to water quality and flow regime. Survival and reproduction are dependent on hydrological stability and upstream catchment management. Not considered groundwater-dependent. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Geyer's whorl snail (Vertigo geyeri) [1013]	Yes	Yes	Species with strong dependence on high water tables, typically in fen or flush habitats; sensitive to minor hydrological change. A 2 km buffer captures local dispersal and microhabitat continuity. Hydrological and hydrogeological linkages are assessed separately.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
				Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	
Grey Seal (Halichoerus grypus) [1364]	Yes	No	As there are no direct or functional connections between the proposed development and the marine environment, core dispersal metrics such as foraging range or home range are not considered relevant to this assessment for these species. However, hydrological considerations remain important, particularly in relation to localised pathways of disturbance or degradation (e.g. runoff, acoustic or sedimentation effects) which may interact with nearby estuarine or coastal systems. There are no plausible source-pathway-receptor connections that would result in fragmentation of movement patterns or impacts at the population level for these species. As such, the application of a 2 km buffer along with hydrological pathway screening is considered appropriate and precautionary in this context.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Harbour Porpoise (Phocoena phocoena) [1351]	Yes	No	As there are no direct or functional connections between the proposed development and the marine environment, core dispersal metrics such as foraging range or home range are not considered relevant to this assessment for these species. However, hydrological considerations remain important, particularly in relation to localised pathways of disturbance or degradation (e.g. runoff, acoustic or sedimentation effects) which may interact with nearby estuarine or coastal systems. There are no plausible source-pathway-receptor connections that would result in fragmentation of movement patterns or impacts at the population level for these species. As such, the application of a 2 km buffer along with hydrological pathway screening is considered appropriate and precautionary in this context.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Harbour seal (Phoca vitulina) [1365]	Yes	No	As there are no direct or functional connections between the proposed development and the marine environment, core dispersal metrics such as foraging range or home range are not considered relevant to this assessment for these species. However, hydrological considerations remain important, particularly in relation to localised pathways of disturbance or degradation (e.g. runoff, acoustic or sedimentation effects) which may interact with nearby estuarine or coastal systems. There are no plausible source-pathway-receptor connections that would result in fragmentation of movement patterns or impacts at the population level for these species. As such, the application of a 2 km buffer along with hydrological pathway screening is considered appropriate and precautionary in this context.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]	Yes	Yes	Aquatic habitat influenced by groundwater and/or surface water inputs, with sensitivity to nutrient and flow conditions. A 2 km buffer captures land-use influences and ecological linkages. Hydrological and hydrogeological pathways are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Humid dune slacks [2190]	Yes	No	Feature maintained by surface water conditions such as periodic flooding, seasonal inundation, or rainfall-driven moisture. Hydrological connectivity is relevant, but there is no known reliance on groundwater inputs. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Juniperus communis formations on heaths or calcareous grasslands [5130]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
			of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Kerry Slug (Geomalacus maculosus) [1024]	No	No	Species with highly restricted range and low dispersal capability, typically under 1 km. A 2 km buffer is considered precautionary to account for undocumented populations and potential movement corridors through woodland or humid microhabitats.	Reich, I., O'Meara, K., McDonnell, R.J., & Gormally, M.J. (2012). An assessment of the use of conifer plantations by the Kerry Slug (Geomalacus maculosus) with reference to the impact of forestry operations. Irish Wildlife Manuals, No. 64. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. McDonnell, R.J. & Gormally, M.J. (2013). Distribution and conservation status of the Kerry Slug (Geomalacus maculosus) in Ireland. Basteria, 77(1–3), 13–18.	2
Killarney fern (Trichomanes speciosum) [1421]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Killarney Shad (Alosa fallax killarnensis) [5046]	Yes	No	Species dependent on clean, well-oxygenated flowing water for spawning and juvenile development. Hydrological connectivity is critical to life cycle stages. Groundwater does not provide significant functional support. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Large shallow inlets and bays [1160]	Yes	No	Habitat reliant on tidal and coastal hydrological processes, including salinity gradients and sediment dynamics. No functional reliance on groundwater. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Lesser horseshoe bat (Rhinolophus hipposideros) [1303]	No	No	Lesser horseshoe bats tend to forage in summer in broadleaved woodland and around riparian vegetation (Bontadina *et al*., 2002; Biggane, 2003). In 2016, the Bat Conservation Trust (BCT) carried out a review of literature pertaining to mean and maximum bat foraging distances (BCT, 2016). In their review, a Core Sustenance Zone (CSZ) refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. For the BCT review, lesser horseshoe bat data was available from 83 radio-tracked individuals from four separate studies. The weighted average maximum foraging distance for lesser horseshoe bats was 2.02 km. The BCT noted that for Annex II species there is justification for increasing the CSZ to reflect use of the landscape by all bats in a population. Some researchers have found that lesser horseshoe bats normally forage in woodlands/scrub within 2.5 km of their roosts (Bontadina *et al*., 2002); thus, for each roost, a 2.5 km zone is considered an appropriate distance to foraging areas for the purpose of the current SSCO targets. The 2.5 km zone around each known roost is mapped and potential foraging grounds within the zone are identified and mapped for each SAC using the Forestry Inventory and Planning System (FIPS) (2007/2012) spatial dataset. The target is that there is no significant decline in potential foraging habitat within 2.5 km of qualifying roosts. However, Collins *et al*. (2016) also note that seasonal movements between summer and winter roosts are reported to be between 5 to 10 km in distance.	Biggane, G. (2003). The Lesser Horseshoe Bat in Ireland: Habitat Studies and Conservation. PhD thesis, University College Dublin. Bontadina, F., Schofield, H., Naef-Daenzer, B. (2002). Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland. Journal of Zoology, 258(3), 281–290. https://doi.org/10.1017/S0952836902001401 Bat Conservation Trust (BCT) (2016). Core Sustenance Zones: Literature Review and Evidence Synthesis. Bat Conservation Trust, London. Collins, J., Jones, G., & Cooper-Bohannon, R. (2016). Lesser Horseshoe Bat Conservation Handbook. Bat Conservation Trust, London. Forestry Inventory and Planning System (FIPS) (2007/2012). Forest Service Spatial Dataset. Department of Agriculture, Food and the Marine, Dublin.	10
Limestone pavements [8240]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
			non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Machairs * in Ireland [21A0]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Marsh Fritillary (Euphydryas aurinia) [1065]	No	No	Species with a typical dispersal range of 1-2 km, though occasional longer dispersal events (>2 km) have been recorded. A 2 km buffer captures likely metapopulation dynamics and connectivity between suitable habitat patches. Wahlberg, N., Klemetti, T. and Hanski, I., 2002. Dynamic populations in a dynamic landscape: the metapopulation structure of the marsh fritillary butterfly. Ecography, 25(2), pp.224-232. Suggests that most females disperse a few hundred metres, but individuals can move up to 2 km, especially in fragmented landscapes.	Wahlberg, N., Klemetti, T. & Hanski, I. (2002). Dynamic populations in a dynamic landscape: the metapopulation structure of the marsh fritillary butterfly. Ecography, 25(2), 224–232. https://doi.org/10.1034/j.1600-0587.2002.250210.x Porter, K. (1981). The population dynamics of small colonies of the butterfly Euphydryas aurinia. Oecologia, 51(3), 328–332. https://doi.org/10.1007/BF00540907 Wahlberg, N. (2001). The phylogenetics and biogeography of Euphydryas butterflies. Annales Zoologici Fennici, 38, 347–364.	2
Marsh saxifrage (Saxifraga hirculus) [1528]	Yes	No	Feature maintained by surface water conditions such as periodic flooding, seasonal inundation, or rainfall-driven moisture. Hydrological connectivity is relevant, but there is no known reliance on groundwater inputs. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) [1420]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Yes	No	Feature maintained by surface water conditions such as periodic flooding, seasonal inundation, or rainfall-driven moisture. Hydrological connectivity is relevant, but there is no known reliance on groundwater inputs. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
			non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Mudflats and sandflats not covered by seawater at low tide [1140]	Yes	No	Habitat reliant on tidal and coastal hydrological processes, including salinity gradients and sediment dynamics. No functional reliance on groundwater. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Narrow-mouthed Whorl Snail (Vertigo angustior) [1014]	Yes	Yes	Species with strong dependence on high water tables, typically in fen or flush habitats; sensitive to minor hydrological change. A 2 km buffer captures local dispersal and microhabitat continuity. Hydrological and hydrogeological linkages are assessed separately.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Natural dystrophic lakes and ponds [3160]	Yes	Yes	Aquatic habitat influenced by groundwater and/or surface water inputs, with sensitivity to nutrient and flow conditions. A 2 km buffer captures land-use influences and ecological linkages. Hydrological and hydrogeological pathways are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]	Yes	Yes	Aquatic habitat influenced by groundwater and/or surface water inputs, with sensitivity to nutrient and flow conditions. A 2 km buffer captures land-use influences and ecological linkages. Hydrological and hydrogeological pathways are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Nore Pearl Mussel (Margaritifera durrovensis) [1990]	Yes	No	Species highly sensitive to water quality and flow regime. Survival and reproduction are dependent on hydrological stability and upstream catchment management. Not considered groundwater dependent. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Northern Atlantic wet heaths with Erica tetralix [4010]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

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			non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130]	Yes	Yes	Aquatic habitat influenced by groundwater and/or surface water inputs, with sensitivity to nutrient and flow conditions. A 2 km buffer captures land-use influences and ecological linkages. Hydrological and hydrogeological pathways are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110]	Yes	Yes	Aquatic habitat influenced by groundwater and/or surface water inputs, with sensitivity to nutrient and flow conditions. A 2 km buffer captures land-use influences and ecological linkages. Hydrological and hydrogeological pathways are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Otter (Lutra lutra) [1355]	Yes	No	Otter (Lutra lutra) is a semi-aquatic; wide-ranging species associated with freshwater and coastal habitats. Home range size varies depending on habitat quality, food availability, and sex, but a mean core range of 13.2 km has been recorded (Reid *et al*., 2013). Accordingly, a Zone of Influence of 13.2 km is applied in this assessment to reflect the potential for commuting, foraging, and resting activity across a connected aquatic network. Hydrological connectivity, particularly via rivers, streams, lakes, and estuarine margins, is essential to understanding functional linkages.	Reid, N., Hayden, B. & Montgomery, W.I. (2013). Methods for assessing changes in otter distribution and population status. Biological Conservation, 160, 18–25.	13.2
Perennial vegetation of stony banks [1220]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Petalwort (Petalophyllum ralfsii) [1395]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Petrifying springs with tufa formation (Cratoneurion) [7220]	Yes	Yes	Habitat reliant on calcareous groundwater discharge with high sensitivity to flow and quality changes. 2 km buffer identifies surrounding ecological context, while groundwater connections are assessed based on source catchments.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Reefs [1170]	Yes	No	Hydrology-dependent feature where groundwater plays no significant role. Assessment should focus on surface water connectivity and catchment-level influences. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
				Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	
River lamprey (Lampetra fluviatilis) [1099]	Yes	No	Hydrology-dependent feature where groundwater plays no significant role. Assessment should focus on surface water connectivity and catchment-level influences. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation [3270]	Yes	Yes	Riverine or riparian habitat dependent on flow regime and water quality. 2 km buffer is used to account for indirect ecological connections, while hydrological pathways are examined at catchment scale and undertaken separately.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Salicornia and other annuals colonising mud and sand [1310]	Yes	No	Habitat reliant on tidal and coastal hydrological processes, including salinity gradients and sediment dynamics. No functional reliance on groundwater. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Sandbanks which are slightly covered by sea water all the time [1110]	Yes	No	Habitat reliant on tidal and coastal hydrological processes, including salinity gradients and sediment dynamics. No functional reliance on groundwater. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Sea lamprey (Petromyzon marinus) [1095]	Yes	No	Species dependent on clean, flowing water with unobstructed connectivity. A 2 km buffer captures ecological context including riparian influences, while hydrological and hydrogeological factors are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) * important orchid sites [6210]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Shifting dunes along the shoreline with Ammophila arenaria - white dunes [2120]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
			of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Siliceous rocky slopes with chasmophytic vegetation [8220]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Slender green feather-moss (Hamatocaulis vernicosus) [6216]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Slender Naiad (Najas flexilis) [1833]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Species-rich Nardus grasslands, on siliceous substrates in mountain areas - and submountain areas in Continental Europe [6230]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
Submarine structures made by leaking gases [1180]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Submerged or partially submerged sea caves [8330]	No	No	Subterranean feature isolated from catchment-scale hydrology. This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Taxus baccata woods of the British Isles [91J0]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Transition mires and quaking bogs [7140]	Yes	Yes	Habitat supported by high and stable water tables, sensitive to both direct and indirect hydrological change. A 2 km buffer is used to identify ecological context such as species recruitment and edge effects. Hydrological and hydrogeological connectivity are assessed independently to capture functional support areas.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Turloughs [3180]	Yes	Yes	Karstic groundwater-dependent wetland with seasonal inundation. 2 km buffer captures surface catchment context, with hydrogeological pathways assessed for subsurface connectivity.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	No	No	This feature does not rely on hydrological or hydrogeological pathways. A 2 km buffer is considered sufficient to encompass the ecological context in which the habitat occurs, including edge effects, dispersal processes, and landscape-scale connectivity. Studies indicate that most edge effects such as microclimatic change, light penetration, or altered species interactions typically operate within the first few hundred metres of a boundary and rarely extend beyond 500 m. Seed dispersal and propagule movement in temperate systems are also generally localised, with the majority occurring within 1–2 km, even for species dispersed by wind or animals. At the landscape scale, patterns of structural connectivity and ecological function are often described at distances of 1–2 km, which represent the effective neighbourhood of interaction for most semi-natural terrestrial habitats. It is important to note that 2 km is identified as the extreme range for these dynamics. On this basis, a 2 km buffer provides an appropriate distance to capture the spatial dynamics most relevant to	Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

Qualifying Interest	Hydrological Sensitivity (Y/N)	Hydrogeological Sensitivity (Y/N)	Rationale	Scientific References	Pathway Distance (km)
			non-hydrological pathways of effect, while acknowledging that pressures such as dust deposition also diminish to background levels within this range under typical conditions.		
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]	Yes	Yes	Aquatic habitat influenced by groundwater and/or surface water inputs, with sensitivity to nutrient and flow conditions. A 2 km buffer captures land-use influences and ecological linkages. Hydrological and hydrogeological pathways are assessed independently.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2
White-clawed crayfish (Austropotamobius pallipes) [1092]	Yes	No	Hydrology-dependent feature where groundwater plays no significant role. Assessment should focus on surface water connectivity and catchment-level influences. A 2 km buffer is also applied to identify ecological context, such as species dispersal, vegetation connectivity, and potential indirect influences not captured by hydrological modelling alone.	This rationale is supported by the logic of minimal on-land ecological function and interaction – this connects to the broader literature for the terrestrial habitat function and it's more likely that the hydrological interaction pathway is more relevant. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science advances, 1(2), p.e1500052. Nathan, R. *et al*. (2008). Mechanisms of long-distance seed dispersal. Trends in Ecology & Evolution, 23(11): 638–647 Forman, R.T.T. & Godron, M. (1986). Landscape Ecology. John Wiley & Sons. Institute of Air Quality Management (IAQM) (2016). Guidance on the Assessment of Dust from Demolition and Construction.	2

C.1.1 Important Notes on Application of Table for SPAs

- Seabird foraging ranges (derived from Woodward *et al*., 2019 and Thaxter *et al*., 2012): These values were generated from GPS-tracking studies of seabirds at sea. They are meaningful ONLY where there is a plausible marine, coastal, or airspace pathway between the project and the SPA. For terrestrial and inland projects, pelagic and coastal seabird species have no functional interaction with the project area. Record in Table 3.1 that no pathway exists for these species; no buffer radius need be drawn and no further assessment is required. The rationale column for each seabird species states clearly whether the distance applies to terrestrial projects.
- Central-place foraging (CPF) distances: These apply where (a) the species forages away from a fixed base (colony, roost, or breeding territory) and (b) there is a plausible physical interaction between the project area and that foraging movement. The presence of a species within the project area alone is not sufficient to confirm connectivity; a plausible functional relationship between the project area and the SPA population's conservation objectives must exist (European Commission, 2021; OPR, 2021 PN01).
- Distribution-led (DL) assessment: Where this is indicated, the author must evaluate whether the project area falls within the known or likely distribution of the SCI species during the relevant season, and whether the project could affect individuals that form part of the SPA population. This is not a buffer exercise; it requires ecological judgement informed by the evidence base cited in the rationale column.
- Out-of-season population identity: The column 'Out-of-Season Population Identity & Demographic Relevance to SPA' implements the requirement in Section 3.3 of this report; namely, that where individuals recorded outside the SPA qualifying season could reasonably form part of, or contribute to, the SPA population during the qualifying season, potential connectivity must be retained for the purposes of AA screening. The population identity classification (SAME POP. / DIFF. POP. / MIXED) is critical: the mere presence of a species outside its qualifying season does not automatically create connectivity to the SPA population if those individuals are from a geographically or demographically separate population.
- **Proxy distances:** the 20 km grey goose value is applied only where no published range exists for the species or a comparable species. Where a species-specific published range exists (as for Bewick's swan), it is used instead.
- **Estuarine and coastal species:** the N/A-T and 'Surf: N' flags assume the project has no surface-water connection to the estuary or coast. Where a project drains to an estuarine or coastal SPA, treat surface-water connectivity as relevant, since water quality changes can affect intertidal habitat and prey. Several of these species also breed or feed inland in Ireland (for example oystercatcher, ringed plover and redshank), so check current distribution before applying N/A-T.
- Notes in parentheses within cells indicate where current primary data sources (I-WeBS, WWT GSMP, BirdWatch Ireland/NPWS survey reports) should be consulted before finalising the assessment for a specific project. These are signposts to current quantitative data, not indicators of uncertainty in the ecological rationale.

ABBREVIATION KEY

- Irish Seasonal Status: SV = Summer visitor, WV = Winter visitor, RB = Resident breeder, PM = Passage migrant
- Hydro Flags: Y = Yes (relevant pathway), N = No, N/A = Not applicable, Surf = surface water connectivity, GW = groundwater connectivity.
- Screening Mode: CPF = Central-place forager; distance-led screening applies, DL = Distribution-led assessment required, WU = Wetland unit (assess via hydrological connectivity to SPA waterbody), N/A-T = Not applicable for terrestrial projects; record in Table 3.1 that no pathway exists, with a brief justification
- Population Identity: SAME POP. = Out-of-season birds are largely the same individuals as the qualifying-season SPA population, DIFF. POP. = Out-of-season birds are largely a different population (different subspecies, breeding origin, or non-overlapping range), MIXED = Partial overlap; cannot readily distinguish SPA population birds from others; precautionary principle applies
- Distances: All distances in kilometres (km) and represent core foraging range mean-maximum unless otherwise stated.

Table C-2: Ecological pathways for each Special Conservation Interest species and the associated rationale as supported by relevant literature

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
Wetlands and Waterbirds [A999]	*N/A*	All seasons	**N/A**: heterogeneous category; see rationale	**Surf: Y** **GW: Y**	In Ireland, this SCI designation is treated as equivalent to a wetland habitat type rather than a species-specific bird SCI. The designation encompasses the range of wetland habitats (open water, fen, marsh, swamp, wet grassland, intertidal flats) that support waterbird assemblages. The assessment therefore considers	N/A: catch-all category. Out-of-season considerations must be addressed at species level once constituent SCI species are identified from the NPWS SPA datasheet.	2 km minimum (wetland habitat connectivity). Species-specific distances apply if individual waterbird SCI species require assessment. DL where no fixed distance is available.	• NPWS SPA standard data forms (site-specific; www.npws.ie) • European Commission (2021) Methodological guidance on AA, Art. 6(3) and (4). C(2021) 6913 final, Brussels • OPR (2021) Practice Note PN01: AA Screening for Development Management. OPR, Dublin

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
					connectivity to the relevant wetland habitat and associated hydrological conditions, rather than species-specific foraging distances. A 2 km buffer is applied as a minimum spatial influence zone around the project area for general wetland habitat connectivity. Where a specific SPA is designated under A999 and species-level assessment is required (e.g. for wind energy projects with collision risk), the author should identify which waterbird species are present using the NPWS standard data form and apply the relevant species-specific pathway distances from this table.			
Arctic tern	*Sterna paradisaea*	Breeding	**SV**: arrives Apr/May; departs Jul–Sep. Absent Oct–Mar.	**Surf:** N **GW:** N	CPF during breeding season. Core foraging range: 25.7 km mean-maximum (Woodward *et al*., 2019; good confidence). IMPORTANT: applies only where a plausible marine, estuarine, or large freshwater pathway exists between the project and the SPA colony. For terrestrial/inland projects with no such interface, record in Table 3.1 that no pathway exists, with a brief justification. No hydrological or hydrogeological dependency.	Long-distance trans-equatorial migrant; winters in Southern Ocean (BirdWatch Ireland, 2024; BTO BirdFacts). Birds in Irish waters outside breeding season include Irish-bred birds and birds of Scandinavian, Greenland and high-Arctic origin (Bruderer & Boldt, 2001; BTO ringing recoveries). Population identity for Aug–Sep passage: MIXED. Species absent Oct–Mar entirely. Out-of-season demographic relevance for overwintering period: N/A. Passage birds (Aug–Sep) could include Irish-bred individuals but mortality is not a realistic impact pathway for terrestrial projects. No out-of-season assessment required for land-based projects.	CPF (breeding): 25.7 km (marine/coastal/large freshwater projects only). N/A-T (terrestrial: no pathway; record this in Table 3.1). Species is absent Oct–Mar; no out-of-season terrestrial assessment required.	• Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. (2019) Desk-based revision of seabird foraging ranges used for HRA screening. BTO Research Report 724. BTO, Thetford • NatureScot (2023) Guidance Note 3: Marine Birds: Identifying theoretical connectivity with breeding-site SPAs using breeding-season foraging ranges. v1. NatureScot, Inverness • NatureScot (2023) Guidance Note 4: Determining connectivity of marine birds with marine SPAs in the non-breeding season. v1. NatureScot, Inverness • Bruderer, B. & Boldt, A. (2001) Flight characteristics of birds: I. Radar measurements of speeds. Ibis 143(2): 178–204 • BirdWatch Ireland (2024) Species accounts: Arctic Tern. www.birdwatchireland.ie • NPWS (2024) SPA datasheets. NPWS, Dublin
Atlantic puffin	*Fratercula arctica*	Breeding	**SV**: arrives Mar/Apr at colonies; departs Aug–Sep. Winters at sea; rarely seen from land.	**Surf:** N **GW:** N	CPF during breeding season. Core foraging range: 137.1 km mean-maximum (Woodward *et al*., 2019); 199.6 km if outlier colonies excluded. CRITICAL: values derived from GPS-tracking of birds at sea: meaningful ONLY where a marine or coastal airspace pathway exists. For terrestrial/inland projects, no functional pathway exists. No pathway; record this in Table 3.1 without further assessment. No hydrological or hydrogeological dependency.	Winters at sea in North Atlantic (Harris & Wanless, 2011). Irish-colony birds mix at sea with birds from UK, Faroese and Norwegian colonies; cannot be distinguished without tracking devices. Population identity: MIXED at sea. For offshore projects in Irish waters: precautionary principle applies; connectivity to Irish breeding colony SPAs cannot be excluded without site-specific data. (Note: current seabird at-sea distribution atlases should be consulted for the most recent Irish Sea puffin wintering density data when assessing offshore projects.)	CPF (breeding): 137.1 km (marine/offshore projects only). N/A-T (terrestrial: no pathway; record this in Table 3.1). Out-of-season: relevant for offshore projects only (MIXED pop.; precautionary principle applies); not relevant for any terrestrial project.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Harris, M.P. & Wanless, S. (2011) The Puffin. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Bar-tailed godwit	*Limosa lapponica*	Wintering	**WV**/PM: present Aug–Apr; peak Oct–Mar. Absent May–Jul.	**Surf: Y** **GW:** N	Lapponica subspecies; strongly tied to intertidal mudflat systems. Does not exhibit predictable CPF: foraging areas and high-tide roost sites are both within the intertidal/estuarine system; no regular overland commuting to	Breeds in Arctic Norway and Siberia. Population identity: SAME POP.; birds on both migration legs show strong site fidelity to wintering estuaries (Rehfisch *et al*., 2003); passage mortality (Aug–Apr) is therefore relevant to wintering SPA	DL (wintering; intertidal/estuarine). 20 km precautionary maximum if fixed distance required. Out-of-season: SAME POP. on passage Aug–Apr; relevant to wintering SPA population. N/A Jun–Jul.	• Davidson, N.C. & Evans, P.R. (1986) The role and potential of man-made and man-modified wetlands in the enhancement of the survival of overwintering waders. Colonial Waterbirds 9(2): 176–188 • NatureScot (2023) Guidance Note 4. NatureScot, Inverness

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
					inland feeding sites. DL assessment based on intertidal and estuarine connectivity appropriate (NatureScot GN4, 2023). Where a fixed precautionary distance is required, 20 km is applied (Davidson & Evans, 1986; NatureScot GN4, 2023). Hydrological (surface water/tidal) assessment required; not groundwater-dependent.	populations. Out-of-season assessment IS relevant where project activities coincide with Aug–Apr presence. N/A Jun–Jul (species absent).		• SNH (2016) Assessing connectivity with Special Protection Areas (SPAs). v3. NatureScot, Inverness • Rehfisch, M.M., Clark, N.A., Langston, R.H.W. & Greenwood, J.J.D. (2003) A guide to the provision of refuges for waders: an analysis of 30 years of ringing data from the Wash, England. Journal of Applied Ecology 40(5): 913–927 • NPWS Blackwater Estuary SPA (004028) • NPWS (2024) SPA datasheets. NPWS, Dublin
Barnacle goose	*Branta leucopsis*	Wintering	**WV**: arrives Oct/Nov; departs Mar/Apr. Absent May–Sep.	**Surf:** Y **GW:** Y	CPF in winter; regular flights between roost sites (coastal grassland, islands, shoreline) and feeding areas (improved pasture, machair). SNH (2016) core foraging range: 15 km (maximum ~25 km). Distance-led screening appropriate. Irish birds are of the Greenland population, using specific west-coast SPAs (e.g. Inishkea Islands, Lough Swilly, Lissadell). Hydrological and hydrogeological connectivity to wetland roost habitats relevant.	Greenland barnacle goose population (wintering Ireland and western Scotland) is distinct from Svalbard population (wintering Scotland) and Russian/Baltic population (wintering Netherlands/Germany) (Black *et al*., 2014; WWT GSMP). Population identity: SAME POP.; ringing confirms Oct–Nov arrivals and Mar–Apr departing birds are Greenland-origin individuals (WWT GSMP annual reports). No birds of this population present May–Sep. Out-of-season (Oct–Nov arrival; Mar–Apr departure): SAME POP.; mortality IS demographically relevant.	CPF (wintering): 15 km core; 25 km maximum. Out-of-season: SAME POP. Oct–Nov and Mar–Apr staging; relevant to SPA population. N/A May–Sep.	• SNH (2016) Assessing connectivity with Special Protection Areas (SPAs). v3. NatureScot, Inverness • Black, J.M., Prop, J. & Larsson, K. (2014) The Barnacle Goose. T & A D Poyser, London • WWT Goose & Swan Monitoring Programme: annual reports. www.wwt.org.uk/our-work/projects/goose-and-swan-monitoring-programme • Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Foraging flight distances of wintering ducks and geese: a review. Avian Conservation and Ecology 9(2):2 • NPWS (2024) SPA datasheets. NPWS, Dublin
Bewick's swan	*Cygnus columbianus bewickii*	Wintering	**WV**: arrives Oct/Nov; departs Feb/Mar. Absent Apr–Sep. Population now critically small in Ireland (<100 birds in recent winters).	**Surf:** Y **GW:** Y	CPF in winter. No species-specific Irish SNH (2016) core range data available. The whooper swan proxy (core <5 km; SNH, 2016) is likely under-precautionary: Rees *et al*. (1997) documented roost-to-feed movements of 5–15 km at Slimbridge and Dutch sites; Nolet *et al*. (2002) recorded movements up to 15 km in the Netherlands. A distance of 10 km is applied as an evidence-based precautionary screening distance. Hydrological and hydrogeological connectivity to wetland habitats relevant. NOTE: Irish wintering population has declined from >1,500 birds in the 1980s to <100 in recent winters (NPWS/I-WeBS data). Verify current site usage before assuming SPAs remain actively used.	NW European population breeds in Arctic Russia. Same individuals return to traditional wintering sites year after year with very high site fidelity (Rees *et al*., 1997). Population identity: SAME POP.; Oct–Nov arrival and Feb–Mar departure staging birds are the same individuals constituting the wintering SPA population. Out-of-season mortality during staging IS demographically relevant. (Note: I-WeBS annual data should be checked for current site usage given the very small numbers now wintering in Ireland.)	CPF (wintering): 10 km [increased from NatureScot whooper proxy of 5 km; based on Rees *et al*., 1997 and Nolet *et al*., 2002]. Out-of-season: SAME POP. Oct–Nov and Feb–Mar; relevant. N/A Apr–Sep. VERIFY current site usage against most recent I-WeBS data.	• SNH (2016) Assessing connectivity with Special Protection Areas (SPAs). v3. NatureScot, Inverness • Rees, E.C., Nutt, M. & Underhill, M. (1997) Feeding ecology and habitat selection of Bewick's Swans Cygnus columbianus bewickii wintering in Britain. Wildfowl 48: 74–95 • Nolet, B.A., Bevan, R.M., Klaassen, M., Langevoord, O. & van der Heijden, Y.G.J.T. (2002) Habitat switching by Bewick's Swans: maximisation of average long-term energy gain? Journal of Animal Ecology 71: 979–993 • WWT Goose & Swan Monitoring Programme: Bewick's Swan annual reports. www.wwt.org.uk • I-WeBS (most recent report; www.npws.ie) • NPWS (2024) SPA datasheets. NPWS, Dublin
Black-headed gull	*Chroicocephalus ridibundus*	Breeding / Wintering	**RB**/WV: small resident breeding population; large winter influx of continental birds. Year-round; numbers highest Oct–Mar.	**Surf:** N **GW:** N	Breeding season: CPF; core foraging range 15 km (Brandl & Corke, 1988; Gorke & Brandl, 1986; Jakubas *et al*., 2020). Distance-led screening appropriate for breeding SPAs. Wintering season: not a CPF: ranges widely and opportunistically; no predictable roost-to-feed structure (Fijn *et al*., 2022). DL assessment appropriate; 20 km precautionary	Irish breeding birds (RB) are resident year-round. Wintering birds are a mix of Irish-bred birds and large influx from Netherlands, Belgium, UK and Scandinavia (Wernham *et al*., 2002; BTO ringing data). Population identity: MIXED. Irish breeding SPA population is a small fraction of total wintering population. For SPAs designated for breeding birds: Irish-bred SAME POP. year-round; connectivity cannot be excluded for	CPF (breeding): 15 km. DL (wintering). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; continental immigrants DIFF. POP. dominate in winter). Precautionary principle applies; proportion of SPA birds in wintering population likely low but cannot be excluded.	• Brandl, R. & Corke, M. (1988) Ornis Scandinavica 19(2): 123–128 • Gorke, M. & Brandl, R. (1986) Oecologia 70(2): 288–290 • Jakubas, D., Indykiewicz, P., Kowalski, J., Iciek, T. & Minias, P. (2020) Ecology and Evolution 10(12): 5489–5505 • Fijn, R., Govers, L., Lutterop, D., Middelveld, R. & van Bemmelen, R. (2022) Ardea 110(1): 15–29 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 4. NatureScot, Inverness

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
					cross-check may be applied if a fixed distance is required. No hydrological or hydrogeological dependency in either season.	wintering projects but proportion of SPA birds in winter flock is likely low. Authors should note this uncertainty explicitly and apply the precautionary principle.		• NPWS (2024) SPA datasheets. NPWS, Dublin
Black-legged kittiwake	*Rissa tridactyla*	Breeding / Wintering	**RB**/WV: breeds on Irish sea cliffs; large additional wintering influx from UK/N. European colonies. Coastal/offshore year-round.	**Surf:** N **GW:** N	Breeding season: CPF; mean-maximum 156.1 km (±141.5 km SD); maximum 770 km (Woodward *et al*., 2019; good confidence). IMPORTANT: derived from GPS tracking at sea: applies only where marine or coastal airspace pathway exists. For terrestrial/inland projects no pathway; record this in Table 3.1. Wintering season: pelagic; not CPF; DL required (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.	Irish breeding kittiwakes (RB) winter at sea mixing with UK, Faroese and Icelandic colony birds (Coulson, 2011; BTO ringing data). Population identity: MIXED at sea. For coastal and offshore projects: precautionary principle applies; connectivity to Irish breeding colony SPAs cannot be excluded. For terrestrial projects: N/A-T applies (pelagic species).	CPF (breeding): 156.1 km (marine/coastal projects only). DL (wintering; pelagic). N/A-T (terrestrial: no pathway; record this in Table 3.1 at all seasons; no terrestrial foraging pathway exists). Out-of-season: relevant for offshore/coastal projects (MIXED pop.; precautionary); irrelevant for terrestrial projects.	• Woodward, I. *et al*. (2019) BTO Research Report 724. BTO, Thetford • Coulson, J.C. (2011) The Kittiwake. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Black-tailed godwit	*Limosa limosa*	Wintering	**WV**/PM: islandica subspecies. Arrives Jul–Aug; departs Mar–Apr. Some non-breeders present May–Jun.	**Surf: Y** **GW:** N	Irish wintering birds are the islandica subspecies (breeding Iceland). They use a wider range of habitats than bar-tailed godwit including intertidal mudflats, freshwater marshes, flooded callows and wet grassland (Gill *et al*., 2007). Not strict CPF between separate roost and foraging sites; movements are complex and habitat-driven. DL assessment based on connected estuarine, freshwater wetland and wet grassland systems appropriate (NatureScot GN4, 2023). Where a fixed precautionary distance is required, 20 km may be applied. Hydrological (surface water) assessment required; not groundwater-dependent.	Population identity: SAME POP.; islandica birds show high site fidelity to wintering estuaries (Gunnarsson *et al*., 2005); birds arriving Jul–Aug and departing Mar–Apr are the same individuals counted at wintering SPAs. Out-of-season mortality IS relevant during these shoulder months. NOTE: the limosa subspecies (breeding continental Europe) is effectively absent from Ireland in winter: Irish wintering birds are overwhelmingly islandica (Gill *et al*., 2007). Mortality of limosa elsewhere is irrelevant to Irish SPA populations.	DL (wintering). 20 km precautionary maximum if fixed distance required. Out-of-season: SAME POP. (islandica) Jul–Aug and Mar–Apr; relevant. N/A for limosa subspecies (not an Irish SPA population concern).	• Gill, J.A. *et al*. (2007) Contrasting trends in two Black-tailed Godwit populations: a review of causes and recommendations. Ibis 149(Suppl. 1): 223–235 • Gunnarsson, T.G. *et al*. (2005) Population-scale drivers of individual arrival times in migratory birds. Journal of Animal Ecology 74: 1119–1128 • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Black-throated diver	*Gavia arctica*	Wintering	**WV**: present Oct–Apr on coastal/offshore waters. Rare inland. Absent May–Sep.	**Surf:** N **GW:** N	Winters exclusively in marine and coastal environments; not a CPF. DL assessment appropriate (NatureScot GN4, 2023). For terrestrial/inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Breeds in Scandinavia and northern Scotland. No breeding population in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present in Oct and Apr are passage migrants: SAME POP. as the wintering SPA individuals; mortality during these months IS relevant. N/A May–Sep (species absent).	DL (wintering; marine/coastal only). N/A-T (terrestrial). Out-of-season: SAME POP. during Oct and Apr passage; relevant. N/A May–Sep.	• NatureScot (2023) Guidance Note 4. NatureScot, Inverness • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • BirdWatch Ireland (2024) Species accounts: Black-throated Diver. www.birdwatchireland.ie • BTO BirdFacts: Gavia arctica. www.bto.org • NPWS (2024) SPA datasheets. NPWS, Dublin
Common coot	*Fulica atra*	Breeding / Wintering	**RB**/WV: resident breeder; significant winter influx from UK and continental Europe. Present year-round.	**Surf: Y** **GW: Y**	Breeding season: coots are strongly territorial; the foraging area is effectively the SPA waterbody itself: no significant overland commuting occurs. Fixed-distance buffers are ecologically inappropriate. Assessment should focus on hydrological connectivity to the SPA waterbody (Ramel, 2023).	Irish breeding coots (RB) are year-round residents. Wintering birds include a large influx of continental European birds (Wernham *et al*., 2002). Population identity: MIXED; wintering flocks contain Irish-resident birds (SAME POP. for breeding SPAs) and continental immigrants. Any out-of-season project impacts on or adjacent to the SPA waterbody	WU (breeding and wintering: assess via hydrological connectivity to SPA waterbody). No fixed distance applicable. Out-of-season: Irish-bred birds SAME POP. year-round for breeding SPAs. Wintering influx MIXED pop. Precautionary principle applies.	• Ayu, P. *et al*. (2021) Ornithological Science 20(2): 201–212 • Baaziz, N. & Samraoui, B. (2008) Ostrich 79(2): 195–200 • Ramel, G. (2023) The Eurasian Coots (Fulica atra) Information. Earth Life. https://earthlife.net/eurasian-coots/ • Saidi, H. *et al*. (2022) Ukrainian Journal of Ecology 12(5): 70–75 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London

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					Wintering season: coots remain within the same lake or marsh throughout winter; numbers fluctuate in response to habitat quality and water conditions rather than commuting between separate sites (Baaziz & Samraoui, 2008; Saidi *et al*., 2022; Ayu *et al*., 2021). Hydrological and hydrogeological connectivity assessment is more informative than a fixed distance buffer. Both surface water and groundwater dependency relevant (lake levels, water quality).	directly affect the breeding SPA population. For wintering SPAs: proportion of Irish-bred birds in winter flock varies by site; precautionary principle applies.		• SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common eider	*Somateria mollissima*	Wintering	**WV**: present Oct–Apr in coastal waters, particularly N and NW coasts. Rare inland.	**Surf:** N **GW:** N	Exclusively marine in Ireland in winter; not a CPF. DL assessment appropriate (NatureScot GN4, 2023). For terrestrial/inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Breeds primarily in Iceland, Norway and northern Scotland (Cramp & Simmons, 1977; Mitchell *et al*., 2004). No breeding eider in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Passage birds in Oct (arrival) and Apr (departure) are SAME POP. as the wintering individuals; mortality during these months IS relevant. N/A May–Sep (species absent).	DL (wintering; marine/coastal only). N/A-T (terrestrial). Out-of-season: SAME POP. during Oct and Apr passage. N/A May–Sep.	• Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford • Mitchell, P.I., Newton, S.F., Ratcliffe, N. & Dunn, T.E. (eds) (2004) Seabird Populations of Britain and Ireland. T & A D Poyser, London • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common goldeneye	*Bucephala clangula*	Wintering	**WV**: present Oct–Mar on inland lakes, rivers and coastal bays. Absent Apr–Sep.	**Surf: Y** **GW: Y**	Diving duck; forages within or immediately adjacent to the waterbody it occupies; does not exhibit predictable CPF between separate roost and foraging sites. DL assessment based on hydrologically-connected lake and estuarine systems appropriate (NatureScot GN4, 2023; Dewey, Animal Diversity Web). Both surface water and groundwater connectivity relevant. No significant overland travel.	Breeds in Scandinavia, Finland and northern Russia (Wernham *et al*., 2002). No breeding goldeneye in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present Oct–Nov (arrival) and Mar (departure) are SAME POP. as the wintering SPA population; mortality during these months IS relevant. N/A Apr–Sep.	DL (wintering; via hydrological connections to SPA waterbodies). Out-of-season: SAME POP. Oct–Nov and Mar. N/A Apr–Sep.	• Dewey, T. Animal Diversity Web: Bucephala clangula. University of Michigan. https://animaldiversity.org/accounts/Bucephala_clangula/ • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common guillemot	*Uria aalge*	Breeding / Non-breeding	**RB**: breeds on Irish sea cliffs Apr–Aug. Winters at sea (coastal/offshore) Oct–Mar; some birds year-round in Irish coastal waters.	**Surf:** N **GW:** N	Breeding season: CPF; core foraging range 73.2 km mean-maximum; 55.5 km excluding Fair Isle outlier (Woodward *et al*., 2019; highest confidence). IMPORTANT: applies only where a marine or coastal airspace pathway exists. For terrestrial/inland projects no pathway; record this in Table 3.1. Non-breeding: not CPF; pelagic; DL assessment (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.	Irish breeding guillemots (RB) disperse to sea after breeding, mixing with birds from UK, Faroese and Norwegian colonies (Wernham *et al*., 2002; BTO ringing data). Population identity for non-breeding: MIXED; Irish colony birds cannot be readily distinguished from other North Atlantic colony birds at sea. For offshore/coastal projects: precautionary principle applies; connectivity to Irish SPA breeding colonies cannot be excluded without site-specific tracking data. (Note: current seabird at-sea distribution atlases should be checked for the most recent Irish Sea wintering density data.)	CPF (breeding): 73.2 km or 55.5 km adjusted (marine/coastal only). DL (non-breeding; pelagic). N/A-T (terrestrial: no pathway; record this in Table 3.1 at all seasons). Out-of-season: MIXED pop. (Irish colony birds + immigrants); precautionary for offshore/coastal projects; irrelevant for terrestrial projects.	• Woodward, I. *et al*. (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common gull	*Larus canus*	Wintering	**WV**/RB: small resident breeder; major winter	**Surf:** N	Not a CPF in winter; ranges widely over agricultural land, coastal	Irish breeding common gulls are a very small population (RB). The vast	DL (wintering). Out-of-season: overwhelmingly DIFF. POP. in winter.	• Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London

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			influx from UK, Scandinavia and Baltic. Numbers highest Oct–Mar.	**GW:** N	areas and urban environments. DL assessment appropriate (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.	majority of wintering birds are immigrants from UK, Scandinavia and the Baltic (Wernham *et al.*, 2002; BTO ringing data). Population identity: MIXED; wintering birds are overwhelmingly continental immigrants (DIFF. POP.); Irish-bred birds form a tiny fraction of the winter population. For SPAs designated for wintering common gull: proportion of Irish-bred SPA birds in the winter flock is negligible for most sites. Precautionary principle means this cannot be dismissed entirely without site-specific ringing data.	Irish-bred birds form negligible fraction of winter population; demographic relevance to Irish breeding SPAs is very low. Precautionary principle applies.	• NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS Ballycotton Bay SPA (004022) • NPWS (2024) SPA datasheets. NPWS, Dublin
Common kingfisher	*Alcedo atthis*	Breeding / Wintering	**RB**: present year-round. Largely sedentary; some local dispersal in winter.	**Surf:** Y **GW:** Y	Breeding season: CPF; territories are linear sections of watercourse typically 1–3 km in length (Fry & Harris, 1992; BTO, 2024). Core screening distance: 3 km. Foraging is entirely riparian/aquatic; strong surface water and groundwater dependency. Wintering season: birds range more widely along connected river systems in winter but do not exhibit predictable long-distance CPF; DL assessment focusing on hydrologically-connected river networks appropriate (BTO, 2024).	Resident breeder (RB); largely sedentary in Ireland (BTO BirdFacts; Wernham *et al.*, 2002). Small influx of continental birds in severe winters but Irish wintering population is predominantly of Irish origin. Population identity: SAME POP. year-round: birds using SPA watercourses in winter are the same individuals (or offspring) as those breeding there in summer. Out-of-season assessment relevant for all project phases.	CPF (breeding): 3 km. DL via hydrological connections (wintering). Out-of-season: SAME POP. year-round (resident; highly sedentary). All project phases require assessment against SPA population.	• Fry, C.H., Fry, K. & Harris, A. (1992) Kingfishers, Bee-eaters and Rollers: A Handbook. Christopher Helm, London • BTO (2024) BirdFacts: Kingfisher Alcedo atthis. www.bto.org/learn/about-birds/birdfacts/kingfisher • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common pochard	*Aythya ferina*	Wintering	**WV**: present Oct–Mar on inland lakes and reservoirs. Very scarce Apr–Sep. No significant breeding population in Ireland.	**Surf:** Y **GW:** Y	CPF in winter; typical roost-to-feed flights for diving ducks 5–10 km (Johnson *et al.*, 2014). A distance of 10 km is applied as a precautionary but proportionate screening distance. Both surface water and groundwater connectivity relevant (lake level, water quality).	Breeds predominantly in central and eastern Europe and Russia (Wernham *et al.*, 2002). Severe European population decline noted (BirdLife International, 2023). No significant breeding pochard in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present Oct–Nov (arrival) and Mar (departure) are SAME POP. as wintering SPA population; mortality during these months IS relevant. N/A Apr–Sep.	CPF (wintering): 10 km. Out-of-season: SAME POP. Oct–Nov and Mar. N/A Apr–Sep.	• Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • BirdLife International (2023) Aythya ferina. IUCN Red List. www.iucnredlist.org • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common scoter	*Melanitta nigra*	Breeding / Wintering	**RB** (very small) / WV: tiny breeding population in NW Ireland (Lough Corrib area, declining). Major winter influx to coastal waters. Some non-breeders offshore year-round.	**Surf:** Y **GW:** Y	Breeding season: breeding scoter are closely associated with their nesting lake; the relevant assessment unit is the wetland itself. Hydrological and hydrogeological connectivity to the breeding lake is the key pathway. Wintering season: scoter raft in coastal waters; not CPF making overland commuting flights. DL assessment along connected coastal systems is appropriate. Hydrological (surface water) assessment required for breeding season. NOTE: Irish breeding population is critically small (estimated fewer than 10 pairs;	Wintering scoter in Irish coastal waters include both Irish-bred birds (SAME POP. for breeding SPAs) and a major influx from Icelandic, Scottish and Scandinavian breeding populations (DIFF. POP.) (Wernham *et al.*, 2002; BirdWatch Ireland, 2024). Irish breeding population is negligibly small relative to total wintering population. For breeding SPAs: year-round assessment of breeding wetland required (SAME POP.). For wintering SPAs: wintering coastal population is overwhelmingly DIFF. POP. from the Irish breeding SPA population.	WU (breeding: assess via hydrological connectivity to breeding lake). DL along coast (wintering). Out-of-season: SAME POP. year-round for breeding SPAs (very small; high sensitivity). Wintering SPAs: overwhelmingly DIFF. POP. VERIFY current Irish breeding population status with NPWS.	• BirdWatch Ireland (2024) Species accounts: Common Scoter. www.birdwatchireland.ie • Hancock, M.H., Robson, H.J., Smith, T.D. & Douse, A. (2019) Spatial and temporal patterns of foraging activity by breeding Common Scoters in Scotland. Ornis Fennica 96: 1–12 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin

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					(Note: NPWS breeding survey data should be checked for current Irish breeding population status.)); loss of even a single breeding female is potentially significant.			
Common shelduck	*Tadorna tadorna*	Wintering	**RB**/WV: small resident breeding population; larger winter influx. Moulting birds largely absent Jul–Aug (moult migration to Bridgwater Bay/Heligoland Bight). Present on estuaries most of year.	**Surf:** N **GW:** N	Wintering shelduck forage almost exclusively on intertidal mudflats; roost and forage within the same intertidal unit. Not a CPF making long overland commuting flights. DL assessment based on connected intertidal systems appropriate (NatureScot GN4, 2023; Viain *et al.*; Cimiotti *et al.*). Tidal/coastal species; no freshwater or groundwater dependency.	Irish breeding shelduck (RB) undertake a moult migration to Bridgwater Bay (Somerset) or Heligoland Bight (Germany) in Jul–Aug, returning Aug–Sep (Wernham *et al.*, 2002). Population identity: SAME POP. for birds using the SPA in non-moult months: Irish-bred birds return to their natal estuary after moulting. Winter visitors include continental birds (MIXED). Jul–Aug moult migration means SPA breeding population is temporarily absent: note in assessments where project activities are timed for this period.	DL (wintering; intertidal systems only). N/A-T (terrestrial/inland). Out-of-season: MIXED (Irish breeders SAME POP. return post-moult; continental immigrants also present). Note Jul–Aug absence of breeding SPA population during moult migration.	• Viain, A. *et al.* Numbers, diet and feeding methods of Common Shelduck Tadorna tadorna wintering in French Atlantic estuarine bays. Wildfowl (in press) • Cimiotti, D.S. *et al.* Wintering patterns in European Common Shelducks. Ibis. See BOU summary: https://bou.org.uk/blog-cimiotti-wintering-shelduck/ • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Common tern	*Sterna hirundo*	Breeding	**SV**: arrives Apr/May; departs Aug–Sep. Absent Oct–Mar.	**Surf:** N **GW:** N	CPF during breeding season; core foraging range 18 km (Woodward *et al.*, 2019; good confidence). IMPORTANT: applies where a marine, estuarine or large freshwater pathway exists between project and SPA colony. For terrestrial/inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Trans-equatorial migrant wintering in West Africa (Wernham *et al.*, 2002). Entirely absent Oct–Mar. Population identity: N/A for non-breeding season (species absent). Birds on southward migration Aug–Sep could include Irish-colony birds but mortality at this stage is not a realistic pathway for most project types. No out-of-season assessment required.	CPF (breeding): 18 km (coastal/estuarine/large freshwater projects only). N/A-T (terrestrial inland projects: no pathway; record this in Table 3.1). Species absent Oct–Mar. No out-of-season assessment required for terrestrial projects.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Corncrake	*Crex crex*	Breeding	**SV**: arrives late Apr/May; departs Aug–Sep. Absent Oct–Apr.	**Surf:** N **GW:** N	CPF with restricted breeding-season movements; average movement distance 415 m (Parisi *et al.*, 2024: Irish study). Core screening distance: 0.5 km from any known calling male. Where no calling males are recorded, DL assessment based on availability of suitable tall grassland and rush pasture habitats is appropriate, confirmed by targeted survey using standard call-playback methodology. CAUTION: while the Irish corncrake population has shown encouraging recent recovery: 218 calling males recorded in the 2023 NPWS survey (up 35% on the 2018 baseline; NPWS, 2023), with a further 20% increase recorded in 2025 (NPWS, 2025): the overall population remains critically small and geographically restricted to NW Ireland (principally Donegal, Mayo and Galway). The precautionary principle must still be applied rigorously; apparent absence must be confirmed by targeted survey before screening out. Loss of even a small number	Trans-Saharan migrant wintering in sub-Saharan Africa (BirdWatch Ireland, 2024). Entirely absent Oct–Apr. Migrates nocturnally and covertly; passage birds rarely detected in Ireland. Population identity: N/A for non-breeding season. No out-of-season assessment required.	CPF (breeding): 0.5 km from calling male. DL if no calling males confirmed by survey. N/A (non-breeding: species absent Oct–Apr). VERIFY against most recent NPWS corncrake survey data before concluding that there is no pathway to any SPA.	• Parisi, A., Moran, J., Carey, J. & O'Brien, J. (2024) Insights into Corncrake (Crex crex) movements in a fragmented agricultural landscape using bioacoustics. Atlantic Technological University/NPWS, Dublin • NPWS (2023) Corncrake/Traonach Conservation Programme: 2023 survey results. National Parks and Wildlife Service, Dublin. www.npws.ie • NPWS (2025) Corncrake/Traonach Conservation Programme: 2025 survey results. National Parks and Wildlife Service, Dublin. www.npws.ie • BirdWatch Ireland (2024) Species accounts: Corncrake. www.birdwatchireland.ie • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin

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					of males from an SPA breeding population is potentially significant. No hydrological or hydrogeological dependency.			
Dunlin	*Calidris alpina*	Wintering / Breeding	**WV**/RB: nominate alpina: major winter visitor to Irish estuaries (Oct–Apr). Schinzii subspecies: breeds on western machair/blanket bog (Apr–Aug). See also Dunlin (schinzii) below.	**Surf:** Y **GW:** N	Breeding season (schinzii and montane alpina): CPF; SNH (2016) core range 3 km. Distance-led screening appropriate. Surface-water dependency (machair pools, blanket bog drainage). Wintering season (alpina): wintering dunlin have very large and non-centralised home ranges (Sanzenbacher & Haig, 2002); not CPF. DL assessment based on intertidal and estuarine connectivity appropriate. See Dunlin (schinzii) below for subspecies-specific breeding assessment. No groundwater dependency.	CRITICAL POPULATION IDENTITY CASE. Wintering dunlin on Irish estuaries are overwhelmingly nominate alpina, breeding in Scandinavia, Iceland and Russia (Greenwood, 1984; Wernham *et al*., 2002; BTO ringing recoveries). The schinzii subspecies breeding at west-coast Irish SPAs (e.g. Mullet/Blacksod Bay) is a DISTINCT population: different breeding origin, different migration routes, largely non-overlapping wintering range (W. Africa; Stroud *et al*., 2004). Population identity: DIFF. POP.; a project affecting wintering alpina on Dublin Bay is not relevant to the schinzii SPA breeding population, and vice versa. Authors must clearly identify which subspecies/population the SPA designates before assessing out-of-season relevance.	CPF (breeding): 3 km (alpina and schinzii). DL (wintering alpina; intertidal/estuarine). Out-of-season: DIFF. POP.; wintering alpina and breeding schinzii are largely non-overlapping populations. Must determine which population the SPA designates before any out-of-season assessment.	• Greenwood, J.J.D. (1984) The wintering of Dunlin Calidris alpina in Britain and Ireland: evidence from ringing. Wader Study Group Bulletin 42: 39–42 • Sanzenbacher, P.M. & Haig, S.M. (2002) Residency and movement patterns of wintering Dunlin. The Condor 104: 271–280 • Stroud, D.A. *et al*. (2004) The ecology and conservation of European breeding waders. Wader Study Group Bulletin 104: 5–14 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Dunlin (schinzii)	*Calidris alpina schinzii*	Breeding	**SV**/RB (partial): breeds on western Irish machair and blanket bog Apr–Aug. Winters in W. Africa. Small numbers may winter in Ireland but subspecific identity rarely confirmed.	**Surf:** Y **GW:** N	Requires separate treatment from nominate alpina. C. a. schinzii breeds on coastal machair, wet machair grassland, blanket bog and associated marsh habitats in western Ireland: entirely distinct from upland/montane habitats of nominate alpina. Breeding behaviour: CPF; 3 km core range (SNH, 2016). Any project within 3 km of an SPA colony in machair/coastal lowland habitat warrants consideration. Hydrological dependency: surface-water dependent (machair pools, drainage channels). No groundwater dependency.	C. a. schinzii is a priority subspecies with a fragmented and declining European breeding distribution (Stroud *et al*., 2004; BirdLife International, 2023). Irish population is one of the largest remaining in W. Europe. Wintering range is W. Africa, largely non-overlapping with wintering alpina in Ireland. Population identity: DIFF. POP. from wintering alpina. Out-of-season (non-breeding): birds depart Aug–Sep; absent Oct–Mar. Small numbers may attempt to winter in Ireland but subspecific identity is rarely confirmed in the field. Conservative approach: assume wintering dunlin in Ireland are alpina unless subspecifically confirmed. No out-of-season assessment required for winter projects unless schinzii confirmed present.	CPF (breeding): 3 km (machair/coastal habitats). Out-of-season: DIFF. POP. from wintering alpina. N/A in winter (species essentially absent). Confirm subspecific identity before any out-of-season assessment.	• Stroud, D.A. *et al*. (2004) The ecology and conservation of European breeding waders. Wader Study Group Bulletin 104: 5–14 • BirdLife International (2023) European Red List of Birds. BirdLife International, Cambridge • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Eurasian curlew	*Numenius arquata*	Wintering / Breeding	**RB**/WV: small and rapidly declining resident breeding population; large winter influx from UK and continental Europe. Present year-round.	**Surf:** Y **GW:** N	Breeding season: CPF; SNH (2016) core range 1 km (maximum 2 km). Distance of 2 km applied to capture full core range. Surface-water dependency (wet grassland, blanket bog, heath). Wintering season: CPF: mean winter home ranges of 5–6 km2 (Donnez *et al*., 2023), equivalent radius approximately 6 km; curlew also commute between estuarine roosts and inland feeding areas. A distance of 6 km is applied as a proportionate screening distance.	COMPLEX POPULATION IDENTITY CASE. Ireland's breeding curlew population (RB) is critically small: estimated at 100–150 pairs nationally (NPWS, 2021 survey) and declining steeply. Large wintering population (WV) consists predominantly of immigrants from UK and continental Europe (Wernham *et al*., 2002; BTO ringing recoveries). Population identity: MIXED; wintering flocks contain a small proportion of Irish-bred birds alongside dominant continental/UK influx. CRITICAL:	CPF (breeding): 2 km. CPF (wintering): 6 km. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; wintering influx largely DIFF. POP.). Apply precautionary principle rigorously at all seasons near breeding SPAs given critically small Irish population.	• Donnez, M., Schwemmer, P., Fort, J. *et al*. (2023) Small Space but High Diversity: Spatial and Temporal Habitat Use by Endangered Eurasian Curlew at Wintering Sites Throughout Europe. Wetlands 43: 80. https://doi.org/10.1007/s13157-023-01728-w • NPWS (2021) National Curlew Survey results. NPWS, Dublin • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • BirdWatch Ireland (2024) Curlew species account. www.birdwatchireland.ie • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness

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					Hydrological dependency: surface-water features (wet grassland, blanket bog, estuaries).	given the near-collapse of the Irish breeding population, a project affecting Irish-bred curlew at any season has high potential significance. Irish breeders (SAME POP. for breeding SPAs) present year-round; any project near a breeding SPA requires all-season assessment.		• NPWS (2024) SPA datasheets. NPWS, Dublin
Eurasian teal	*Anas crecca*	Wintering	**WV**/RB: small resident breeder; major winter influx from Iceland, UK and continental Europe (Oct–Mar). Year-round but numbers far higher in winter.	**Surf:** Y **GW:** Y	CPF in winter; typical roost-to-feed flights for dabbling ducks a few km (Johnson *et al*., 2014). Vallecillo *et al*. (2023) show teal associated with wetlands up to 5 km from day roosts. A distance of 3 km is applied as a proportionate screening distance. Both surface water and groundwater dependency relevant (shallow wetland, flooded grassland, marsh).	Irish breeding teal (RB) are resident and present year-round. Wintering birds overwhelmingly immigrants from Iceland, UK and continental Europe (Wernham *et al*., 2002). Population identity: MIXED; wintering flocks contain Irish-bred birds (SAME POP. for breeding SPAs) and continental immigrants (DIFF. POP. for wintering SPAs). Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs.	CPF (wintering): 3 km. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; wintering influx DIFF. POP.). Precautionary principle applies.	• Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • Vallecillo, D. *et al*. (2023) Biodiversity and Conservation 32: 543–562 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Eurasian wigeon	*Anas penelope*	Wintering	**WV**: arrives Sep/Oct; departs Mar/Apr. Does not breed in Ireland. Absent May–Aug.	**Surf:** Y **GW:** Y	Shows a degree of CPF from roost wetlands to feeding areas but movements are variable and not consistently predictable over long distances. Legagneux *et al*. (2009) show core movements 1–2 km from roosts; Johnson *et al*. (2014) show flights up to 5 km. Given this variability, DL assessment based on hydrologically-connected wetland systems is more robust than a fixed distance. A precautionary maximum of 5 km may be applied as a cross-check. Both surface water and groundwater dependency relevant (shallow wetland, wet grassland, estuary).	Breeds in Iceland, Scandinavia and Russia (Wernham *et al*., 2002). No breeding wigeon in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present Sep–Oct (arrival) and Mar–Apr (departure) are SAME POP. as the wintering SPA population; mortality during these months IS relevant. N/A May–Aug (species absent).	DL (wintering); 5 km precautionary cross-check. Out-of-season: SAME POP. Sep–Oct and Mar–Apr. N/A May–Aug.	• Legagneux, P. *et al*. (2009) Journal of Ornithology 150: 183–193 • Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
European shag	*Phalacrocorax aristotelis*	Breeding / Non-breeding	**RB**: resident breeder on rocky coasts. Non-breeding birds disperse coastally. Present year-round.	**Surf:** N **GW:** N	Breeding season: CPF; core foraging range 13.2 km (Woodward *et al*., 2019; highest confidence). IMPORTANT: applies only where a marine or coastal pathway exists. For terrestrial/inland projects no pathway; record this in Table 3.1. Non-breeding: disperses along coast; not CPF; DL (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.	Resident breeder (RB) in Ireland; largely sedentary and coastal year-round (Wernham *et al*., 2002). Irish-bred birds predominantly remain in Irish and adjacent coastal waters. Population identity: SAME POP. year-round for coastal projects near breeding colonies: non-breeding birds near an SPA colony are likely the same individuals as the breeding SCI. All-season consideration appropriate for coastal/marine projects. N/A-T for all terrestrial projects.	CPF (breeding): 13.2 km (marine/coastal only). DL (non-breeding; coastal). N/A-T (terrestrial: no pathway; record this in Table 3.1 at all seasons; shag forages almost exclusively in marine and intertidal environments and has no functional interaction with terrestrial projects at any season). All-season consideration applies only to marine/coastal projects near breeding colonies.	• Woodward, I. *et al*. (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
European storm-petrel	*Hydrobates pelagicus*	Breeding	**SV**: breeds on remote western islands (May–Oct); winters at sea off W. Africa. Rarely seen from mainland.	**Surf:** N **GW:** N	CPF during breeding season; foraging trips are long-distance pelagic excursions. Mean-maximum foraging range: 266.3 km; maximum 398.0 km (Thaxter *et al*., 2012). CRITICAL: entirely pelagic forager: these distances	Winters at sea off West Africa (Wernham *et al*., 2002). Entirely absent from Irish terrestrial/coastal areas Oct–Apr. Irish-colony birds cannot be distinguished from other European colony birds at sea. Population identity for non-breeding:	CPF (breeding): 266.3 km (offshore marine projects ONLY). N/A-T (any terrestrial or inland project: no pathway; record this in Table 3.1 at all seasons; no terrestrial foraging	• Thaxter, C.B. *et al*. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. Biological Conservation 156: 53–61 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness

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					apply ONLY to marine or offshore projects (e.g. offshore wind). For any terrestrial or inland project, no functional pathway exists; record this in Table 3.1 without further assessment. No hydrological or hydrogeological dependency.	irrelevant for land-based projects. For offshore projects in Irish Atlantic waters: precautionary principle applies; connectivity to Irish SPA colony populations (principally Inishtearaght, Skellig Michael) cannot be excluded. (Note: Irish storm-petrel colonies are difficult to census; the Blasket Islands and associated island complex represent an internationally important breeding population. Check NPWS National Seabird Monitoring Programme (IWM114, 2019) for the most recent comprehensive estimates.)	pathway exists). Out-of-season: irrelevant for land-based projects.	• NatureScot (2023) Guidance Note 4. NatureScot, Inverness • Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • NPWS (2024) SPA datasheets. NPWS, Dublin
Gadwall	*Mareca strepera*	Wintering	**WV**/RB: small and increasing resident breeder (post-2000); major winter influx from UK and Iceland. Year-round but most numerous Oct–Mar. NOTE: genus reclassified from Anas to Mareca.	**Surf:** Y **GW:** Y	Feeding concentrated in and around margins of the wintering waterbody; not a strict long-distance CPF. Legagneux *et al.* (2009) show core movements 1–2 km from roosts. DL assessment focusing on hydrologically-connected wetland systems appropriate. A precautionary 3 km cross-check may be applied. Both surface water and groundwater dependency relevant.	Irish breeding gadwall (small RB population, primarily at a handful of lakes) are present year-round. Wintering birds predominantly immigrants from Iceland and UK (Wernham *et al.*, 2002). Population identity: MIXED; wintering flocks contain small number of Irish-bred birds (SAME POP. for breeding SPAs) and larger number of immigrants (DIFF. POP. for wintering SPAs). Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs.	DL (wintering); 3 km precautionary cross-check. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; wintering influx DIFF. POP.). All-season consideration for breeding SPAs.	• Legagneux, P. *et al.* (2009) Journal of Ornithology 150: 183–193 • Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Golden plover	*Pluvialis apricaria*	Wintering / Breeding	**RB**/WV: very small resident breeder on upland blanket bog; major winter influx from Iceland and UK (Sep–Apr). Year-round but numbers dominate in winter.	**Surf:** Y **GW:** N	Breeding season: CPF; SNH (2016) core range 3 km (maximum 11 km). Surface-water dependency (upland blanket bog, wet heath). Wintering season: CPF: makes regular roost-to-feed flights from wetland/grassland roosts to foraging areas on agricultural land; movements of up to 12 km documented (Gillings & Fuller, 1999). A distance of 12 km is applied for wintering screening. Hydrological (surface water) assessment required for breeding season.	Irish breeding golden plover (very small RB population; few tens of pairs) are present year-round on upland sites. Wintering birds are overwhelmingly Icelandic and UK origin (Wernham *et al.*, 2002; BTO ringing recoveries). Population identity: MIXED; wintering flocks on Irish SPAs contain a very small proportion of Irish-bred birds and a dominant immigrant population. Out-of-season: Irish-bred birds (SAME POP. for breeding SPAs) present year-round on upland sites: all-season consideration appropriate for upland breeding SPAs. Wintering influx (DIFF. POP.) not relevant to Irish breeding SPA population.	CPF (breeding): 3 km. CPF (wintering): 12 km. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round on upland sites; winter influx largely DIFF. POP.). All-season consideration for upland breeding SPAs.	• Gillings, S. & Fuller, R.J. (1999) Winter Ecology of Golden Plovers and Lapwings: A Review. BTO Research Report No. 224. BTO, Thetford • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Great black-backed gull	*Larus marinus*	Wintering	**RB**/WV: resident breeder on rocky coasts and islands; winter influx from Iceland and N. Europe. Year-round in coastal areas.	**Surf:** N **GW:** N	Not a CPF in winter; wide-ranging across coastal, marine and inland areas. DL assessment appropriate for wintering season (NatureScot GN4, 2023). Breeding season: great black-backed gull is a CPF during breeding. GPS tracking studies confirm that individuals regularly forage over terrestrial habitats including agricultural land, landfill and coastal grassland during the breeding season (Good, 2017), establishing that a plausible terrestrial impact pathway exists	Irish breeding great black-backed gulls (RB) present year-round. Wintering birds include immigrants from Iceland and N. Europe (Wernham *et al.*, 2002). Population identity: MIXED. Irish-bred birds SAME POP. year-round: all-season consideration appropriate for breeding SPAs. Wintering influx includes DIFF. POP. birds but proportion varies by site. Precautionary principle applies.	DL (breeding: terrestrial projects; note terrestrial foraging pathway confirmed by GPS tracking; assess whether project area contains suitable terrestrial foraging habitat within realistic range of colony). DL marine/coastal (breeding). DL (wintering; all contexts). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round). All-season consideration for breeding SPAs.	• Good, T.P. (2017) Foraging behaviour of the Great Black-backed Gull (Larus marinus): GPS telemetry reveals individual differences in habitat use. [Grey literature / preprint: treat as supporting evidence for terrestrial foraging confirmation; weight alongside published herring gull analogy data] • Thaxter, C.B. *et al.* (2022) Breeding and foraging habitat are important in determining foraging ranges of sympatric generalist species. BTO, Thetford. Available via www.bto.org • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 4. NatureScot, Inverness

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					for projects near coastal breeding colonies. However, no published study provides a reliable species-specific mean-maximum terrestrial foraging distance for this species in an Irish or UK context. A fixed distance is therefore not applied. For terrestrial projects near breeding SPAs, a DL assessment is appropriate: the author should evaluate whether the project area contains or borders habitats known to be used by great black-backed gulls for terrestrial foraging (agricultural land, landfill, open coastal grassland) and whether the project falls within a realistic foraging envelope of the colony given site-specific context. No hydrological or hydrogeological dependency.			• OPRED (2024) Information and resources: great black-backed gull. Offshore Petroleum Regulator for Environment and Decommissioning, UK • NPWS North-west Irish Sea SPA (004236) • NPWS (2024) SPA datasheets. NPWS, Dublin
Great cormorant	*Phalacrocorax carbo*	Breeding / Wintering	**RB**/WV: resident breeder (inland and coastal). Winter influx of sinensis subspecies from continental Europe. Year-round.	**Surf: Y** **GW: Y**	Breeding season: CPF; core foraging range 25.6 km (Woodward *et al*., 2019). IMPORTANT DISTINCTION: for terrestrial projects near INLAND breeding colony SPAs (e.g. lake or river colonies), 25.6 km applies as a screening distance over both water and terrestrial habitats in the vicinity of foraging waterbodies. For terrestrial projects near COASTAL breeding colony SPAs, the marine/coastal context caveat applies and a terrestrial project at distance from the coast may have no plausible pathway: this should be evaluated case by case. Wintering season: not CPF; ranges widely across inland and coastal waterbodies (Van Eerden *et al*., 2011); DL appropriate (NatureScot GN4, 2023). Hydrological assessment required for inland populations (lake, river and reservoir connectivity).	Two subspecies relevant: carbo (breeding on Irish coasts and inland; RB year-round) and sinensis (continental; major winter influx). Irish-bred carbo birds are resident year-round. Wintering birds include major influx of sinensis from NW European colonies (Van Eerden *et al*., 2011). Population identity: MIXED; Irish-bred carbo (SAME POP. for Irish breeding SPAs) present year-round; sinensis winter immigrants (DIFF. POP.). The two subspecies can be distinguished in the field. For wintering SPAs: must determine whether the designation refers specifically to carbo, sinensis or both.	CPF (breeding): 25.6 km (applies to terrestrial projects near inland colony SPAs; coastal colony SPAs require case-by-case pathway assessment). DL (wintering). Out-of-season: MIXED pop. (carbo SAME POP. year-round; sinensis DIFF. POP.). All-season consideration for inland breeding SPAs. Hydro assessment required for inland populations.	• Woodward, I. *et al*. (2019) BTO Research Report 724. BTO, Thetford • Van Eerden, M.R. *et al*. (2011) Distribution of Cormorants in Europe in January 2003. NSAC/BSAC Workshop, Lulea, Sweden • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Great crested grebe	*Podiceps cristatus*	Wintering	**RB**/WV: resident breeder on inland lakes; disperses to coastal bays and larger lakes in winter, with some UK influx. Year-round.	**Surf: Y** **GW: Y**	Not a CPF in winter; widely distributed across inland lakes and coastal bays (BirdWatch Ireland, 2024); DL assessment appropriate (NatureScot GN4, 2023). Hydrological and hydrogeological assessment required (freshwater and estuarine dependency).	Irish breeding great crested grebe (RB) present year-round; some dispersal to coasts in winter. Winter influx from UK (Wernham *et al*., 2002). Population identity: MIXED; wintering birds include Irish-bred birds (SAME POP. for breeding SPAs) and UK immigrants. Irish-bred birds may use estuaries in winter; all-season consideration appropriate for breeding SPAs.	DL (wintering; via hydrological connections). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; some UK influx). All-season consideration for breeding SPAs.	• BirdWatch Ireland (2024) Species accounts: Great Crested Grebe. www.birdwatchireland.ie • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Great northern diver	*Gavia immer*	Wintering	**WV**: present Oct–Apr on coastal waters and larger	**Surf:** N **GW:** N	Exclusively marine and coastal in winter; not a CPF; DL appropriate (NatureScot GN4, 2023). For terrestrial inland projects no	Breeds in Iceland and North America; does not breed in Ireland (Cramp & Simmons, 1977). Population identity: DIFF. POP. from any Irish breeding	DL (wintering; marine/coastal only). N/A-T (terrestrial). Out-of-season:	• Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford

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			lakes. Absent May–Sep. Does not breed in Ireland.		pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	context. Birds present Oct–Nov (arrival) and Mar–Apr (departure) are SAME POP. as the wintering SPA population. Mortality during these months IS relevant. N/A May–Sep (species absent).	SAME POP. Oct–Nov and Mar–Apr. N/A May–Sep.	• NatureScot (2023) Guidance Note 4. NatureScot, Inverness • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Greater scaup	*Aythya marila*	Wintering	**WV**: present Oct–Mar on coastal bays and larger inland lakes. Absent Apr–Sep. Does not breed in Ireland.	**Surf:** Y **GW:** N	Diving duck; forages within the waterbody it occupies; movements between sites are variable and food-availability-driven rather than exhibiting predictable CPF (Cervencl & Fernandez, 2012). DL assessment appropriate.Scaup in Ireland are primarily coastal/estuarine and large lake birds; groundwater connectivity is not a meaningful pathway. Hydrological (surface water) assessment required for connectivity between coastal and inland waterbodies.	Breeds in Iceland, Scandinavia and northern Russia (Cramp & Simmons, 1977). Does not breed in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present Oct–Nov (arrival) and Mar (departure) are SAME POP. as the wintering SPA population; mortality during these months IS relevant. N/A Apr–Sep.	DL (wintering; coastal/estuarine/large lake systems). Out-of-season: SAME POP. Oct–Nov and Mar. N/A Apr–Sep.	• Cervencl, A. & Fernandez, S.A. (2012) Winter distribution of Greater Scaup (Aythya marila) in relation to available food resources. Journal of Sea Research 73: 41–48 • Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Greenland white-fronted goose	*Anser albifrons flavirostris*	Wintering	**WV**: arrives Oct/Nov; departs Mar/Apr. Absent May–Sep.	**Surf:** Y **GW:** Y	CPF in winter; SNH (2016) core foraging range 5–8 km. A distance of 8 km is applied as the more precautionary end of the core range. Irish Greenland white-fronted geese use raised bog, blanket bog, wet grassland and lake margins; hydrological and hydrogeological connectivity to these habitats is relevant.	Greenland white-fronted goose (flavirostris subspecies) is a discrete population breeding in W. Greenland and wintering almost exclusively in Ireland and western Scotland (Fox *et al*., 2014). Entirely distinct from European white-fronted goose (albifrons), which winters in the Netherlands and is effectively absent from Ireland. Population identity: SAME POP. for all Irish SPA designations: birds staging in Ireland in Oct–Nov and Mar–Apr are the same individuals counted at wintering SPA sites, confirmed by ringing data and high site fidelity (Fox *et al*., 2014). Out-of-season mortality during staging months IS directly relevant to wintering SPA populations. NOTE: the global population is in a continuing and serious long-term decline and is at historically low levels (WWT GSMP, 2024). High conservation sensitivity; precautionary principle must be applied rigorously.	CPF (wintering): 8 km. Out-of-season: SAME POP. Oct–Nov arrival and Mar–Apr departure; directly relevant. N/A May–Sep. High conservation sensitivity; population at historically low levels: apply precautionary principle rigorously.	• Fox, A.D., Francis, I.S. & Walsh, A. (2014) Report of the 2012/2013 international census of Greenland White-fronted Geese. Greenland White-fronted Goose Study Research Report No. 19. GWFGS, Slimbridge • WWT Goose & Swan Monitoring Programme (2024): Greenland White-fronted Goose census results. www.wwt.org.uk/our-work/projects/goose-and-swan-monitoring-programme • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • NPWS (2024) SPA datasheets. NPWS, Dublin
Greenshank	*Tringa nebularia*	Wintering	**WV**/PM: present Jul–May in small numbers on estuaries and coastal wetlands; peak passage Jul–Sep (southward) and Apr–May (northward). Does not breed in Ireland.	**Surf:** Y **GW:** N	Wintering greenshank in Ireland are predominantly estuarine; they maintain individual territories along estuarine channel margins and tidal creeks (Cayford, 1993) and do not make long overland commuting flights. Not strict CPF. DL assessment based on connected intertidal and freshwater-margin systems appropriate. A 20 km precautionary maximum may be applied where a fixed distance is required. Hydrological (surface	Breeding population is in Scotland and Scandinavia; no breeding population in Ireland (Wernham *et al*., 2002). IMPORTANT DISTINCTION: site-faithful wintering birds (showing strong inter-year fidelity to specific estuaries; Cayford, 1993) are SAME POP. as the wintering SPA population: mortality Sep–Mar IS relevant. However, the much larger passage population in Jul–Sep and Apr–May is predominantly DIFF. POP.; birds moving through from Scandinavian/Scottish breeding grounds to African wintering areas.	DL (wintering; intertidal/estuarine). 20 km precautionary maximum if fixed distance required. Out-of-season: SAME POP. site-faithful birds Sep–Mar. DIFF. POP. Jul–Sep and Apr–May passage birds (not relevant to Irish wintering SPAs).	• Cayford, J.T. (1993) Greenshank ecology in Scotland: habitat use, wintering site fidelity and foraging behaviour. Bird Study 40(3): 198–207 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin

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					water/tidal) assessment required; not groundwater-dependent.	For out-of-season assessment: distinguish between site-faithful wintering birds (SAME POP.; relevant Sep–Mar) and passage birds (DIFF. POP.; not relevant to Irish wintering SPAs but relevant to Scottish/Scandinavian breeding SPAs).		
Grey heron	*Ardea cinerea*	Breeding / Wintering	**RB**: present year-round. Resident breeder; some winter influx from UK and Iceland in severe winters.	**Surf:** Y **GW:** Y	CPF; makes regular flights from colony or roost to foraging sites along watercourses, lake margins and coastal areas. Mean regular movement distance 2.8 km (Manikowska-Slepowronska *et al*., 2024). A distance of 3 km is applied. Both surface water and groundwater dependency relevant (riparian and wetland species). NOTE: Irish SPAs for grey heron are designated for wintering populations; however breeding herons use the same territories year-round.	Resident breeder (RB) in Ireland; largely sedentary with limited migratory tendency (Wernham *et al*., 2002). Small influx of Icelandic and UK birds in severe winters. Population identity: SAME POP.; Irish-bred birds use the same wetland territories year-round; the SPA wintering population substantially overlaps with the breeding population. All-season consideration appropriate. Winter influx birds: MIXED; proportion of Irish-origin birds in any winter count is generally high.	CPF: 3 km (all seasons). Out-of-season: SAME POP. year-round (resident; highly sedentary). All-season consideration appropriate.	• Manikowska-Slepowronska, B. *et al*. (2024) Habitat selectivity during the annual life cycle of the Grey Heron Ardea cinerea revealed by GPS-tracking. Animal Biotelemetry 12: 7 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Grey plover	*Pluvialis squatarola*	Wintering	**WV**/PM: present Aug–Apr on intertidal mudflats and sandy shores. Absent May–Jul. Does not breed in Ireland.	**Surf:** N **GW:** N	Exclusively intertidal in Ireland; not a CPF making overland flights. DL assessment based on connected intertidal systems appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features. N/A-T for all non-coastal/inland projects.	Breeds in high-Arctic Russia and Canada (Cramp & Simmons, 1977). Does not breed in Ireland or UK. Population identity: DIFF. POP. from any Irish breeding context. Birds present Aug–Oct (southward passage) and Mar–Apr (northward passage) are SAME POP. as the wintering SPA population: ringing studies confirm strong site fidelity at wintering estuaries (Rehfisch *et al*., 2003). Out-of-season mortality during passage months IS relevant to wintering SPA populations. N/A May–Jul (species absent).	DL (wintering; intertidal/estuarine only). N/A-T (terrestrial/inland). Out-of-season: SAME POP. Aug–Oct and Mar–Apr passage. N/A May–Jul.	• Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford • Rehfisch, M.M. *et al.* (2003) Journal of Applied Ecology 40(5): 913–927 • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS South Dublin Bay SPA (004024) • NPWS (2024) SPA datasheets. NPWS, Dublin
Greylag goose	*Anser anser*	Wintering	**WV**/RB: feral/naturalised breeding population year-round at some sites; major winter influx of Icelandic birds (Oct–Mar). IMPORTANT: two functionally distinct populations present: see rationale.	**Surf:** Y **GW:** Y	CPF in winter; SNH (2016) core foraging range 15–20 km. A distance of 20 km is applied as the more precautionary end of the core range. Hydrological and hydrogeological connectivity to wetland roost habitats and foraging grasslands relevant.	IMPORTANT POPULATION COMPLEXITY: Two functionally distinct greylag populations must be distinguished. (1) Icelandic migratory birds (WV): these are the SCI population at Irish SPAs; birds staging Oct–Nov (arrival) and Mar–Apr (departure) are SAME POP. as the wintering SPA population (Icelandic origin; confirmed by ringing data and WWT GSMP). (2) Feral/naturalised birds (RB): present year-round at some sites; of uncertain genetic origin and NOT considered part of the wild Icelandic SCI population for conservation purposes. Mortality of feral year-round birds is NOT relevant to the Icelandic SCI population. Authors must identify which population is relevant to the specific SPA under consideration. (Note: I-WeBS annual reports and NPWS SPA datasheet narratives should be	CPF (wintering, Icelandic pop.): 20 km. Out-of-season: SAME POP. (Icelandic birds) Oct–Nov and Mar–Apr; relevant. Feral year-round birds are DIFF. POP. and not relevant to Icelandic SCI. VERIFY site-specific population composition with I-WeBS.	• SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • WWT Goose & Swan Monitoring Programme: Greylag Goose annual reports. www.wwt.org.uk • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • I-WeBS (most recent report; www.npws.ie) • NPWS (2024) SPA datasheets. NPWS, Dublin

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						consulted to determine the population composition at any specific greylag SPA before applying this assessment.)		
Hen harrier	*Circus cyaneus*	Breeding / Wintering	**RB**: present year-round; small and declining resident breeder. Winter influx of Scandinavian/UK birds.	**Surf:** N **GW:** N	Breeding season: CPF; SNH (2016) core range 2 km (maximum 10 km). A 2 km core screening distance is applied, with 10 km noted as the outer range for larger/better-quality breeding areas. Wintering season: nomadic; not a CPF; wide-ranging from communal roosts in diverse daily directions (Probst & Probst, 2025). DL assessment based on known/likely winter roost locations and suitable habitat (open moorland, coastal fringe, lowland farmland) appropriate. No hydrological or hydrogeological dependency. NOTE: the Irish hen harrier population is in severe decline. The 2022 National Survey (Ruddock *et al*., 2024; IWM147) recorded 85–106 breeding pairs, a 33% decline since 2015 and the lowest population size in 25 years. Five of the six breeding SPAs showed population declines of 20–80% since designation. Population extinction within 25 years has been identified as a realistic risk at current rates of decline (NPWS, 2024). Any project with potential to affect breeding or wintering hen harriers must apply the precautionary principle rigorously.	Irish breeding hen harrier (RB) present year-round, though some local movement. Winter influx of Scandinavian and UK birds (Wernham *et al*., 2002). Population identity: MIXED; wintering birds contain Irish-bred birds (SAME POP. for breeding SPAs) and continental/UK immigrants. Irish breeding population has declined severely (estimated ~150 breeding females; NPWS, 2015 survey;). Given population fragility, all-season consideration for breeding SPAs is warranted.	CPF (breeding): 2 km core; 10 km maximum. DL (wintering; based on roost locations and suitable habitat). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; continental/UK influx DIFF. POP.). All-season consideration for breeding SPAs given critically declining Irish population.	• SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • Ruddock, M., Wilson-Parr, R., Lusby, J., Connolly, F., Bailey, J. & O'Toole, L. (2024) The 2022 National Survey of breeding Hen Harrier in Ireland. Irish Wildlife Manual 147. National Parks and Wildlife Service, Dublin • Probst, R. & Probst, R. (2025) Winter Ecology of the Hen Harrier, Circus cyaneus. Animals 15(7): 1057 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NPWS (2024) SPA datasheets. NPWS, Dublin
Herring gull	*Larus argentatus*	Breeding / Wintering	**RB**/WV: resident breeder; significant winter influx from Iceland, UK and Scandinavia. Year-round in coastal areas.	**Surf:** N **GW:** N	Breeding season: CPF; Woodward *et al*. (2019) give mean-maximum 58.8 km (good confidence). This figure is derived from GPS-tracking studies of coastal and marine foraging trips and applies where a marine or coastal pathway exists. For terrestrial projects near coastal breeding SPAs: herring gull forages extensively over terrestrial habitats (farmland, landfill, urban areas) during the breeding season and a terrestrial impact pathway is plausible. Thaxter *et al*. (2022; BTO multi-colony study) give a mean terrestrial foraging range of 9.1 km (SD ±10.7 km; maximum 83.8 km) for herring gull during breeding. A precautionary terrestrial breeding screening distance of 20 km is therefore applied for projects with a terrestrial pathway to a coastal breeding SPA, reflecting the mean-maximum terrestrial range.	Irish breeding herring gulls (RB) present year-round. Wintering birds include major influx from Iceland, UK and Scandinavia (Wernham *et al*., 2002). Population identity: MIXED; Irish-bred birds (SAME POP. for breeding SPAs) present year-round; wintering influx (DIFF. POP.). All-season consideration appropriate for breeding SPAs.	CPF (breeding): 58.8 km (marine/coastal projects). 20 km (terrestrial projects near coastal breeding SPAs: based on Thaxter *et al*., 2022 terrestrial foraging range). DL (wintering). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round). All-season consideration for breeding SPAs (apply relevant distance for terrestrial or marine context).	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Thaxter, C.B., Ross-Smith, V.H., Clark, N.A., Conway, G.J., Rehfisch, M.M., Bouten, W. & Burton, N.H.K. (2022) Breeding and foraging habitat are important in determining foraging ranges of sympatric generalist species [Lesser Black-backed Gull and Herring Gull multi-colony GPS study]. BTO, Thetford. Available via www.bto.org • O'Hanlon, N.J. *et al*. (2022) Habitat Selection and Specialisation of Herring Gulls During the Non-breeding Season. Frontiers in Marine Science 9: 816881 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin

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					Wintering season: not CPF; wide-ranging across coastal, agricultural and urban areas (O'Hanlon *et al*., 2022); DL appropriate (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.			
Knot	*Calidris canutus*	Wintering	**WV**/PM: present Jul–May on intertidal mudflats; peak Jul–Sep (southward) and Apr–May (northward). Numbers highest Oct–Mar at estuarine SPAs.	**Surf:** N **GW:** N	Knot commute between roost and intertidal feeding areas but both sites are within the estuarine unit. Knot exhibit roost-to-feed commuting within estuaries but the effective assessment unit is the estuarine/intertidal system rather than overland flights to separate inland feeding areas. DL assessment based on intertidal connectivity is correct. Not dependent on freshwater or groundwater features. N/A-T for all non-coastal/intertidal projects.	Wintering birds in Ireland are the islandica subspecies (breeding NE Canada and N. Greenland) (Piersma *et al*., 2005; Wernham *et al*., 2002). Strong site fidelity to wintering estuaries documented (Rehfisch *et al*., 2003). Population identity: SAME POP.; birds present during southward passage (Jul–Sep) and northward passage (Apr–May) are the same islandica individuals as those in the wintering SPA population. Mortality during passage months IS directly relevant. N/A Jun (species effectively absent). NOTE: canutus subspecies (wintering in West Africa) does occur in very small numbers on passage in Ireland: authors should note this if canutus birds are recorded at survey, as they are DIFF. POP. from the wintering islandica SPA population.	DL (wintering; intertidal/estuarine only). N/A-T (terrestrial/inland). Out-of-season: SAME POP. (islandica) Jul–Sep and Apr–May passage. N/A Jun. Confirm subspecific identity (islandica vs. canutus) if relevant.	• Piersma, T. *et al*. (2005) Shorebirds and people. In: Lanctot, R.B. *et al*. (eds) Shorebirds. BirdLife International • Rehfisch, M.M. *et al*. (2003) Journal of Applied Ecology 40(5): 913–927 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS South Dublin Bay SPA (004024); NPWS North Bull Island SPA (004006) • NPWS (2024) SPA datasheets. NPWS, Dublin
Lapwing	*Vanellus vanellus*	Wintering	**RB**/WV: small and declining resident breeder; major winter influx from UK and continental Europe (Sep–Mar). Year-round but numbers dominate in winter.	**Surf:** Y **GW:** N	CPF in winter; movements of up to 12 km from roost documented (Gillings & Fuller, 1999). A distance of 12 km is applied. Hydrological (surface water) assessment required; lapwing use wet grassland and flooded pasture. No groundwater dependency.	Irish breeding lapwing (RB) present year-round but declining steeply (BirdWatch Ireland, 2024). Winter influx from UK and continental Europe (Wernham *et al*., 2002). Population identity: MIXED; wintering flocks contain Irish-bred birds (SAME POP. for breeding SPAs) and continental/UK immigrants. Irish breeding population is now very small and declining; any project affecting Irish-bred lapwing year-round has high potential significance to breeding SPAs. All-season consideration appropriate for breeding SPAs.	CPF (wintering): 12 km. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; winter influx DIFF. POP.). All-season consideration for breeding SPAs given declining Irish population.	• Gillings, S. & Fuller, R.J. (1999) Winter Ecology of Golden Plovers and Lapwings. BTO Research Report No. 224. BTO, Thetford • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • BirdWatch Ireland (2024) Species accounts: Lapwing. www.birdwatchireland.ie • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Leach's storm-petrel	*Oceanodroma leucorhoa*	Breeding	**SV**: breeds on remote NW islands (May–Oct); winters in open Atlantic. Very rarely seen from land.	**Surf:** N **GW:** N	CPF during breeding; entirely pelagic foraging trips. Mean-maximum: 245 km; maximum 700 km (Thaxter *et al*., 2012). CRITICAL: entirely pelagic forager: these distances apply ONLY to offshore marine projects. For any terrestrial or inland project, no functional pathway exists; record this in Table 3.1 without further assessment. No hydrological or hydrogeological dependency.	Winters in the open Atlantic; entirely absent from Irish terrestrial/coastal areas Oct–Apr. Irish colonies (principally Inishkea North; also St Kilda complex in adjacent waters) represent one of the largest European populations but are very difficult to survey. Population identity for non-breeding: irrelevant for land-based projects. For offshore Atlantic projects: precautionary principle applies. (Note: Leach's storm-petrel colonies in Ireland are very difficult to survey. The most recent comprehensive estimates are in NPWS IWM114 (2019); authors should check for any more recent colony-specific data.)	CPF (breeding): 245 km (offshore marine projects ONLY). N/A-T (any terrestrial or inland project: no pathway; record this in Table 3.1 at all seasons; no terrestrial foraging pathway exists). Out-of-season: irrelevant for land-based projects.	• Thaxter, C.B. *et al*. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate MPAs. Biological Conservation 156: 53–61 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • Woodward, I. *et al*. (2019) BTO Research Report 724. BTO, Thetford • NPWS (2024) SPA datasheets. NPWS, Dublin

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Lesser black-backed gull	*Larus fuscus*	Breeding / Wintering	**SV**/RB: primarily a summer visitor (Mar–Oct); increasing number of birds overwintering. Breeding population declining.	**Surf:** Y **GW:** N	Breeding season: CPF; Woodward *et al*. (2019) give mean-maximum 127 km. This figure derives from GPS-tracking of UK colonies making long offshore foraging trips over productive marine feeding areas: appropriate for marine/offshore contexts only. For terrestrial projects, Irish lesser black-backed gulls forage primarily over agricultural land, landfill and coastal habitats within a much shorter range: published Irish and UK land-based colony studies indicate the large majority of foraging occurs within 20–40 km of the colony (Thaxter *et al*., 2012; Shamoun-Baranes *et al*., 2011). A distance of 40 km is therefore applied for terrestrial projects as a proportionate and more ecologically defensible screening distance; 127 km applies only where a marine pathway is relevant. Wintering season: not CPF; wide-ranging; DL appropriate (NatureScot GN4, 2023). Hydrological assessment required for breeding season (use of wetland/agricultural mosaic near colonies).	Irish breeding birds (SV/RB) are largely migratory; most depart Aug–Oct for Iberia and West Africa, though an increasing proportion overwinters. Irish-bred birds (SAME POP. for breeding SPAs) present Mar–Oct at breeding colonies. Overwintering birds include Irish-bred individuals (SAME POP.) and immigrants from UK and Scandinavian colonies (DIFF. POP.) which cannot readily be distinguished in the field (Wernham *et al*., 2002). Out-of-season (Nov–Feb): small number of birds present; mixture; precautionary principle applies. (Note: BTO/BirdWatch Ireland ringing recovery data should be consulted to determine the most current composition of the Irish overwintering population before finalising any out-of-season assessment.)	CPF (breeding): 40 km terrestrial; 127 km marine/offshore. DL (wintering). Out-of-season: MIXED pop. Nov–Feb (Irish-bred SAME POP. cannot be excluded). Precautionary principle applies Nov–Feb.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Thaxter, C.B. *et al.* (2022) Breeding and foraging habitat are important in determining foraging ranges of sympatric generalist species. BTO, Thetford. Available via www.bto.org • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Light-bellied brent goose	*Branta bernicla hrota*	Wintering	**WV**: arrives Oct/Nov; departs Mar/Apr. Absent May–Sep.	**Surf:** Y **GW:** Y	CPF in winter; barnacle goose proxy from SNH (2016) gives core 15 km, consistent with Johnson *et al*. (2014) showing winter roost-feed flights of 5–15 km for geese. A distance of 15 km is applied. Brent geese in Ireland increasingly use coastal grassland and amenity grass in addition to intertidal Zostera beds; hydrological connectivity to coastal wetland and estuary roost habitats relevant. Both surface water and groundwater connectivity may apply at inland roost sites.	The hrota subspecies has two geographically distinct wintering populations: (1) Svalbard/Franz Josef Land population, wintering primarily in Ireland; and (2) Canadian Arctic population, wintering primarily in Iceland with small numbers reaching Ireland. Irish SPAs are designated almost exclusively for the Svalbard/Franz Josef Land population (Davidson & Evans, 1986; Clausen *et al*., 2018). Population identity: SAME POP.; birds staging at Irish sites in Oct–Nov and Mar–Apr are the Svalbard/FJL population individuals, confirmed by ringing and satellite tracking (Clausen *et al*., 2018). Out-of-season mortality during staging months IS directly relevant to Irish wintering SPA populations. N/A May–Sep. (Note: WWT GSMP annual reports should be checked for current hrota population size and trend data.)	CPF (wintering): 15 km. Out-of-season: SAME POP. (Svalbard/FJL population) Oct–Nov and Mar–Apr staging; relevant. N/A May–Sep.	• Clausen, K.K., Madsen, J., Cottaar, F., Kuijken, E. & Verscheure, C. (2018) Highly dynamic wintering strategies in migratory geese: Coping with environmental change. Global Change Biology 24(7): 3214–3225 • Davidson, N.C. & Evans, P.R. (1986) Colonial Waterbirds 9(2): 176–188 • Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • WWT GSMP: Light-bellied Brent Goose annual reports. www.wwt.org.uk • NPWS (2024) SPA datasheets. NPWS, Dublin
Little grebe	*Tachybaptus ruficollis*	Wintering	**RB**/WV: resident breeder; some winter influx. Year-round on inland waters.	**Surf:** Y **GW:** Y	Not a CPF; makes short movements between nearby waterbodies but no predictable long-distance roost-to-feed commuting (BTO, 2023). DL assessment based on hydrologically-connected waterbodies appropriate. Both	Resident breeder (RB) in Ireland; largely sedentary year-round (Wernham *et al*., 2002). Small winter influx from UK possible. Population identity: SAME POP.; Irish-bred birds use the same waterbodies year-round; the SPA wintering population substantially overlaps with the	DL (wintering; via hydrological connections to SPA waterbody). Out-of-season: SAME POP. year-round (resident; highly sedentary). All-season consideration appropriate.	• BTO (2023) BirdFacts: Little Grebe Tachybaptus ruficollis. www.bto.org/learn/about-birds/birdfacts/little-grebe • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin

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					surface water and groundwater dependency relevant.	breeding population. All-season consideration appropriate.		
Little gull	*Hydrocoloeus minutus*	Wintering	**WV**/PM: present primarily on passage (Sep–Nov and Mar–Apr); small numbers may winter in Irish coastal waters. Does not breed in Ireland. NOTE: Latin name updated to Hydrocoloeus minutus following current IOC taxonomic treatment.	**Surf:** N **GW:** N	Fully pelagic in winter; not a CPF; DL appropriate (NatureScot GN4, 2023). For terrestrial and inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Breeds in northern and eastern Europe and Siberia; does not breed in Ireland (BTO BirdFacts). Small wintering population in Irish waters is of uncertain but likely largely NE European origin. Population identity: DIFF. POP. from any Irish breeding context. Passage birds in Sep–Nov and Mar–Apr are SAME POP. as the wintering SPA population; mortality during passage months IS relevant. N/A May–Aug (species absent or very scarce).	DL (wintering; marine/coastal only). N/A-T (terrestrial). Out-of-season: SAME POP. Sep–Nov and Mar–Apr passage. N/A May–Aug.	• IOC World Bird List v14.2 (2024): Hydrocoloeus minutus. www.worldbirdnames.org • BTO BirdFacts: Little Gull. www.bto.org • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Little tern	*Sternula albifrons*	Breeding	**SV**: arrives late Apr/May; departs Aug–Sep. Absent Oct–Apr. NOTE: genus reclassified from Sterna to Sternula.	**Surf:** N **GW:** N	CPF during breeding season; core range 3.5 km (Woodward *et al*., 2019; moderate confidence). IMPORTANT: little terns forage in shallow coastal, estuarine and occasionally freshwater environments; applies where a coastal/estuarine pathway exists. For terrestrial inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Trans-Saharan migrant wintering in West Africa (Wernham *et al*., 2002). Entirely absent Oct–Apr. Irish breeding population is now very small (estimated 100–200 pairs nationally; (Note: check current BirdWatch Ireland/NPWS tern survey data for most recent Irish little tern colony locations and sizes before applying this to a specific project.)). Population identity: N/A for non-breeding season (species absent). No out-of-season assessment required.	CPF (breeding): 3.5 km (coastal/estuarine only). N/A-T (terrestrial inland: no pathway; record this in Table 3.1). Species absent Oct–Apr. No out-of-season assessment required.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Mallard	*Anas platyrhynchos*	Wintering	**RB**/WV: common resident breeder year-round; significant winter influx from Iceland and UK.	**Surf:** Y **GW:** Y	CPF in winter; roost-to-feed movements typically 1–2 km (Legagneux *et al*., 2009; Davis & Afton, 2010), though longer flights are possible. A distance of 2 km is applied as a proportionate screening distance. Both surface water and groundwater dependency relevant (shallow wetland, river margin, flooded grassland).	Resident breeder (RB) in Ireland year-round. Major winter influx from Iceland and UK (Wernham *et al*., 2002). Population identity: MIXED; wintering flocks contain Irish-bred birds (SAME POP. for breeding SPAs) and immigrants. Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs.	CPF (wintering): 2 km. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; winter influx DIFF. POP.). All-season consideration for breeding SPAs.	• Davis, B.E. & Afton, A.D. (2010) Movement distances and habitat switching by female Mallards wintering in the Lower Mississippi Alluvial Valley. Waterbirds 33(3): 349–356 • Legagneux, P. *et al*. (2009) Journal of Ornithology 150: 183–193 • Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Manx shearwater	*Puffinus puffinus*	Breeding / Non-breeding	**SV**: breeds at island colonies Mar–Sep; winters in SW Atlantic (Brazil/Argentina). Absent Oct–Feb.	**Surf:** N **GW:** N	CPF during breeding season; extremely long-distance pelagic foraging. Mean-maximum: 1,346.8 km (Woodward *et al*., 2019; moderate confidence). CRITICAL: entirely pelagic forager: this distance applies ONLY to offshore marine projects (e.g. offshore wind in the Atlantic). For any terrestrial or inland project, no functional pathway exists; record this in Table 3.1 without further assessment. The 1,346.8 km figure MUST NOT be applied as a screening radius for terrestrial projects. Non-breeding: pelagic, wintering in SW Atlantic; DL (NatureScot GN4, 2023). No	Winters in South Atlantic (Brazil/Argentina); entirely absent from Ireland Oct–Feb (Wernham *et al*., 2002). Irish breeding population (principally Skellig Michael, Blasket Islands and other Atlantic island colonies) is one of the largest globally. Population identity for non-breeding: MIXED at the global scale: Irish-colony birds cannot be distinguished from other North Atlantic colony birds at South Atlantic wintering grounds without tracking devices. For offshore projects in Irish and adjacent Atlantic waters during the breeding season: precautionary principle applies; connectivity to Irish SPA colony populations cannot be	CPF (breeding): 1,346.8 km (offshore Atlantic projects ONLY: do NOT apply to terrestrial projects under any circumstances). N/A-T (any terrestrial or inland project: no pathway; record this in Table 3.1 at all seasons). Out-of-season: irrelevant for land-based projects.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
					hydrological or hydrogeological dependency.	excluded. (Note: Irish Manx shearwater colonies: principally the Blasket Islands, Kerry and Saltee Islands, Wexford: represent a significant proportion of the world population alongside UK colonies. Most of the world population breeds in Britain and Ireland (BirdWatch Ireland, 2024). Check NPWS IWM114 (2019) for the most recent comprehensive Irish population estimates.)		
Mediterranean gull	*Larus melanocephalus*	Wintering	**WV**: present Oct–Mar on coastal areas; small breeding colony recently established in Ireland. Numbers increasing. NOTE: authors should verify whether any Irish breeding colony SPAs have been designated, as breeding assessment requirements would then apply.	**Surf:** N **GW:** N	Not a CPF in winter; moves freely along coastlines; not pelagic. DL assessment along coastal systems appropriate (NatureScot GN4, 2023). No hydrological or hydrogeological dependency. NOTE: if Irish breeding colonies become SPA SCIs, breeding season CPF assessment will be required using Woodward *et al.* (2019) data.	Wintering birds in Ireland are predominantly from continental European breeding populations (Netherlands, Belgium, Black Sea area) (Wernham *et al.*, 2002; BirdWatch Ireland, 2024). Small Irish breeding population (if present) would be SAME POP. year-round, but currently no Irish SPA is designated for breeding Mediterranean gull. Wintering birds: overwhelmingly DIFF. POP. (continental origin). Out-of-season: currently N/A (wintering designation only; continental DIFF. POP.). VERIFY Irish breeding status and any new SPA designations for this species.	DL (wintering; coastal systems). Out-of-season: currently N/A (wintering designation only; continental DIFF. POP.). VERIFY Irish breeding status and any new SPA designations.	• Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • BirdWatch Ireland (2024) Species accounts: Mediterranean Gull. www.birdwatchireland.ie • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Merlin	*Falco columbarius*	Breeding / Wintering	**RB**/WV: small resident breeder; winter influx from Iceland and UK. Year-round.	**Surf:** N **GW:** N	Breeding season: CPF; SNH (2016) core range ≤5 km. A distance of 5 km is applied. Wintering season: nomadic; not a CPF; wide-ranging and unpredictable movements (Warkentin & Oliphant, 1990); DL assessment based on suitable wintering habitat (coastal fringe, open moorland, lowland farmland) appropriate. No hydrological or hydrogeological dependency.	Irish breeding merlins (RB) present year-round on upland breeding territories; some move to lower ground in winter. Winter influx of Icelandic and UK birds (Wernham *et al.*, 2002). Population identity: MIXED; wintering birds include Irish-bred birds (SAME POP. for breeding SPAs) and Icelandic/UK immigrants (DIFF. POP.). Given the small and declining Irish breeding population, all-season consideration appropriate for breeding SPAs.	CPF (breeding): 5 km. DL (wintering; habitat-based). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; Icelandic/UK influx DIFF. POP.). All-season consideration for breeding SPAs.	• SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • Warkentin, I.G. & Oliphant, L.W. (1990) Wintering range, habitat use, and site fidelity of urban Merlins in Saskatoon, Saskatchewan. The Condor 92(1): 132–138 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NPWS (2024) SPA datasheets. NPWS, Dublin
Northern fulmar	*Fulmarus glacialis*	Breeding / Non-breeding	**RB**: breeds on sea cliffs (Apr–Sep); non-breeding birds at sea year-round. Some colonial attendance outside breeding season.	**Surf:** N **GW:** N	Breeding season: CPF; pelagic foraging trips; mean-maximum 542.3 km (Woodward *et al.*, 2019; good confidence). CRITICAL: entirely pelagic: applies ONLY to offshore marine projects. For any terrestrial or inland project, no pathway exists; record this in Table 3.1. Non-breeding: pelagic; exclusively offshore; DL (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.	Resident breeder (RB) at Irish coastal cliff colonies; disperses at sea after breeding, mixing with birds from UK, Faroese and Icelandic colonies (Wernham *et al.*, 2002). Population identity: MIXED for birds at sea: cannot distinguish Irish-colony birds from other N. Atlantic colony birds without tracking data. For offshore/coastal projects near known breeding cliffs: precautionary principle applies year-round. N/A-T for all terrestrial projects.	CPF (breeding): 542.3 km (offshore marine projects ONLY). N/A-T (terrestrial: no pathway; record this in Table 3.1 at all seasons; fulmar forages exclusively at sea and has no functional interaction with any terrestrial project). Out-of-season: MIXED pop. at sea; precautionary for offshore projects only.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Northern gannet	*Morus bassanus*	Breeding	**SV**/RB: breeds at a small number of Irish colonies (Little Skellig, Bull Rock); non-breeding birds present	**Surf:** N **GW:** N	CPF during breeding season; mean-maximum core foraging range 315.2 km (Woodward *et al.*, 2019; highest confidence).	Irish gannet colonies (Little Skellig: one of the world's largest gannetries) are highly significant. Irish-bred birds winter at sea from Bay of Biscay to	CPF (breeding): 315.2 km (marine/offshore projects ONLY). N/A-T (terrestrial: no pathway; record this in Table 3.1 at all seasons; gannet is	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford

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			in Irish waters year-round but Irish-colony birds largely absent from colonies Oct–Mar.		CRITICAL: entirely marine forager: applies ONLY where a marine or offshore pathway exists. For terrestrial projects no functional pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	West Africa, mixing with birds from UK, Faroese and Icelandic colonies (Wernham *et al.*, 2002; Votier *et al.*, 2011). Population identity for non-breeding: MIXED; cannot distinguish Irish-colony birds from other N. Atlantic colony birds at sea without tracking data. For offshore projects in Irish and adjacent waters: precautionary principle applies; connectivity to Little Skellig SPA cannot be excluded. N/A-T for all terrestrial projects year-round.	an exclusively marine forager). Out-of-season: MIXED pop. at sea; precautionary for offshore Irish/adjacent waters projects only.	• Votier, S.C., Grecian, W.J., Patrick, S. & Newton, J. (2011) Inter-colony movements, at-sea behaviour and foraging in an immature seabird. Marine Biology 158: 355–362 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Northern pintail	*Anas acuta*	Wintering	**WV**: arrives Sep/Oct; departs Mar/Apr. Does not breed in Ireland. Absent May–Aug.	**Surf:** Y **GW:** Y	Dabbling duck; not a strict CPF in winter; inter-site movements driven by habitat availability and disturbance. Johnson *et al.* (2014) suggest dabbling duck flights up to 5 km. DL assessment based on connected estuarine, lake and wet grassland systems more appropriate than a fixed distance. A 5 km precautionary cross-check may be applied. Both surface water and groundwater dependency relevant.	Breeds in Iceland, Scandinavia and Russia (Wernham *et al.*, 2002). Does not breed in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present Sep–Oct (arrival) and Mar–Apr (departure) are SAME POP. as wintering SPA population; mortality during these months IS relevant. N/A May–Aug (species absent).	DL (wintering); 5 km precautionary cross-check. Out-of-season: SAME POP. Sep–Oct and Mar–Apr. N/A May–Aug.	• Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Northern shoveler	*Spatula clypeata*	Wintering	**WV**/RB: small resident breeder; major winter influx from Iceland and continental Europe (Sep–Mar). Year-round but numbers far higher in winter. NOTE: genus reclassified from Anas to Spatula.	**Surf:** Y **GW:** Y	Dabbling duck; filter-feeds in nutrient-rich shallow wetlands; not a strict CPF in winter. Johnson *et al.* (2014) suggest dabbling duck flights up to 5 km. DL assessment based on connected shallow wetland systems appropriate. A 5 km precautionary cross-check may be applied. Both surface water and groundwater dependency relevant.	Irish breeding shoveler (small RB population) present year-round. Winter influx from Iceland and continental Europe (Wernham *et al.*, 2002). Population identity: MIXED; wintering flocks contain Irish-bred birds (SAME POP. for breeding SPAs) and immigrants (DIFF. POP. for wintering SPAs). Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs.	DL (wintering); 5 km precautionary cross-check. Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; winter influx DIFF. POP.). All-season consideration for breeding SPAs.	• Johnson, W.P., Schmidt, P.M. & Taylor, D.P. (2014) Avian Conservation and Ecology 9(2):2 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • IOC World Bird List (current version): Spatula clypeata. www.worldbirdnames.org • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Oystercatcher	*Haematopus ostralegus*	Wintering	**RB**/WV: resident breeder; large winter influx from Iceland and UK. Year-round on coasts.	**Surf:** N **GW:** N	Not a CPF; forages and roosts within the intertidal zone of its estuarine unit (Morten *et al.*, 2022); highly sedentary within its estuary in winter. DL assessment based on intertidal connectivity appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features. N/A-T for all non-coastal/inland projects.	Irish breeding oystercatchers (RB) present year-round. Winter influx from Iceland and UK (Wernham *et al.*, 2002). Population identity: MIXED; wintering estuarine birds include Irish-bred individuals (SAME POP. for breeding SPAs) and immigrants. Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs.	DL (wintering; intertidal/estuarine only). N/A-T (terrestrial/inland). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; winter influx DIFF. POP.). All-season for breeding SPAs.	• Morten, J.M. *et al.* (2022) Variety in responses of wintering oystercatchers Haematopus ostralegus to near-collapse of their prey in the Exe Estuary, UK. Ecology and Evolution 12: e9526 • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Peregrine falcon	*Falco peregrinus*	Breeding / Wintering	**RB**: present year-round; sedentary resident breeder. Small winter influx of northern/tundra birds.	**Surf:** N **GW:** N	Breeding season: CPF; SNH (2016) core range 2 km (maximum 18 km). A distance of 2 km is applied as the core screening distance with 18 km noted as the outer range for high-quality territories. Wintering season: nomadic; not a CPF; wide-ranging (Gu *et al.*, 2021); DL assessment appropriate (NatureScot GN4,	Resident breeder (RB) in Ireland; largely sedentary year-round (Wernham *et al.*, 2002). Small influx of tundra peregrines from N. Europe/Arctic in winter. Population identity: SAME POP.; Irish-bred birds use the same breeding territories year-round; SPA breeding population overlaps substantially with year-round population. All-season consideration	CPF (breeding): 2 km core; 18 km maximum. DL (wintering). Out-of-season: SAME POP. year-round (resident; sedentary). All-season consideration for breeding SPAs.	• Gu, Z., Dixon, A., Zhan, X. *et al.* (2021) Falcon flyways. Nature Ecology & Evolution 6: 17–18 • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • NPWS (2024) SPA datasheets. NPWS, Dublin

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					2023). No hydrological or hydrogeological dependency.	appropriate for breeding SPAs. Winter influx tundra birds are DIFF. POP. and rarely relevant to Irish breeding SPAs.		
Purple sandpiper	*Calidris maritima*	Wintering	**WV**: present Oct–Apr on rocky shores and coastal structures. Absent May–Sep.	**Surf:** N **GW:** N	Highly sedentary; forages and roosts within a narrow band of rocky coastline; typically does not make significant overland movements (Nightingale *et al*., 2018). Not a CPF in any meaningful roost-to-feed commuting sense. DL assessment based on rocky coastal habitat connectivity appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features. N/A-T for all non-rocky-coastal projects.	Breeds in Scandinavia, Iceland and Arctic Canada; does not breed in Ireland (Cramp & Simmons, 1977). Strong site fidelity to wintering rocky shore territories (Nightingale *et al*., 2018). Population identity: DIFF. POP. from any Irish breeding context. Birds present in Oct (arrival) and Apr (departure) are SAME POP. as the wintering SPA population; mortality during these months IS relevant. N/A May–Sep (species absent).	DL (wintering; rocky coastline only). N/A-T (terrestrial/inland). Out-of-season: SAME POP. Oct and Apr. N/A May–Sep.	• Nightingale, J., Stevenson, D. & Rowsell, E. (2018) Activity budgets of a wintering population of Purple Sandpipers. Wader Study 125(2): 122–128 • Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Razorbill	*Alca torda*	Breeding	**RB**: breeds on sea cliffs Apr–Aug. Non-breeding birds offshore Oct–Mar.	**Surf:** N **GW:** N	CPF during breeding season; mean-maximum 88.7 km (73.8 km excluding outlier) from Woodward *et al*. (2019; highest confidence). IMPORTANT: applies only where a marine or coastal pathway exists. For terrestrial/inland projects no pathway; record this in Table 3.1. Non-breeding: pelagic; DL (NatureScot GN4, 2023). No hydrological or hydrogeological dependency.	Resident breeder (RB) at Irish cliff colonies; disperses to sea after breeding, mixing with UK, Faroese and Icelandic colony birds (Wernham *et al*., 2002). Population identity for non-breeding: MIXED; Irish-colony birds cannot be readily distinguished from other N. Atlantic colony birds at sea. For coastal/offshore projects: precautionary principle applies; connectivity to Irish SPA breeding colonies cannot be excluded. N/A-T for all terrestrial projects.	CPF (breeding): 88.7 km or 73.8 km adjusted (marine/coastal only). DL (non-breeding; pelagic). N/A-T (terrestrial: no pathway; record this in Table 3.1 at all seasons). Out-of-season: MIXED pop. (Irish colony birds + immigrants); precautionary for coastal/offshore projects; irrelevant for terrestrial projects.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Red-billed chough	*Pyrrhocorax pyrrhocorax*	Breeding	**RB**: present year-round on western and southern coasts and islands. Non-migratory.	**Surf:** N **GW:** N	CPF during breeding season; foraging strongly concentrated within ~1 km of nesting cliffs (Robertson *et al*., 1995; Reid *et al*., 2007). A 1 km core screening distance is applied. Post-breeding, chough form flocks and move more widely across coastal grassland and cliff habitats, but Irish SPAs are designated for the breeding population and the breeding season is the primary relevant season. No hydrological or hydrogeological dependency. NOTE: The 1 km breeding range figure is based on published chough foraging ecology studies; Reid *et al.* (2007) is the primary cited source for Irish chough ecology.	Non-migratory resident (RB) in Ireland; Irish birds show very high site fidelity year-round (Reid *et al*., 2007; BirdWatch Ireland, 2024). Population identity: SAME POP. year-round: birds using SPA coastal grassland and cliff habitats in winter are the same individuals as those breeding there. All-season consideration appropriate for breeding SPAs. No immigrant population. NOTE: Irish chough population is a discrete population of conservation concern; any mortality is potentially significant.	CPF (breeding): typically within 1 km (ecologically-derived estimate; Reid *et al*., 2007). Out-of-season: SAME POP. year-round (non-migratory resident). All-season consideration for breeding SPAs. High conservation sensitivity.	• Reid, J.M., Bignal, E.M., Bignal, S., McCracken, D.I. & Monaghan, P. (2007) Diagnosing the mechanisms of change in metapopulation structure: habitat, vital rates and dispersal in red-billed choughs. Journal of Animal Ecology 76: 327–338 • BirdWatch Ireland (2024) Species accounts: Chough. www.birdwatchireland.ie • NPWS Beara Peninsula SPA (004155) and other chough SPAs • NPWS Irish Wildlife Manual 151 (2024): National Chough Survey • NPWS (2024) SPA datasheets. NPWS, Dublin
Red-breasted merganser	*Mergus serrator*	Wintering	**RB**/WV: small resident breeder on inland lakes and rivers; major winter influx to coastal and estuarine waters. Year-round.	**Surf:** Y **GW:** N	Not a CPF in winter; moves along connected coastal, estuarine and riverine systems following fish prey availability (BirdLife, 2018); DL assessment appropriate (NatureScot GN4, 2023). Mergansers are coastal and estuarine in Ireland in winter;	Irish breeding mergansers (RB) present year-round; breeding on inland lakes and rivers (Wernham *et al*., 2002). Winter influx of birds from Iceland and N. Europe to coastal and estuarine habitats. Population identity: MIXED; wintering coastal birds include Irish-bred birds (SAME POP.	DL (wintering; coastal/estuarine/riverine connectivity). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; winter influx DIFF. POP.). All-season for breeding SPAs.	• BirdLife International (2018) Red-breasted Merganser Mergus serrator: Species Factsheet. https://datazone.birdlife.org • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness

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					groundwater is not a meaningful pathway. Hydrological (surface water) assessment required for estuarine and river connectivity.	for breeding SPAs) and immigrants. Irish-bred birds move to coastal areas in winter but return to inland breeding sites in spring. Out-of-season: Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs on inland lakes and rivers.		• NPWS (2024) SPA datasheets. NPWS, Dublin
Red-throated diver	*Gavia stellata*	Wintering	**WV**: present Oct–Apr on coastal and offshore waters. Very rare inland. Does not breed in Ireland.	**Surf:** N **GW:** N	Marine in winter; not a CPF; DL appropriate (NatureScot GN4, 2023). For terrestrial inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Breeds in Scotland, Scandinavia and Iceland; does not breed in Ireland. Population identity: DIFF. POP. from any Irish breeding context. Birds present Oct–Nov (arrival) and Mar–Apr (departure) are SAME POP. as the wintering SPA population. Mortality during these months IS relevant. N/A May–Sep (species absent).	DL (wintering; marine/coastal only). N/A-T (terrestrial). Out-of-season: SAME POP. Oct–Nov and Mar–Apr. N/A May–Sep.	• BirdWatch Ireland (2024) Species accounts: Red-throated Diver. www.birdwatchireland.ie • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Redshank	*Tringa totanus*	Wintering	**RB**/WV: resident breeder (small and declining); major winter influx from Iceland (~90% of wintering birds). Year-round; peak numbers Oct–Mar.	**Surf:** N **GW:** N	Intertidal and coastal in winter; not a CPF making long overland commuting flights; DL assessment based on intertidal/estuarine connectivity appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features in winter. N/A-T for all non-coastal/intertidal projects.	Irish breeding redshank (RB) are a small and declining population present year-round. Major winter influx from Iceland (~90% of wintering birds are of Icelandic origin; Wernham *et al.*, 2002; BTO ringing recoveries). Population identity: MIXED but predominantly DIFF. POP. for wintering SPAs. Irish-bred birds (SAME POP. for breeding SPAs) are present year-round; given the severe decline of Irish breeding redshanks, all-season consideration for breeding SPAs is warranted.	DL (wintering; intertidal/estuarine only). N/A-T (terrestrial/inland). Out-of-season: MIXED pop. (predominantly Icelandic DIFF. POP. in winter; Irish-bred SAME POP. year-round for breeding SPAs). All-season consideration for breeding SPAs.	• Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • BirdWatch Ireland (2024) Species accounts: Redshank. www.birdwatchireland.ie • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS South Dublin Bay SPA (004024); NPWS North Bull Island SPA (004006) • NPWS (2024) SPA datasheets. NPWS, Dublin
Ringed plover	*Charadrius hiaticula*	Wintering	**RB**/WV/PM: resident breeder (coastal, declining); large winter influx and passage populations from Greenland and Arctic Canada. Year-round. COMPLEX POPULATION STRUCTURE: see rationale.	**Surf:** N **GW:** N	Intertidal in winter; not a CPF making long overland flights; DL assessment based on intertidal connectivity appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features in winter. N/A-T for all non-coastal/intertidal projects.	COMPLEX POPULATION STRUCTURE: Three populations are present in Ireland at different times: (1) Irish/British breeding birds (tundrae subspecies; RB: SAME POP. for Irish breeding SPAs, year-round); (2) Greenlandic/Canadian birds (tundrae; WV/PM: winter and passage birds; DIFF. POP. from Irish breeding SPAs); (3) Arctic Canadian long-distance migrants (psammodromus subspecies; PM: passage only Jul–Sep and Apr–May; DIFF. POP.). For wintering SPAs: dominant wintering population is tundrae of mixed origin; Irish-bred fraction is small. For breeding SPAs: Irish-bred tundrae birds are SAME POP. year-round; all-season consideration appropriate given declining Irish breeding population. Authors must identify which subspecies/population the SPA designates.	DL (wintering; intertidal only). N/A-T (terrestrial/inland). Out-of-season: COMPLEX: Irish-bred tundrae SAME POP. year-round (breeding SPAs); Greenlandic wintering/passage birds DIFF. POP. (not relevant to Irish breeding SPAs). All-season for Irish breeding SPAs.	• Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • BirdWatch Ireland (2024) Species accounts: Ringed Plover. www.birdwatchireland.ie • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS South Dublin Bay SPA (004024) • NPWS (2024) SPA datasheets. NPWS, Dublin
Roseate tern	*Sterna dougallii*	Breeding	**SV**: arrives May; departs Aug–Sep. Absent Oct–Apr. Irish population	**Surf:** N **GW:** N	CPF during breeding season; core range 12.6 km (Woodward *et al.*, 2019; moderate confidence).	Trans-equatorial migrant wintering on West African coast, principally Ghana (Cabot & Nisbet, 2013). Entirely	CPF (breeding): 12.6 km (marine/coastal only). N/A-T (terrestrial inland: no pathway; record this in	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
			represents ~80–90% of the NW European population.		IMPORTANT: forages in coastal and offshore marine environments; applies where a marine or estuarine pathway exists. For terrestrial inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency. NOTE: the Irish roseate tern population (principally Rockabill Island SPA, and Tern Island, Wexford Harbour) represents approximately 80–90% (Rockabill Island alone supports approximately 1,600 breeding pairs: the largest colony in Europe; BirdWatch Ireland, 2024) of the NW European population; exceptionally high conservation sensitivity.	absent Oct–Apr. Because the Irish population constitutes the overwhelming majority of the NW European population, birds on southward migration (Aug–Sep) in Irish/UK waters are almost entirely SAME POP. as the SPA breeding population. Mortality of roseate terns in Aug–Sep in Irish/UK waters IS therefore directly and significantly relevant to the Irish SPA breeding population. Out-of-season (Aug–Sep): SAME POP.; mortality during southward migration is potentially of major significance given extremely small NW European population. N/A Oct–Apr.	Table 3.1). Out-of-season: SAME POP. Aug–Sep southward migration in Irish/UK waters is relevant for marine/coastal projects given the exceptionally high proportion of NW European population represented by Irish SPA colonies. N/A-T for terrestrial projects. EXTREMELY high conservation sensitivity.	• Cabot, D. & Nisbet, I. (2013) Terns. Collins New Naturalist Library No. 124. HarperCollins, London • NPWS Rockabill SPA (004014) • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin • BirdWatch Ireland (2024) Seabird surveys and monitoring: Roseate Tern. www.birdwatchireland.ie/our-work/surveys-research/research-monitoring/seabird-monitoring/
Sanderling	*Calidris alba*	Wintering	**WV**/PM: present Aug–May on sandy beaches; peak Oct–Mar. Absent Jun–Jul. Does not breed in Ireland.	**Surf:** N **GW:** N	Sandy beach specialist in winter; not a CPF making overland flights. DL assessment based on connected sandy coastal habitats appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features. N/A-T for all non-sandy-coastal projects.	Breeds in high-Arctic Canada and Greenland; does not breed in Ireland (Cramp & Simmons, 1977). Strong site fidelity to wintering beaches documented (Rehfisch *et al*., 2003). Population identity: DIFF. POP. from any Irish breeding context. Birds present Aug–Oct (southward passage) and Apr–May (northward passage) are SAME POP. as the wintering SPA population: ringing studies confirm inter-year fidelity to specific beaches. Out-of-season mortality during passage months IS relevant to wintering SPA populations. N/A Jun–Jul (species absent).	DL (wintering; sandy coastal habitats only). N/A-T (terrestrial/inland). Out-of-season: SAME POP. Aug–Oct and Apr–May passage. N/A Jun–Jul.	• Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford • Rehfisch, M.M. *et al.* (2003) Journal of Applied Ecology 40(5): 913–927 • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS South Dublin Bay SPA (004024); NPWS North Bull Island SPA (004006) • NPWS (2024) SPA datasheets. NPWS, Dublin
Sandwich tern	*Thalasseus sandvicensis*	Breeding	**SV**: arrives Mar/Apr; departs Aug–Oct. Absent Nov–Feb. NOTE: genus reclassified from Sterna to Thalasseus following current IOC/BOU/BirdLife taxonomic treatment.	**Surf:** N **GW:** N	CPF during breeding season; core range 34.3 km (Woodward *et al*., 2019; moderate confidence). IMPORTANT: forages in marine and estuarine environments; applies where a coastal/estuarine pathway exists. For terrestrial inland projects no pathway; record this in Table 3.1. No hydrological or hydrogeological dependency.	Trans-equatorial migrant wintering on West and South African coasts (Wernham *et al*., 2002). Entirely absent Nov–Feb. Irish Sandwich tern colonies (e.g. Tern Island Wexford, Lady's Island Lake, Rockabill) contribute birds to the southward passage. Birds on southward migration (Aug–Oct) include Irish-colony birds (SAME POP. as SPA breeding population). Out-of-season (Aug–Oct): SAME POP.; mortality during this period is potentially relevant to Irish SPA breeding populations. N/A Nov–Feb. (Note: check current BirdWatch Ireland/NPWS tern survey data for most recent Irish Sandwich tern colony locations and sizes before applying this to a specific project.)	CPF (breeding): 34.3 km (marine/coastal only). N/A-T (terrestrial inland: no pathway; record this in Table 3.1). Out-of-season: SAME POP. Aug–Oct southward migration in Irish/adjacent waters relevant for marine/coastal projects. N/A-T for terrestrial projects.	• Woodward, I. *et al.* (2019) BTO Research Report 724. BTO, Thetford • Wernham, C.V. *et al.* (eds) (2002) The Migration Atlas. T & A D Poyser, London • IOC World Bird List (current version): Thalasseus sandvicensis. www.worldbirdnames.org • NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Slavonian grebe	*Podiceps auritus*	Wintering	**WV**: present Oct–Apr on coastal bays and sheltered inlets. Absent May–Sep. Does not breed in Ireland.	**Surf:** N **GW:** N	Coastal/marine in winter; not a CPF; DL appropriate (NatureScot GN4, 2023). The species is exclusively coastal in Ireland in winter and is not dependent on freshwater or groundwater	Breeds in Iceland and Scandinavia; does not breed in Ireland (Cramp & Simmons, 1977). Strong site fidelity to wintering bays documented. Population identity: DIFF. POP. from any Irish breeding context. Birds	DL (wintering; coastal/marine only). N/A-T (terrestrial/inland). Out-of-season: SAME POP. Oct–Nov and Mar–Apr. N/A May–Sep.	• Cramp, S. & Simmons, K.E.L. (eds) (1977) Handbook of the Birds of Europe, the Middle East and North Africa, Vol. 1. Oxford University Press, Oxford • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
					features. N/A-T for all non-coastal/marine projects.	present Oct–Nov (arrival) and Mar–Apr (departure) are SAME POP. as the wintering SPA population; mortality during these months IS relevant. N/A May–Sep (species absent).		• NatureScot (2023) Guidance Note 3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Tufted duck	*Aythya fuligula*	Wintering	**RB**/WV: resident breeder on inland lakes; major winter influx from Iceland and N. Europe (Oct–Mar). Year-round.	**Surf:** Y **GW:** Y	Diving duck; forages within the waterbody it occupies; does not exhibit predictable CPF between separate roost and foraging sites. DL assessment based on hydrologically-connected lake and wetland systems appropriate (NatureScot GN4, 2023). Both surface water and groundwater dependency relevant (lake level, water quality).	Irish breeding tufted duck (RB) present year-round; winter influx from Iceland and N. Europe (Wernham *et al*., 2002). Population identity: MIXED; wintering birds contain Irish-bred birds (SAME POP. for breeding SPAs) and immigrants (DIFF. POP. for wintering SPAs). Irish-bred birds present year-round; all-season consideration appropriate for breeding SPAs.	DL (wintering; via hydrological connections to SPA waterbodies). Out-of-season: MIXED pop. (Irish breeders SAME POP. year-round; winter influx DIFF. POP.). All-season consideration for breeding SPAs.	• Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin
Turnstone	*Arenaria interpres*	Wintering	**WV**/PM: present Aug–May on rocky shores and coastal structures. Peak Oct–Mar. Does not breed in Ireland.	**Surf:** N **GW:** N	Rocky shore specialist; highly sedentary within wintering territory; not a CPF making overland flights. DL assessment based on rocky coastal habitat connectivity appropriate (NatureScot GN4, 2023). Not dependent on freshwater or groundwater features. N/A-T for all non-rocky-coastal projects. CORRECTION: previous version of this table contained a typographical error describing this as 'disturbance-led': corrected to 'distribution-led'.	Breeds in Greenland, Iceland and Scandinavia; does not breed in Ireland (Wernham *et al*., 2002). Strong site fidelity to wintering rocky shore territories (Rehfisch *et al*., 2003). Population identity: DIFF. POP. from any Irish breeding context. Birds present Aug–Oct (southward passage) and Apr–May (northward passage) are SAME POP. as the wintering SPA population. Out-of-season mortality during passage months IS relevant. N/A Jun–Jul (species absent or very rare).	DL (wintering; rocky coastline only). N/A-T (terrestrial/inland). Out-of-season: SAME POP. Aug–Oct and Apr–May passage. N/A Jun–Jul.	• Rehfisch, M.M. *et al.* (2003) Journal of Applied Ecology 40(5): 913–927 • Wernham, C.V. *et al*. (eds) (2002) The Migration Atlas. T & A D Poyser, London • SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS North Bull Island SPA (004006) • NPWS (2024) SPA datasheets. NPWS, Dublin
Whooper swan	*Cygnus cygnus*	Wintering	**WV**: arrives Oct/Nov; departs Mar/Apr. Absent May–Sep.	**Surf:** Y **GW:** Y	CPF in winter; SNH (2016) core range <5 km. A distance of 5 km is applied. Whooper swans in Ireland use wet grassland, callows, lakes and floodplains; hydrological and hydrogeological connectivity to these habitats relevant. NOTE: this species forms the basis for the proxy value used in the Bewick's swan entry above; the whooper proxy was assessed as under-precautionary for Bewick's (increased to 10 km) given published differences in foraging ecology and Irish wintering habitat use. BREEDING SEASON CAVEAT: Whooper swan very rarely attempts to breed in Ireland (a small number of isolated breeding records exist, principally in Donegal and Mayo; no current established breeding population and no Irish SPA is designated for breeding whooper swans). Where occasional breeding is suspected or confirmed near a project, a precautionary breeding season screening distance of 3 km from the nesting wetland is appropriate. This reflects published data	Icelandic population wintering in Ireland, confirmed by ringing data and stable isotope analysis (WWT GSMP annual reports). Strong site fidelity to traditional wintering sites (Rees *et al*., 1990). Population identity: SAME POP.; birds staging in Ireland in Oct–Nov (arrival) and Mar–Apr (departure) are the same Icelandic-breeding individuals as those counted at wintering SPA sites. Out-of-season mortality during staging months IS directly relevant to wintering SPA populations. N/A May–Sep (species absent).	CPF (wintering): 5 km. Out-of-season: SAME POP. Oct–Nov arrival and Mar–Apr departure staging; directly relevant. N/A May–Sep.	• SNH (2016) Assessing connectivity with SPAs. v3. NatureScot, Inverness • Rees, E.C., Beekman, J.H., Hilton, G.M. & Speelman, E.N. (1990) Wintering behaviour and habitat requirements of Whooper Swans Cygnus cygnus in Britain. Wildfowl 41: 48–64 • WWT Goose & Swan Monitoring Programme: Whooper Swan annual reports. www.wwt.org.uk • NatureScot (2023) Guidance Note 4. NatureScot, Inverness • NPWS (2024) SPA datasheets. NPWS, Dublin • Pennycuick, C.J., Einarsson, O., Bradbury, T.A.M. & Owen, M. (1996) Migrating Whooper Swans Cygnus cygnus: satellite data and simulations of flight behaviour. Journal of Avian Biology 27: 118–134

SCI (Common Name)	Latin Name	Season(s) of Relevance	Irish Seasonal Status	Hydrological Flags (Surf. water / Groundwater)	Foraging Mode & Pathway Rationale (with inline citations)	Out-of-Season Population Identity & Demographic Relevance to SPA	Pathway Conclusion & Distance / Mode	Full Sources & References
					showing breeding whooper swans forage predominantly within 1–3 km of the nest during incubation and early chick-rearing, constrained by territorial behaviour and nest attendance requirements (Rees *et al*., 1990; Pennycuick *et al*., 1996). Movements rarely exceed 5 km from the nesting wetland during the breeding season: considerably shorter than the wintering core range.			

Appendix D Figures

Appropriate Assessment Screening and Nature Impact Report

Meath County Development Plan **Proposed Variation No.6**

Variation No. 6

Meath County Council

SLR Project No.: 425.069056.00001

17 November 2026

Figure D-1 Site location

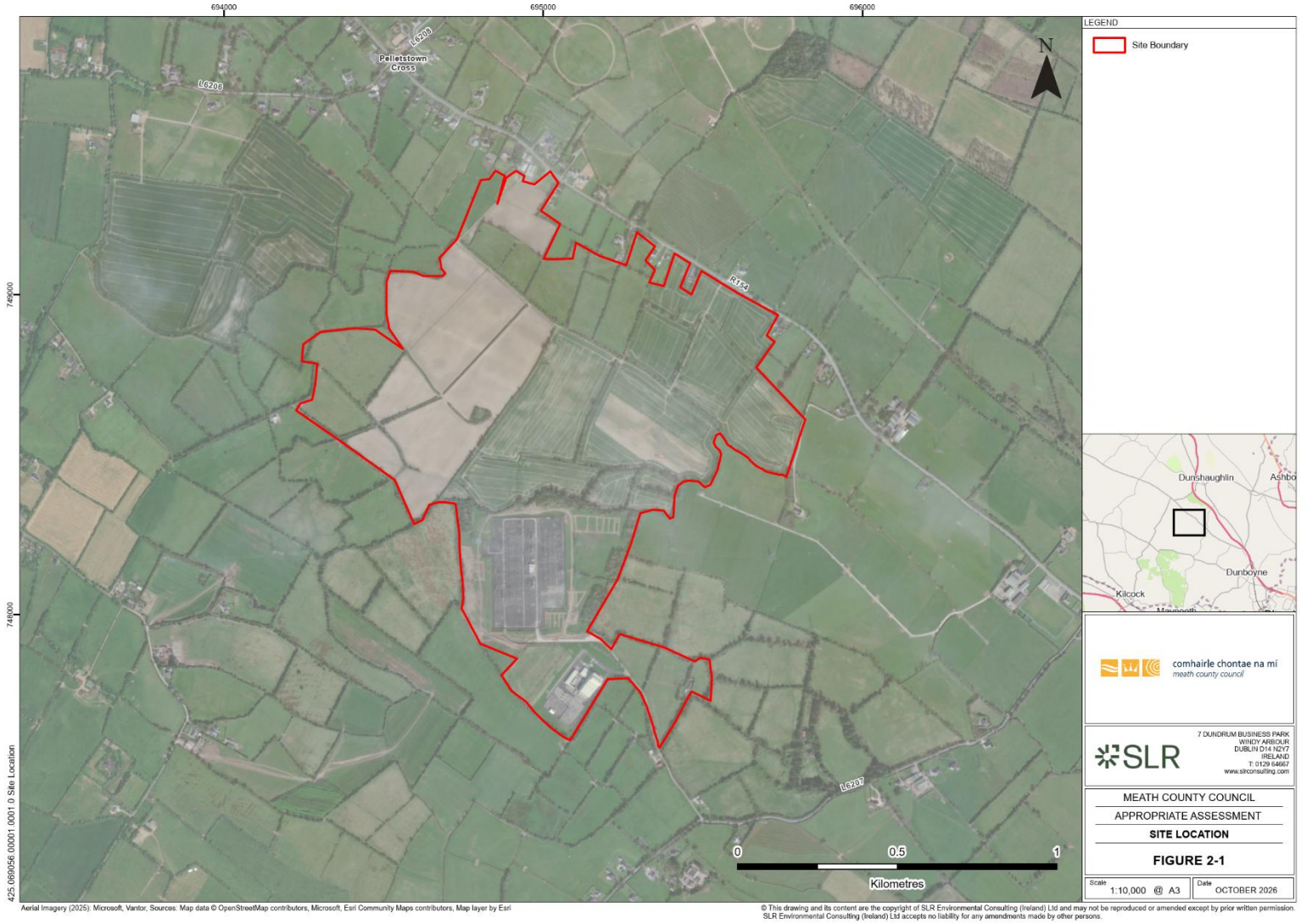


Figure D-2 Location of European Sites Considered for Source – Pathway – Receptor Links

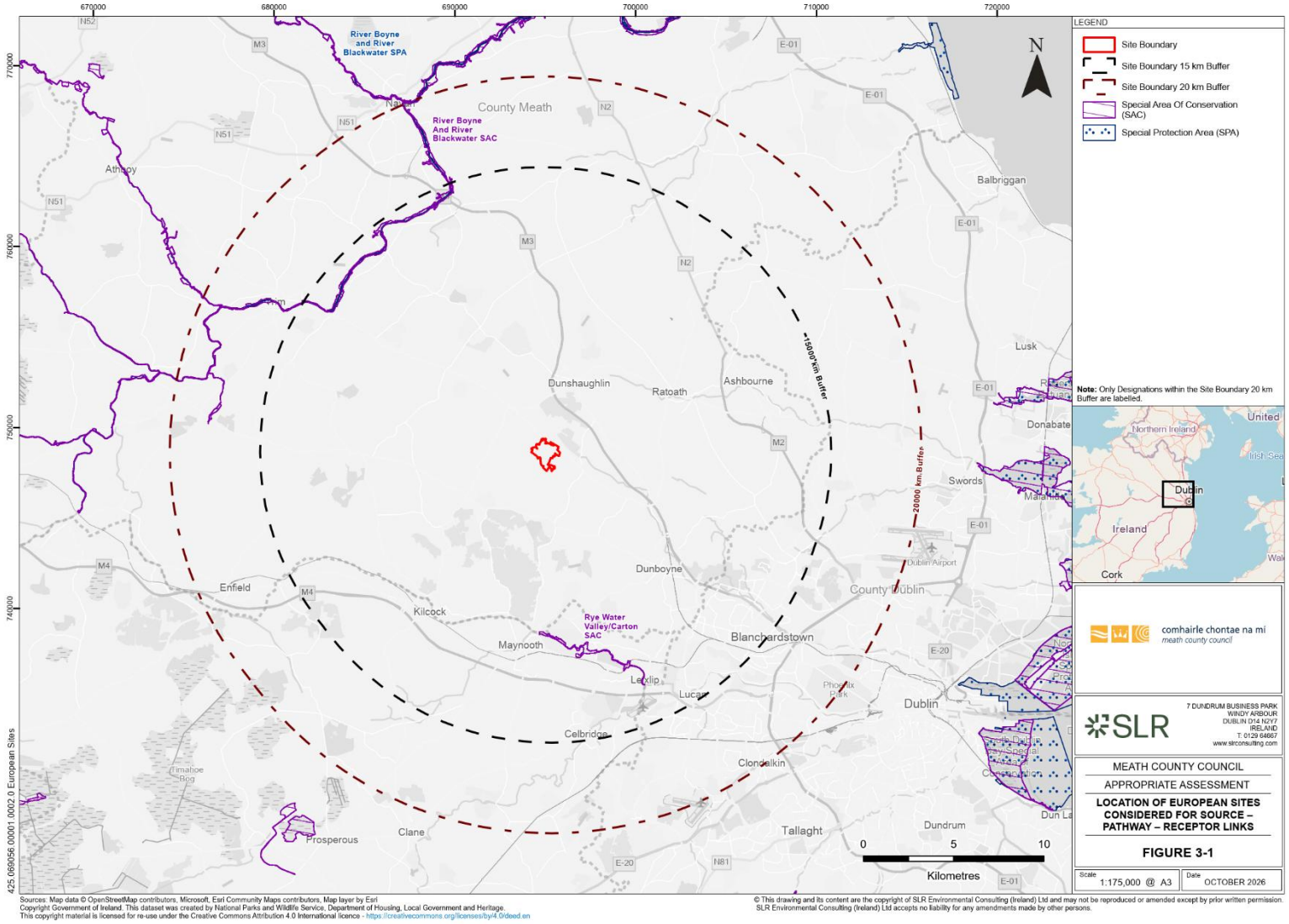
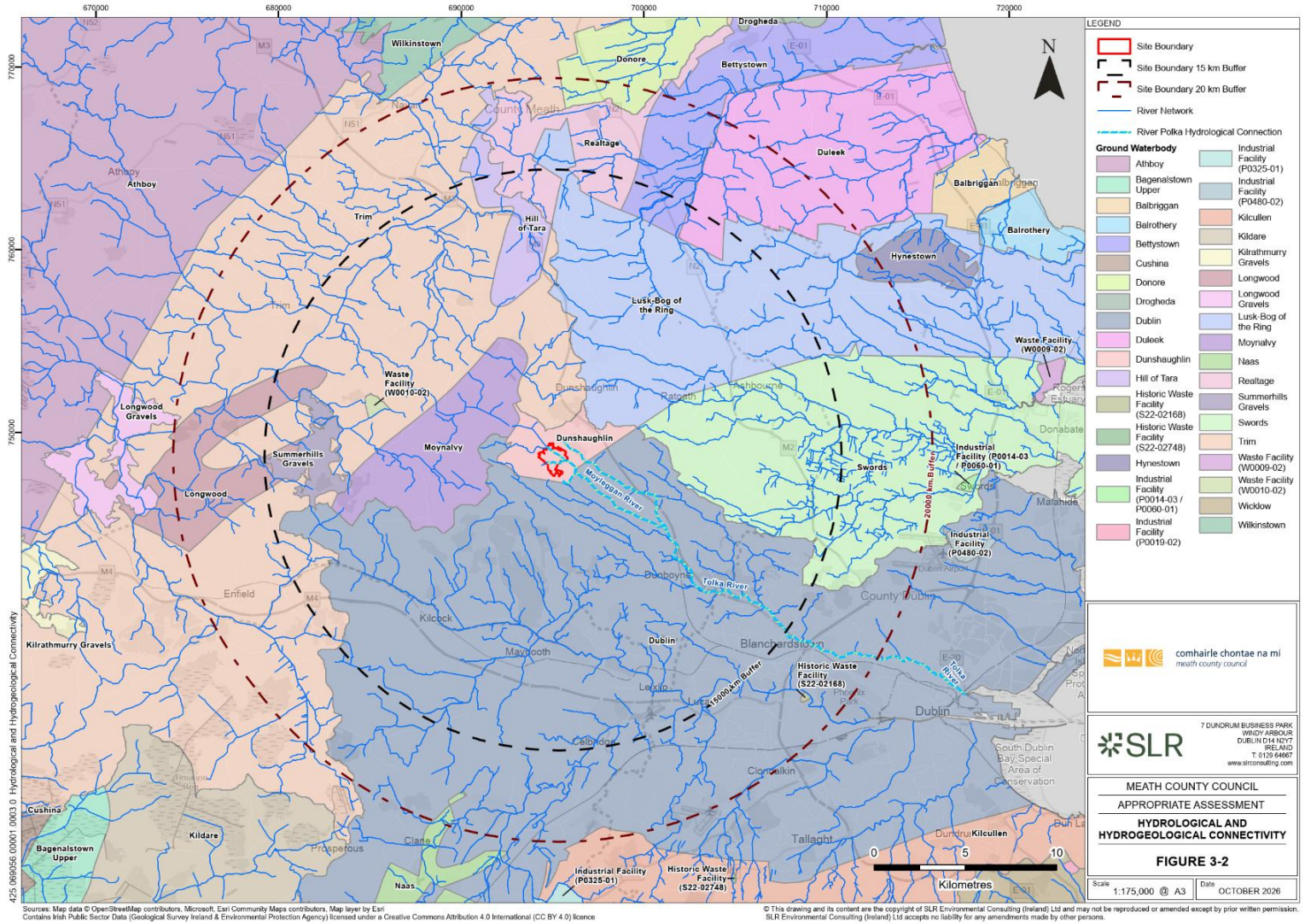


Figure D-3 Hydrological and Hydrogeological Connectivity Map



Appendix E In Combination Assessment of plans and projects

Appropriate Assessment Screening and Nature Impact Report

Meath County Development Plan **Proposed Variation No.6**

Variation No. 6

Meath County Council

SLR Project No.: 425.069056.00001

17 November 2026

E.1 In Combination Assessment of Plans

Table F-1 In-Combination Assessment of Plans

Plan	Are there potential impact pathways by which the Plan/Programme could act in combination with the Proposed Variation to adversely impact European sites?	Will the Plan/Programme act in combination with the Proposed Variation to adversely affect the integrity of European sites?
National Development Plan 2021-2030	The National Development Plan (NDP) is a strategic investment framework that supports the delivery of infrastructure, energy, transport and economic development projects throughout Ireland. While projects delivered under the NDP could potentially give rise to impact pathways such as habitat loss, disturbance, hydrological impacts and water quality effects, all projects must comply with statutory planning requirements and are subject to environmental assessment, including AA where required. In the Meath County Development Plan (MCDP) 2021-2030, objectives such as INF POL 45, HER OBJ 33, RUR DEV SO 9 and DM OBJ 76 require AA Screening and, where necessary, Appropriate Assessment of future development proposals.	No in combination impact. Any future projects facilitated by the NDP would be subject to the environmental safeguards, biodiversity protection measures and AA requirements contained within the MCDP 2021-2030. Consequently, no adverse effects on the integrity of European sites are anticipated.
National Energy and Climate Plan 2021-2030	The National Energy and Climate Plan promotes renewable energy development, electricity infrastructure and decarbonisation measures. Potential pathways could arise through future energy infrastructure projects; however, the MCDP contains extensive safeguards including INF POL 34, INF OBJ 39, INF POL 45 and INF POL 50, which require avoidance of impacts on biodiversity, water quality and Natura 2000 sites and require AA of energy-related proposals.	No in combination impact. While renewable energy infrastructure could have environmental effects if poorly managed, all future development facilitated by the Proposed Variation would be subject to the biodiversity, water quality and AA safeguards contained within the MCDP. No adverse effects on European site integrity are predicted.
Project Ireland 2040 - National Planning Framework	The National Planning Framework provides a strategic framework for national growth and infrastructure delivery. Potential impact pathways could arise through the implementation of lower-tier plans and projects, including habitat loss, disturbance, hydrological impacts and water quality impacts. However, development supported by the NPF must comply with lower-tier plans and statutory assessment processes. The MCDP includes robust mitigation measures relating	No in combination impact. The protective policies and objectives of the MCDP ensure that future development proposals arising from the NPF are assessed and managed to prevent adverse effects on European sites.

Plan	Are there potential impact pathways by which the Plan/Programme could act in combination with the Proposed Variation to adversely impact European sites?	Will the Plan/Programme act in combination with the Proposed Variation to adversely affect the integrity of European sites?
	to biodiversity protection, green infrastructure, water quality protection and Appropriate Assessment.	
Climate Action Plan 2025	The Climate Action Plan supports renewable energy, transport and climate adaptation measures. While implementation could facilitate projects with potential environmental pathways, all projects remain subject to planning consent and environmental assessment. Policies including INF POL 45, HER POL 31, HER OBJ 33 and DM OBJ 76 ensure ecological assessment and protection of Natura 2000 sites.	No in combination impact. The climate adaptation and decarbonisation objectives of the plan are considered compatible with the protection of European sites due to the safeguards contained within the MCDP and the requirement for AA of future projects.
National Biodiversity Action Plan 2023-2030	The National Biodiversity Action Plan seeks to halt biodiversity loss and restore ecosystems through a range of strategic actions. The plan supports enhanced protection and restoration of habitats and species and therefore contributes positively to the conservation objectives of European sites. No adverse impact pathways have been identified.	No in combination impact. As the National Biodiversity Action Plan seeks to protect and enhance biodiversity, no likely significant in combination effects are predicted.
National Air Pollution Control Programme	The programme seeks to reduce air pollution and improve environmental quality. It does not contain land-use proposals or spatially specific development measures that could generate pathways for impacts on European sites. The plan is expected to contribute positively to environmental protection.	No in combination impact. The programme contributes towards improved environmental quality and does not present any mechanism by which adverse effects on European site integrity could occur.
National Water Resources Plan - Framework Plan	The National Water Resources Plan aims to provide sustainable water supply infrastructure. Potential hydrological and water quality pathways could arise from water infrastructure projects; however, these projects are subject to statutory environmental assessment. The MCDP contains robust water protection measures including INF POL 14, INF POL 31, INF OBJ 29, INF OBJ 38, INF OBJ 26 and HER POL 48.	No in combination impact. Future water services projects will be subject to project-level AA and the water quality safeguards contained within the MCDP. No adverse effects on European site integrity are anticipated.
Eastern and Midland Regional	The RSES provides a strategic framework for regional growth and infrastructure. Potential pathways could include habitat loss, disturbance, fragmentation and water quality effects arising from	No in combination impact. The biodiversity, water quality and AA safeguards contained within the MCDP ensure that development arising from the

Plan	Are there potential impact pathways by which the Plan/Programme could act in combination with the Proposed Variation to adversely impact European sites?	Will the Plan/Programme act in combination with the Proposed Variation to adversely affect the integrity of European sites?
Spatial and Economic Strategy (RSES) 2019-2031	future development. However, implementation occurs through lower-tier plans and projects that are subject to AA and environmental assessment.	RSES will not adversely affect the integrity of European sites.
River Basin Management Plan for Ireland 2022-2027	The River Basin Management Plan seeks to improve water quality, restore water bodies and prevent deterioration in ecological status. The objectives of the Plan support the protection of aquatic habitats and species and therefore benefit European sites connected via hydrological pathways.	No in combination impact. The Plan contributes positively to water quality and ecological condition and therefore does not present a pathway for adverse effects on European sites.
Meath Heritage Plan	The Heritage Plan promotes protection, conservation and enhancement of the county's natural and cultural heritage. Its implementation is expected to have positive effects on biodiversity and ecological resources. No adverse pathways have been identified.	No in combination impact. The Plan supports environmental protection and therefore will not act in combination with the Proposed Variation to adversely affect European sites.
Meath Biodiversity Action Plan	The Biodiversity Action Plan provides a framework for biodiversity conservation, habitat enhancement and public awareness. The objectives of the plan are aligned with the protection and enhancement of ecological resources and European sites.	No in combination impact. As the Plan seeks to conserve and enhance biodiversity, no likely significant in combination effects are predicted.

E.2 In Combination Assessment of Projects

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
23136	This application seeks permission for amendments to a previously approved battery energy storage facility and synchronous condenser development at Creemore and Belshamstown, Batterstown. The proposed changes include revisions to the internal access road network, attenuation pond, drainage and ducting infrastructure, removal of a permitted earthen berm, and associated landscaping, level changes and excavation works, while retaining the approved access to the R154.	Yes. Large infrastructure project with construction-phase drainage works and earthworks which could contribute cumulatively to hydrological impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. As identified in Section 3.5.2, the battery energy storage and synchronous condenser developments involve extensive earthworks, excavation and installation of surface water drainage infrastructure which have the potential to contribute to deterioration in water quality within receiving waters and increased pollutant loading to downstream European sites.	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.
22837	The development comprises a large-scale battery energy storage facility and	Yes. Significant infrastructure project with substantial site works and drainage infrastructure which could contribute	Potential for in combination likely significant effects cannot be excluded due to hydrological and air quality pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	synchronous condenser on agricultural land, including battery storage containers, a synchronous condenser building, control building, transformers, underground cabling, wastewater treatment infrastructure, SuDS measures, attenuation ponds, internal roads, lighting, CCTV, landscaping and ancillary infrastructure, with connections to a proposed adjoining 220 kV substation.	cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites, as well as nitrogen deposition affecting air pollution-sensitive habitats within European sites. Section 3.5.2 identifies this development as having the potential to contribute cumulatively to hydrological effects through earthworks, excavation and drainage infrastructure, and to air quality effects through increased NOx emissions and associated nitrogen deposition.	
221550	This proposal involves the expansion and upgrading of the existing Woodland 400 kV substation through the installation of additional air-insulated switchgear, busbar extensions, lightning masts, electrical apparatus, underground cable	Yes. Major utility infrastructure project with substantial ground disturbance and drainage works which could contribute cumulatively to hydrological impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	connections and a control building extension, together with associated site clearance, drainage, access tracks, fencing, landscaping and construction compounds.	hydrologically connected to downstream European sites. Section 4.1 identifies the Woodland 400 kV Substation expansion as involving extensive earthworks, excavation and drainage infrastructure which could contribute cumulatively to hydrological effects.	
2561001	This application proposes modifications to a previously permitted Large-Scale Residential Development, including a realigned link road, a new bridge over the River Tolka, a pumping station and access road, together with associated footpaths, cycleways, drainage infrastructure, lighting, landscaping and boundary treatments.	Yes. Direct interaction with the River Tolka corridor which could contribute cumulatively to hydrological impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies this project as involving excavation and drainage infrastructure within the River Tolka catchment which could contribute cumulatively to deterioration in downstream water quality.	Potential for in combination likely significant effects cannot be excluded due to the direct hydrological connection to the River Tolka.
2460063	The development comprises the construction of the	Yes. Major road project involving extensive earthworks and drainage within the	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	Eastern Distributor Road between Navan Road and Station Road, including a new railway bridge, cycle lanes, footpaths, signalised junctions, drainage infrastructure, public lighting, landscaping works, temporary construction compounds and associated ancillary infrastructure.	catchment which could contribute cumulatively to hydrological impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies the Eastern Distributor Road as having the potential to contribute cumulatively to sediment release, increased runoff and pollutant loading to receiving waters.	
2460045	This application provides for a glass recycling facility comprising a warehouse and production building, office accommodation, staff facilities, outdoor storage areas, HGV and staff parking, a weighbridge, wastewater treatment infrastructure and associated site works. The development requires a Waste Licence.	Yes. Industrial waste facility with a potential water quality pathway which could contribute cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites, as well as nitrogen deposition impacting pollution-sensitive habitats within European sites. Section 3.5.2 identifies the	Potential for in combination likely significant effects cannot be excluded due to hydrological and air quality pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
		development as having the potential to contribute cumulatively to hydrological effects.	
FW22A/0177	The proposal involves the expansion of an existing manufacturing facility through the construction of warehouse, laboratory, production and office extensions, the installation of additional chemical storage, expanded parking and access infrastructure, and associated plant and services. The development is accompanied by an EIAR and relates to a facility subject to Industrial Emissions Licensing and COMAH regulations.	Yes. Large industrial expansion with potential construction and operational emissions to the water environment which could contribute cumulatively to hydrological impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies the development as having the potential to contribute cumulatively to hydrological effects.	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.
FW22A/0319	The development consists of the construction of a 16,805 m² medical devices manufacturing facility	Yes. Large-scale industrial development with substantial construction and operational surface water requirements which could contribute cumulatively to	Potential for in combination likely significant effects cannot be excluded due to hydrological impacts.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	incorporating production areas, ancillary warehousing, a three-storey administration building, surface parking, cycle and motorcycle facilities and associated service infrastructure.	hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. . Section 3.5.2 identifies this project as having the potential to contribute cumulatively to hydrological impact.	
FW22A/0243	Alterations to existing development	No. Insufficient scale to contribute to cumulative effects. No hydrological or air quality pathway identified that could contribute to the impact pathways.	No potential for in combination likely significant effects identified.
FW23A/0264	The development consists of a substantial extension to an existing hotel, providing 112 additional bedrooms and associated guest facilities. The proposal also includes revised parking arrangements, enhanced pedestrian and cyclist access, EV charging	Yes. Commercial development with increased impermeable area and drainage requirements which could contribute cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites.	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	infrastructure, landscaping, drainage works, green and blue roofs and ancillary site development works.	Consistent with Section 3.5.2, commercial development within the catchment has the potential to contribute cumulatively to increased surface water runoff and pollutant loading to receiving waters.	
ACP: 309318	This Strategic Housing Development consists of 169 apartments, a crèche and associated site works including access, services, open space and landscaping.	Yes. Large residential development contributing cumulative urbanisation pressures which could contribute cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies residential developments within the catchment as having the potential to contribute cumulatively to increased surface water runoff and pollutant loading to receiving waters.	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.
ACP: 307656	This Strategic Housing Development consists of 725 apartments, a crèche and	Yes. Large residential development contributing cumulative urbanisation pressures which could contribute	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	associated infrastructure including access roads, landscaping, drainage, public open space and ancillary site works.	cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies residential developments within the catchment as having the potential to contribute cumulatively to increased surface water runoff and pollutant loading to receiving waters.	
ACP: 306167	The proposed Strategic Housing Development comprises 435 apartments together with associated roads, services, public open space, landscaping and supporting infrastructure.	Yes. Large residential development contributing cumulative urbanisation pressures which could contribute cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies residential developments within the catchment as	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
		having the potential to contribute cumulatively to increased surface water runoff and pollutant loading to receiving waters.	
4705/23	This application seeks permission for the change of use of an existing industrial unit to a waste recovery, storage and transfer facility for non-hazardous commercial, industrial and household waste, including a weighbridge and associated site services.	Yes. Waste-related development with a potential water quality pathway which could contribute cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Industrial developments within the catchment have the potential to contribute cumulatively to pollutant loading in receiving waters.	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.
4828/22	The proposal comprises alterations to existing industrial units, including demolition and reconfiguration of office accommodation, installation of a mezzanine floor, staff	No. No pathway for cumulative effects was identified.	No potential for in combination likely significant effects identified.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	welfare facilities, modifications to entrances and the provision of new external signage.		
ACP: 310860	The development comprises a Strategic Housing Development consisting of 1,614 build-to-rent apartments and associated site infrastructure, landscaping, access arrangements and communal facilities.	Yes. Large residential development contributing cumulative urbanisation pressures which could contribute cumulatively to hydrological and air quality impacts to European sites described in Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies residential developments within the catchment as having the potential to contribute cumulatively to increased surface water runoff and pollutant loading to receiving waters.	Potential for in combination likely significant effects cannot be excluded due to hydrological pathways.
ACP: 308905	The development involves the demolition of an existing vacant motor vehicle showroom and adjacent buildings and the	Yes. Large residential development contributing cumulative urbanisation pressures which could contribute cumulatively to hydrological and air quality impacts to European sites described in	Potential for in combination likely significant effects cannot be excluded due to shared hydrological pathways.

Application Reference	Project Description	Potential for in combination effect	Conclusion regarding in combination effect Will the project act in combination with Variation No. 6 to adversely affect the integrity of European sites?
	construction of 101 apartments, together with associated access arrangements, landscaping and supporting site infrastructure.	Section 4.1, including deterioration in water quality, increased surface water runoff, and pollutant loading within receiving waters hydrologically connected to downstream European sites. Section 3.5.2 identifies residential developments within the catchment as having the potential to contribute cumulatively to increased surface water runoff and pollutant loading to receiving waters.	
3265/23	This development comprises the conversion of six permitted office units to 18 residential apartments, including private balconies, associated elevation alterations, bicycle storage facilities and ancillary works.	No. Limited scale redevelopment with no identified pathways.	No potential for in combination likely significant effects identified.

Appendix F Plan Level Environmental Protection Policies and Objectives

Meath County Development Plan Proposed Variation No. 6

Meath County Council

SLR Project No.: 425.069056.00001

17 November 2026

F.1 Plan Level Environmental Protection Policies and Objectives relevant to zoning changes proposed by Variation No. 6

Chapter	Policy/Objectives Ref.	Key Provision	Relevance to AA Screening
Chapter 6: Infrastructure Strategy	INF POL 34, INF OBJ 39	Support renewable energy development only where biodiversity, water quality, landscape and environmental receptors are not adversely affected.	Ensures renewable energy proposals avoid significant environmental impacts.
	INF POL 45	Requires AA Screening and, where necessary, Stage 2 AA for plans and projects associated with energy generation and supply networks.	Ensures AA screenings are required for future energy infrastructure.
	INF POL 50	Avoids overhead energy infrastructure within Natura 2000 sites unless AA demonstrates no adverse effect on site integrity.	Protects European sites from direct effects.
	INF POL 14, INF POL 31, INF OBJ 29	Protect and improve surface water and groundwater quality through implementation of the Water Framework Directive and River Basin Management Plans.	Reduces risks of downstream effects on European sites through water quality pathways.
	INF OBJ 38	Requires riparian buffer strips along watercourses.	Protects aquatic habitats and helps maintain water quality.
	INF POL 15, INF OBJ 16, INF OBJ 25	Require implementation of SuDS and surface water management measures.	Reduces flood risk, runoff and pollution pathways.
	INF OBJ 26	Requires surface water management plans where development occurs within the zone of influence of a European site.	Specifically protects hydrological connections to European sites.
	INF OBJ 22, INF OBJ 23	Protect floodplains, wetlands and Natura 2000 conservation objectives from flood-relief and development impacts.	Safeguards wetland habitats and ecological functions.
Chapter 8: Heritage, Conservation and Landscape	HER POL 27, HER POL 28	Protect, conserve and enhance biodiversity and integrate biodiversity protection into development management.	Ensures biodiversity considerations are incorporated into future development.
	HER POL 31	Requires EcIA, AA Screening, NIS and species surveys, where appropriate.	Provides project-level ecological safeguards.

Chapter	Policy/Objectives Ref.	Key Provision	Relevance to AA Screening
	HER POL 32, HER POL 33	Require AA and adherence to NPWS guidance for developments affecting designated sites.	Directly protects European and nationally designated sites.
	HER OBJ 33, HER OBJ 34	Require AA for plans and projects likely to affect Natura 2000 sites and protect designated sites from inappropriate development.	Ensures AA screenings are required for any development.
	HER POL 47, HER POL 48	Protect waterways, wetlands and associated ecological functions and assess drainage-related proposals.	Addresses hydrological pathways to European sites.
	HER POL 56, HER OBJ 58, HER OBJ 60	Protect and enhance green infrastructure and ecological corridors.	Supports wider ecological networks and Natura 2000 connectivity.
Chapter 9: Rural Development Strategy	RUR DEV SO 9	Requires AA Screening and full AA, where necessary, for rural development proposals.	Key safeguard ensuring compliance with the Habitats Directive.
	RUR DEV SO 2, RD POL 44-46	Protect water resources, groundwater and aquifers through environmental protection measures.	Reduces risks to water-dependent European sites.
	RD POL 51-53	Control wastewater discharges and protect European sites through catchment-based assessment.	Prevents deterioration of water quality affecting Natura 2000 sites.
	RD POL 12, RD POL 16, RD POL 18, RD POL 27	Protect habitats, wildlife, Natura 2000 sites and sensitive ecological areas from agricultural, forestry and extractive developments.	Provides biodiversity safeguards with specific reference to Natura 2000 sites.
Chapter 11: Development Management Standards	Section 11.1.4	Requires AA Screening and, where necessary, Natura Impact Statements for projects.	Ensures assessment of potential impacts on European sites at development stage.
	DM OBJ 7	Requires SuDS for all developments.	Protects water quality and hydrological regimes.
	Section 11.5.10	Requires green infrastructure to inform site design and layout.	Supports retention of ecological features.
	DM OBJ 61	Requires Construction Environmental Management Plans (CEMPs) for larger developments.	Provides mitigation during construction phases.

Chapter	Policy/Objectives Ref.	Key Provision	Relevance to AA Screening
	DM POL 27	Supports renewable energy development that contributes to climate objectives.	Guides future energy infrastructure development sustainably.
	DM OBJ 76	Requires assessment of environmental, cumulative and designated site impacts and implementation of mitigation.	Strong development management safeguard protecting SACs, SPAs and NHAs.
	DM OBJ 77	Requires biodiversity, ecology, hydrology, flood risk and environmental management assessments for solar energy developments.	Provides detailed safeguards for future renewable energy projects.
	TU Zoning Framework	Requires infrastructure development to be sustainable and protect biodiversity, landscapes and heritage.	Ensures environmental considerations are integrated into future development of zoned lands.

comhairle chontae na mí
meath county council

Proposed Variation No. 6 to the Meath County Development Plan 2021-2030 (as varied)

Appropriate Assessment Screening Determination

Meath County Council has prepared a proposed variation to the County Development Plan (Proposed Variation No. 6 to the Meath County Development Plan 2021-2030). The proposed variation sets out the changes to the current Development Plan required to align with the findings of a study carried out by Meath County Council entitled, 'Strategic sites for energy generation and potential co-location for large energy users in County Meath'. The study provides a plan led evidence-based approach to the protection of existing energy infrastructure assets within the County and potential co-location with large energy users to enable the transition to a low-carbon economy on a commercial, industrial and community scale. A number of amendments are therefore proposed to the relevant sections of Volume One of the Plan together with Volume 3 Book of Maps once the variation is adopted.

In accordance with requirements Article 6(3) of the Habitats Directive (92/43/EEC of 21 May 19921), Regulation 42 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended and Part 6 of the Planning and Development Act 20242 (and SI 452 of 2025), Meath County Council has completed screening for appropriate assessment of the proposed variation and has determined that the likelihood of same giving rise to significant effects on European sites (either individually or in combination with other projects or other plans) cannot be excluded in view of the relevant sites conservation objectives, as a result of:

- Habitat loss and/or fragmentation
- Impacts to habitat structure
- Disturbance to species of conservation concern
- Mortality to species (such as roadkill)
- Noise pollution
- Emissions to air
- Emissions to water

There is a possibility that the zoning and subsequent development of the site being zoned as part of this Variation could result in significant effects on 6 European sites. Applying the precautionary principle therefore, and in accordance with Article 6(3) of the Habitats Directive, Stage 2 Appropriate Assessment is required. It is therefore considered necessary for Meath County Council to complete an Appropriate Assessment of the proposed variation and to prepare a Natura Impact Report in support of same in accordance with sections 203 and 205 of the Planning and Development Act 2024 as amended.

I recommend the proposed determination as set out above.

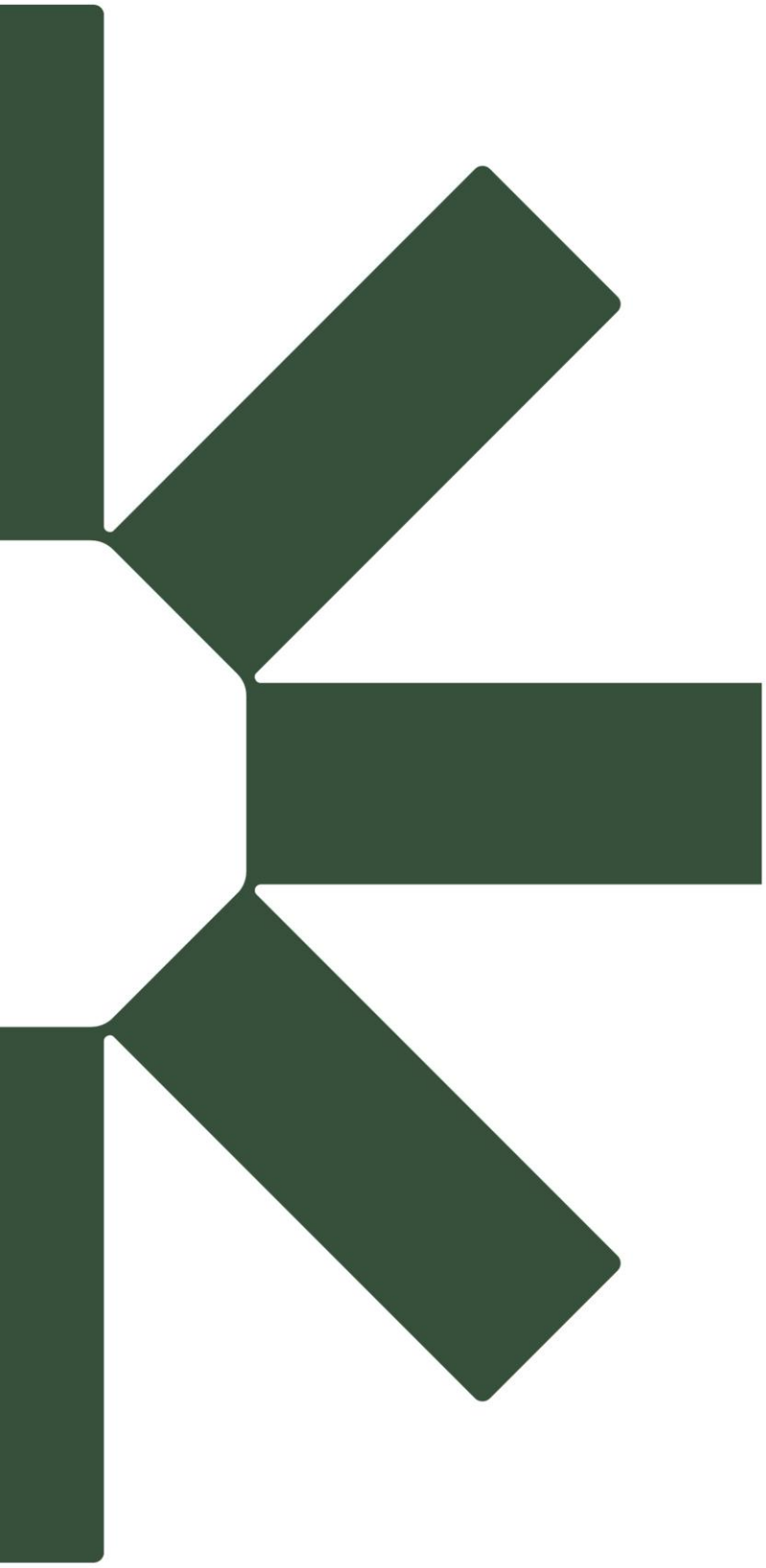
Name: Alan Russell



Signature:

Title: Senior Planner

Date: 18/11/2026



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