

Appropriate Assessment Screening Report and Natura Impact Statement

Cooloo Wind Farm, Co.
Galway





DOCUMENT DETAILS

Client: **Neoen**

Project Title: **Cooloo Wind Farm, Co. Galway**

Project Number: **190723**

Document Title: **Appropriate Assessment Screening Report and Natura Impact Statement**

Document File Name: **NIS F – 190723 – 2025.09.26**

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Rev	Status	Date	Author(s)	Approved By
01	Draft	25/08/2025	EF	RW
02	Draft	29/08/2025	EF	RW
03	Final	23/09/2025	EF	RW

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1. INTRODUCTION

1.1 Background

MKO has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment of the proposed renewable energy development at Cooloo, County Galway.

Screening for Appropriate Assessment (AA) is required under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The current project is not directly connected with, or necessary for, the management of any European Site. Consequently, the project has been subject to the AA Screening process.

This Natura Impact Statement (NIS) has been prepared in accordance with:

- *European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites. Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2021)*
- *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018)*
- *Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010)*
- *Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin 7, Ireland OPR (2021).*

1.2 References to the Proposed Project

The Proposed Project, 'Cooloo Wind Farm' is referenced within the NIS as follows:

- The 'Proposed Project' refers to the entirety of the project ('Proposed Wind Farm' and 'Proposed Grid Connection' as described below) for the purposes of this NIS.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compound, underground cabling, peat and spoil management, site drainage, biodiversity enhancement, turbine delivery accommodation works and all ancillary works and apparatus.
- Where the 'Proposed Grid Connection' is referred to the 110kV onsite substation, battery energy storage system and 110kV underground cabling connecting to the existing Cloon 110kV substation, and all ancillary works and apparatus.
- Where the 'Site' is referred to, this relates to the study area boundary for the NIS, as shown in Figure 2-1 encompasses an area of approximately 355 hectares.
- Where the 'Proposed Wind Farm site' is referred to, this refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route.

1.3

Statement of Authority

This report has been prepared by Emily Fair (B.Sc., M.Sc.). Emily is an Ecologist with MKO and has over 4 years of professional experience. This report has been reviewed by Rachel Walsh (B.Sc., MCIEEM). Rachel has extensive experience in ecological consultancy and has undertaken numerous assessments covering a wide range of projects including wastewater treatment plants, wind farms, road and rail infrastructure and housing developments.

The baseline ecological surveys were undertaken by Emily Fair, Cathal Bergin (B.Sc.), Cora Twomey (B.Sc.), Brónagh Boylan (B.Sc.), Rudraksh Gupta (B.Sc., M.Sc.), Tom Peters (B.Sc., M.Sc.), Mairead Kavanagh (B.Sc.), Nora Szijarto (B.Sc., M.Sc.), Timothy O'Ceallaigh (B.Sc., MSc.), Caitrin Farren (B.Sc.), Cuan Feely (B.Sc.) and Matthew Kieran (B.Sc.).

With regard to ornithological surveys, the scope of works and survey methodology was devised by Pdraig Cregg, Principal Ornithologist of MKO, and is fully compliant with recent NatureScot guidance (SNH, 2017). Field surveys were undertaken by Cian Cahalin (B.Sc.), Colin Delahunt (B.Sc.), Conor Geoghegan (B.Sc.), David Naughton (B.Sc.), Jonah Gaine (B.Sc.), Jack Kennedy (B.Sc.), Louis de Vries (M.Sc.), Marcus Hogan (B.Sc.), Margaux Pierrel (B.Sc.), Peter Capsey (B.A.), Paul Troake (N.Dip.), Susan Doran (B.Sc.), Sarah Jorgensen (M.Sc.), Sean O'Brien (B.Sc.), Zuzana Erosova (B.Sc.) and Zak O'Connor (B.Sc.). All of the aforementioned surveyors are suitably qualified and competent in the field of ornithological and/or ecological surveying as relevant.

1.4

Methodology

1.4.1

Appropriate Assessment Process

Screening - The purpose of the screening stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, either alone or in combination with other plans or projects, is likely to have significant effects on a European site in view of the site's conservation objectives.

There is no necessity to establish such an effect; it is merely necessary for the Competent Authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of AA has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether AA of a project is required. Therefore, where significant effects are likely, uncertain or unknown at screening stage, an AA of the project will be required.

Appropriate Assessment - This stage of the process is a focused and detailed examination, analysis and evaluation by the Competent Authority of the implications of the plan or project, either alone or in combination with other plans and projects, on the integrity of a European site in view of that site's conservation objectives. Case law has established that such an AA, to be lawfully conducted must:

- (i) identify, in the light of the best scientific knowledge in the field, all aspects of the proposed project which may, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;
- (ii) contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and
- (iii) may only include a determination that the proposed project will not adversely affect the integrity of any relevant European site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt

remains as to the absence of potential adverse effects. If adverse impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three (assessment of alternative) and, if necessary, stage four (IROPI¹).

1.4.2 Ecological Survey Methodologies

The following sections describe the methodologies followed to establish the baseline ecological condition of the site and surrounding area.

1.4.2.1 Ecological Multidisciplinary Walkover Surveys

Multidisciplinary walkover surveys were undertaken on the following dates:

- 21st May 2021
- 9th November 2021
- 18th November 2022
- 13th of July 2023
- 2nd and 29th August 2023
- 5th, 8th and 22nd September 2023
- 5th October 2023
- 14th November 2023
- 18th September 2024
- 18th June 2025
- 2nd September 2025

A comprehensive walkover of the Site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys. The walkover surveys are designed to detect the presence, or likely presence, of a range of protected species and invasive species.

The multi-disciplinary walkover surveys comprehensively covered the entire study area for features and locations of ecological significance. The 2021, 2022, 2023, 2024 and 2025 surveys were carried out in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (NRA, 2009).

Habitats were identified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2010), while mosses and liverworts nomenclature follows 'Mosses and Liverworts of Britain and Ireland - a field guide' (British Bryological Society, 2010). During the surveys, the site was searched for species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011).

Other targeted survey methodologies undertaken at the Site are described in the following subsections.

1.4.2.2 Otter Survey

Otter surveys were conducted on all river and watercourse crossing points along the Proposed Grid Connection on the 13th of August 2024 and the 18th of June 2025. Targeted otter surveys were also carried out within the Proposed Wind Farm Site during each of the multidisciplinary walkover surveys, as outlined above. All watercourses within the Proposed Wind Farm site, and along the Proposed Grid Connection were identified as providing potential habitat for otter and were subject to targeted surveys

¹ IROPI - 'imperative reasons of overriding public interest', the test found in Article 6(4) of the Habitats Directive.

for this species. This involved a search for all otter signs (e.g. spraints, scat, prints, slides, trails, couches and holts) within 150m of each survey site. Where otter signs were observed these were mapped.

In addition, dedicated otter surveys were undertaken along other watercourses in the vicinity of the Site during dedicated aquatic surveys undertaken in July 2024 (Aquatic Baseline Report, Appendix 1).

The otter surveys were conducted as per NRA (2009^{Error! Bookmark not defined.}) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter survey also followed the guidance as set out in NRA (2008) ‘*Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes*’ and following CIEEM best practice competencies for species surveys (CIEEM, 2013²).

1.4.2.3 Aquatic surveys

The watercourses that flow off the site of the Proposed Project, and downstream watercourses, were subject to biological evaluation and assessment through kick sampling, fish stock assessment (electro-fishing) and habitat appraisal, white-clawed crayfish surveys, lacustrine macro-invertebrate surveys and macrophyte and aquatic bryophyte surveys between the 24th to 27th July 2024. A total of 31 sites (21 riverine sites, 3 lakes and 7 ponds) were selected for detailed fisheries and aquatic assessments.

Survey effort focused on both instream and riparian habitats at each aquatic sampling location. Surveys at each of these sites included a fisheries assessment (electro-fishing and/or fisheries habitat appraisal), white-clawed crayfish survey (*Austropotamobius pallipes*), otter survey (within 150m of the survey site), macrophyte and aquatic bryophyte survey and (where suitable) biological water quality sampling (Q-sampling). Environmental DNA (eDNA) sampling was undertaken for the species strategically chosen riverine locations within the vicinity of the Proposed Project. These water samples were also analysed for white-clawed crayfish and crayfish plague (*Aphanomyces astaci*). This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Proposed Project and ensured that any habitats and species of high conservation value would be detected.

Full details of the methodology followed for the aquatic surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, Appendix 1.

1.4.2.4 Bird Surveys

In order to inform the scope of the bird surveys required to inform the NIS, a review was undertaken of the location of nearby Special Protection Areas and associated Special Conservation Interest (SCI) species so that the survey design would include a focus on target SCI species in addition to all species recorded for the purpose of the EIAR chapter, Chapter 7 - Ornithology. Field surveys were undertaken during the survey period October 2019 to March 2022 and again from August 2023 to March 2025, consisting of three breeding seasons (April – September) and five winter seasons (October – March). A summary of surveys undertaken in relation to birds is provided below:

- Vantage point surveys
- Winter walkover surveys
- Breeding walkover surveys
- Waterbird distribution and abundance surveys
- Hen harrier roost surveys
- Breeding raptor surveys
- Breeding Long-eared Owl Surveys

² CIEEM. (2013) *Technical Guidance Series – Competencies for Species Survey*, Online, Available at: <https://cieem.net/resource/competencies-for-species-survey-css/>

Barn Owl Surveys

1.4.2.4.1 Vantage Point Surveys

Vantage point surveys were undertaken in accordance with NatureScot (2017) guidance between October 2023 and March 2024. Surveys were conducted from 3 fixed point vantage points with comprehensive coverage of the site. The surveyor collected data on bird observations and flight activity from a scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e., 6 hours total) per month. The surveyor collected data on bird observations and flight activity from a scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e., 6 hours total) per month.

1.4.2.4.2 Winter Walkover Surveys

Winter walkover surveys were conducted in daylight hours over four visits between October and March (i.e. four visits in winter 2019/2020, four visits in winter 2020/2021, four visits in winter 2021/2022, four visits in winter 2023/2024 and four visits in winter 2024/2025). Winter walkover surveys were undertaken to record the presence of bird species within the site to a 500m radius. The methodology was adapted from the breeding walkover methodology outlined in O'Brien and Smith (1992) and Gilbert et al. (1998), combined with Common Bird Census methods (British Trust for Ornithology, 2021). Transect routes were walked across different habitat complexes within the site where access allowed. All target species were recorded and mapped. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat. Winter walkover surveys were conducted in daylight hours over four visits between October and March.

1.4.2.4.3 Waterbird Distribution and Abundance Surveys

Waterbirds includes swans, geese, and ducks; cormorant, shag, divers and grebes; auks and seabirds; gulls, terns and skuas; herons, egrets and crane; rails and crakes; waders; and kingfisher. Significant wetlands and waterbodies within 5km of the site were surveyed for waterbirds during the winter and passage seasons (August to May inclusive) to provide information on their distribution in relation to the site. Survey methodology follows Gilbert et al. (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021). Surveys were undertaken during daylight hours from suitable vantage points at wetlands and waterbodies. All target waterbird species were recorded and mapped.

1.4.2.4.4 Breeding Walkover Surveys

Breeding walkover surveys were conducted in daylight during breeding season 2020 and 2021, and in the early mornings (start time between 06:00 and 07:30) in breeding season 2024.

Breeding walkover surveys were undertaken to determine possible, probable or confirmed breeding bird activity within the Proposed Wind Farm site and to a 500m radius. The methodology was based on O'Brien and Smith (1992) and Gilbert *et al.* (1998), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitat. Transect routes were walked across different habitat complexes within the survey area where access allowed. Using binoculars, the surveyor regularly scanned the surroundings of each transect for target species.

1.4.2.4.5 Hen Harrier Roost Surveys

Each hen harrier vantage point was surveyed once per month during the winter season between October and March inclusive (in winter 2019/2020, 2020/2021, 2021/2022, 2023/2024 and 2024/2025).

Hen harrier roost surveys were undertaken within the site and to a 2km radius. These surveys aimed to identify active winter hen harrier roosts near or within the site. Survey methodology followed Gilbert et

al. (1998) and O'Donoghue (2019). Roost watches of 2-3 hours were conducted at four hen harrier vantage point locations from dusk until last visible light during which all hen harrier observations were recorded and mapped.

1.4.3 Desk Study

The desk study undertaken for this assessment included a thorough review of the available ecological data associated with the screened-in European Sites within the Likely Zone of Influence of the Proposed Project. Sources of data included the following:

- Review of NPWS Conservation Objectives supporting documents, site synopsis, standard data forms and supporting documents for European Designated Sites,
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA),
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper,
- Review of NPWS Article 17 metadata and GIS database.
- Review of the accompanying EIAR chapters (Chapter 4 Description, Chapter 7 Ornithology, Chapter 8 Land Soils and Geology, Chapter 9 Hydrology and Hydrogeology)

2. DESCRIPTION OF PROPOSED PROJECT

2.1 Site Location

The Proposed Wind Farm is located within a rural, agricultural setting in east Galway, approx. 12km southeast of Tuam. The village of Brierfield is located approx. 1.3km south of the nearest proposed turbine, and the village of Moylough is located approx. 5.3km east of the nearest proposed turbine. The N63 National Road runs south of the Proposed Wind Farm site in a general northeast-southwest orientation entering the settlement of Abbeyknockmoy and then heading northeast towards Moylough, passing within 1.27km of the nearest proposed turbine. The site is accessed via local roads from the R332 Regional Road, which travels in a southeast-northwest direction between Tuam and the N63 National Road, Co. Galway. The site itself is served by a number of existing agricultural roads and tracks. The Site location context is shown in Figure 2-1. The Site measures approximately 355 hectares.

Land-use in the wider landscape comprises a mix of pastoral agriculture, peat bogs and low density residential areas.

2.2 Characteristics of the Proposed Project

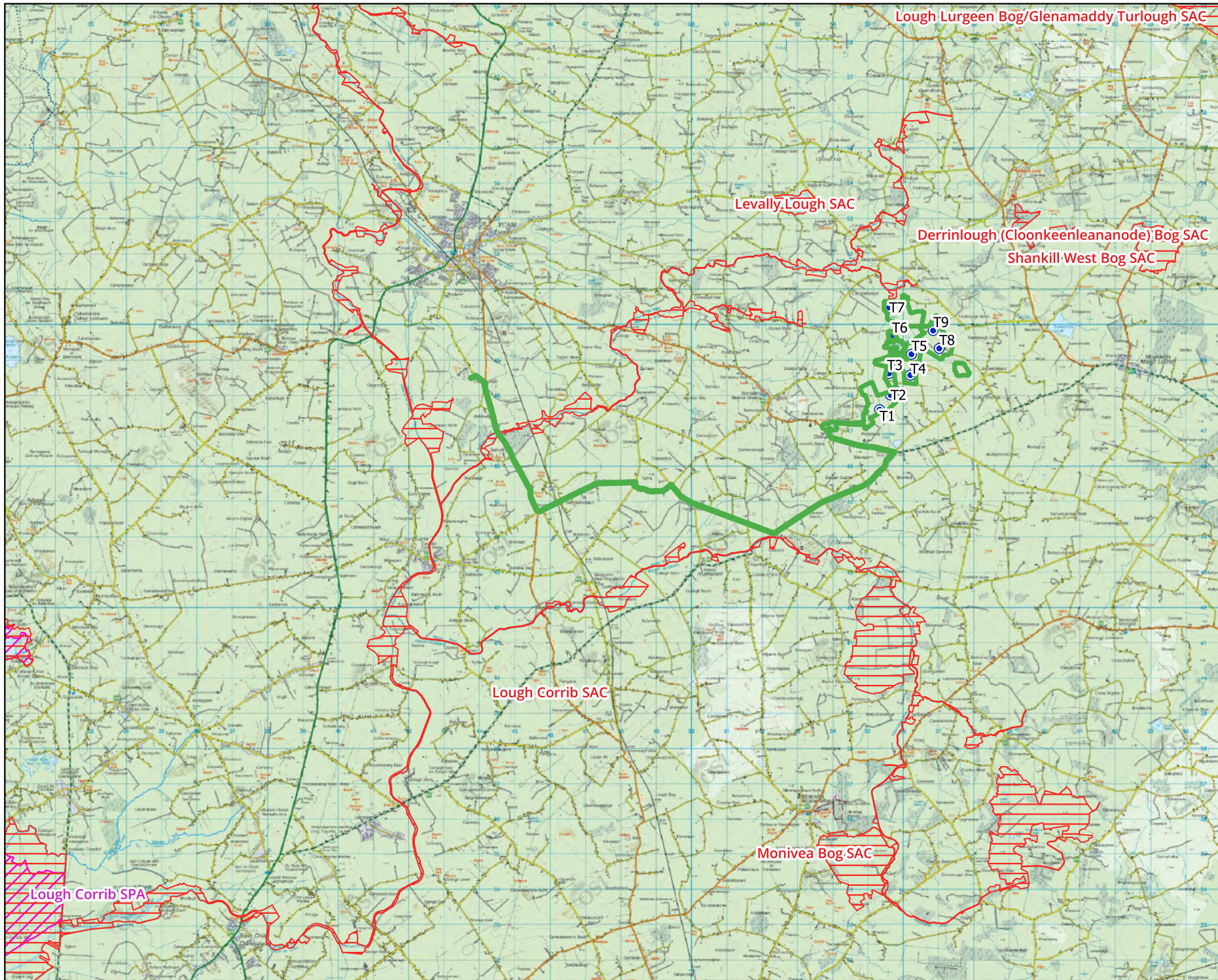
For the purpose of this application the proposed project, hereafter the ‘Proposed Wind Farm’ will consist of the following:

- i. 9 no. wind turbines with the following parameters:*
 - Total turbine tip height of 180 metres;
 - A rotor blade diameter of 150 to 162 metres;
 - A hub height of 99 to 105 metres;
- ii. Permanent turbine foundations, hard-standing and assembly areas;*
- iii. Underground electrical (33kV) and communications cabling;*
- iv. 1 no. temporary construction compound (including site offices and welfare facilities);*
- v. A meteorological mast with a height of 100 metres, security fencing and associated foundation and hard-standing area;*
- vi. 1 no. new site entrance on the R332 in the townland Lisavally;*
- vii. 1 no. new access and egress point off the L6056 Local Road in the townland of Dangan Eighter;*
- viii. 1 no. new access and egress point on to an existing access track in the townland of Dangan Eighter;*
- ix. 2 no. new access and egress points off the L6301 Local Road in the townland of Cooloo and Lecarrow;*
- x. Upgrade of existing site tracks/roads and provision of new site access roads, clear span crossings, junctions and hard-standing areas;*
- xi. A new temporary access road from N63 national road and to R332 Regional Road in the townland of Slievegorm to facilitate the delivery of turbine components and other abnormal sized loads;*
- xii. Demolition of an existing derelict house and adjacent outbuilding in the townland of Cooloo;*
- xiii. Peat and Spoil Management Areas;*
- xiv. Tree felling and hedgerow removal;*
- xv. Biodiversity Management and Enhancement measures;*
- xvi. Site Drainage;*
- xvii. Operational Stage site signage; and*
- xviii. All ancillary apparatus and site development works above and below ground, including soft and hard landscaping.*



This application seeks a ten-year planning permission and 35-year operational life from the date of commissioning of the Proposed Wind Farm.

A map of the Proposed Project layout can be seen below in Figure 2-2.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)



Drawing Title

Site Location

Project Title
Cooloolo Wind Farm, Co. Galway

Drawn By	EF	Checked By	RW
Project No.	190723	Drawing No.	Figure 2-1
Scale	1:140,000	Date	18/09/2025

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Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Turbine Crane Platform and Hardstanding
- Proposed Turbine Foundations
- Proposed Substation and BESS Compound
- Proposed Met Mast
- Proposed Existing Roads to be Upgraded
- Proposed New Roads
- Proposed Construction Compound
- Proposed Peat Repository Areas
- Proposed Spoil Repository Areas
- Proposed Turbine Delivery Route Overrun Area
- Proposed Turbine Delivery Accommodation Area
- Proposed Grid Connection
- Proposed Turbine Delivery Route

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Drawing Title

Site Layout

Project Title

Cooloo Wind Farm, Co. Galway

Drawn By

EF

Checked By

RW

Project No.

190723

Drawing No.

Figure 2-2

Scale

1:25,000

Date

18/09/2025



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2.2.1 Proposed Wind Farm Components

2.2.1.1 Wind Turbines

2.2.1.1.1 Turbine Locations

The proposed wind turbine layout has been optimised using wind farm design software (a combination of WAsP and WindPro) to maximise the energy yield from the Proposed Wind Farm site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance. The ITM Grid Reference coordinates of the proposed turbine locations are listed in Table 2-1 below. The final Top of Foundation Level of the turbine foundations will be determined by the actual ground conditions at each proposed turbine location and may differ slightly from those levels listed in Table 2-1.

Table 2-1 Proposed Wind Turbine Locations and Top of Foundation level

Turbine	ITM X	ITM Y	Top of Foundation Levels (metre OD)
1	555297	747613	73m
2	555608	748030	76m
3	555563	748640	75.5m
4	556167	748591	83.5m
5	556198	749183	66.5m
6	555648	749699	73.5m
7	555568	750508	70m
8	556986	749348	76m
9	556813	749855	66.5m

2.2.1.1.2 Turbine Locations and Site Investigations

As part of the design process for the Proposed Project, numerous intrusive site investigations were undertaken across the Proposed Wind Farm site, to provide detail and clarity on the nature and extent of subsoils and bedrock as a means of characterising the Proposed Wind Farm site. This assisted in providing additional information on the most suitable location for turbines and associated infrastructure.

2.2.1.1.3 Turbine Type

Wind turbines use the energy from the wind to generate electricity. A wind turbine consists of four main components:

- Foundation unit;
- Tower;
- Nacelle (turbine housing);
- Rotor.

The proposed wind turbines to be installed on the Proposed Wind Farm site will have the following dimension range:

- Turbine Tip Height – 180 metres
- Hub Height – Maximum height 105 metres, Minimum height 99 metres
- Rotor Diameter: - Maximum diameter 162 metre, Minimum diameter 150 metres

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. The wind turbines that will be installed on the Proposed Wind Farm site will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times.

The turbines will be multi-ply coated to protect against corrosion. It is proposed that the turbines would be of a light grey colour to blend into the sky background to minimise visual impact as recommended in the 2006 WEDGs and *'The Influence of Colour on the Aesthetics of Wind Turbine Generators'* (ETSU, 1999).

It should also be noted that the assessment of the development footprint of the Proposed Wind Farm site, within this NIS, is based on the maximum potential footprint for all of the infrastructural elements. This precautionary approach is taken as the assessment of the maximum development footprint will, in the absence of mitigation measures, give rise to the greatest potential for significant effects. Should the development footprint be less than the maximum, this in itself will further mitigate the assessed effects.

2.2.1.1.4 **Turbine Foundations**

Turbine foundations are constructed by excavating soil to sub-formation level. Imported structural fill and blinding is placed and compacted to formation level. A reinforced concrete base is cast in-situ. The turbine foundation transmits any load on the wind turbine into the ground. The approximate horizontal and vertical extent of the turbine reinforced concrete foundation will be 25m and 4m respectively. Where ground conditions are unfavourable to excavate and replace, piles will be installed to formation level.

The size of the concrete foundation will be approximately 25m in diameter, based off current models of this scale, but will depend on the loads specified by the turbine manufacturer selected from the competitive tender process. After the formation level has been reached, the turbine "Anchor Cage" is levelled, and reinforcing steel is built up around and through the anchor cage. The outside of the foundation is shuttered with formwork to allow the pouring of concrete and is backfilled with granular fill to finished surface level.

2.2.1.1.5 **Hard Standing Areas**

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base. These will facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine. The hardstands also allow for the offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard standing areas are extended to cover the turbine foundations, once completed, by placing crushed stone over the foundation. The arrangement and positioning of hard standing areas are dictated by turbine suppliers.

2.2.1.1.6 **Assembly Area**

Levelled assembly areas will be located on either side of the hard standing area. These assembly areas are required for offloading turbine blades or turbine blade segments, tower sections and hub from trucks until they are ready to be lifted into position by cranes and to assist the main crane during

turbine assembly. The layout represents the full extent of the assembly areas but may be subject to optimisation according to the turbine supplier's requirements.

2.2.1.1.7 **Generating Capacity**

Modern wind turbine generators currently have a typical generating capacity in the 6 to 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. Turbines of the exact same make, model and dimensions can have different generating potential depending on the capacity of the electrical generator installed in the turbine nacelle. It is assumed that the wind turbine model installed as part of the Proposed Project will have a generating capacity of between 6 and 7.2 MW, and the Proposed Wind Farm would therefore have a combined generating capacity of between 54 to 64.8 MW. The exact generating capacity of the installed turbine will be designed to match the wind regime on the Site and will be determined by the selected manufacturer.

A rated generating capacity of 7 MW has been chosen to calculate the potential capacity of the proposed 9-turbine renewable energy development, which would result in an estimated installed capacity of 63 MW.

With regards to the modern turbine range, i.e., those available on the market at the time of writing, of 6 – 7MW, the resulting electricity produced would range from 165,564MWh to 193,158MWh per annum. The lower end of this range (165,564MWh) would be sufficient to supply approximately 39,420 Irish households with electricity per year, based on the average Irish household using 4.2MWh of electricity. The higher end of this range (193,158MWh) would be sufficient to supply approximately 47,304 Irish households with electricity per year, based on the average Irish household using 4.2MWh of electricity. For context, based on the 2022 Census of Ireland results for Co. Galway, the output range would produce sufficient electricity for the equivalent of 60% and 68% respectively.

2.2.1.2 **Site Roads**

2.2.1.2.1 **Road Construction Types**

To provide access within the Proposed Wind Farm site and to connect the wind turbines and associated, infrastructure, existing roads and tracks will need to be upgraded and new access roads will need to be constructed. The road construction design, as per the *Peat and Spoil Management Plan* in Appendix 3 has taken into account the following key factors:

- *Constructability;*
- *Serviceability requirements for construction and WTG component delivery and maintenance vehicles;*
- *Peat depth;*
- *Horizontal longitudinal and cross-fall gradient of the tracks;*
- *Minimisation of excavation arisings; and*
- *The requirement to minimise disruption to peat hydrology.*

Whilst the above key factors are used to determine the road design the actual construction technique employed for a particular length of road will be determined on the prevailing ground conditions encountered along that length of road.

The Proposed Wind Farm site makes use of the existing road network insofar as possible. It is proposed to upgrade approx. 1.25km of existing site roads and tracks, and to construct approx. 9.3km of new access roads.

Upgrade of Existing Access Roads or Tracks

The existing tracks on-site were constructed using the excavate and replace construction technique. The general construction methodology for upgrading of existing roads or tracks is summarised below. There is approx. 1.25km of the comprising existing roads for upgrade. They will be constructed at the same level as existing ground levels in order to ensure natural flow paths over the floodplain and avoid backup of the water. The requirement for a layer of geotextile and geogrid and the necessary stone thickness will be confirmed by the Site Engineer.

Construction of New Floating Roads

Of the proposed new access tracks, 7.2km are expected to comprise founded construction, with the remaining 2.1km expected to comprise floated construction. A total of 1.25km of existing access track is proposed for upgrade. The general construction methodology for the construction of new floating access roads or tracks is presented in the Peat & Spoil Management Plan in Appendix 3.

Construction of New Roads

The excavation of peat and spoil and founding of access roads on competent stratum (below the peat) for new access roads will be carried out at various locations on the Proposed Wind Farm site. Excavate and replace type access roads are the conventional method for construction of access roads on peatland sites and the preferred construction technique in shallow peat (<1.0m) provided sufficient placement/reinstatement capacity is available onsite for the excavated peat. The methodology for the construction of new roads (excavated and floating) is detailed in Section 4.1 of the Peat and Spoil Management Plan in Appendix 3.

2.2.1.3 **Site Underground Electrical (33kV) and Communications Cabling**

Each turbine will be connected to the on-site electricity substation (part of the Proposed Grid Connection) via underground 33kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the on-site substation. The electricity and fibre-optic cabling connecting to the on-site substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways or under the roadways. The route of the cable ducts will follow the access track to each turbine location. The exact number and configuration of cable ducting may vary within the cabling trench. The cabling may be placed on either side of the roads, on both sides of the road and/or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be imported onto the Site should sufficient volumes of suitable material not be encountered on-site.

2.2.1.4 **Meteorological Mast**

One meteorological (met) mast is proposed as part of the Proposed Wind Farm. The met mast will be equipped with wind monitoring equipment at various heights. The mast will be a free-standing slender lattice structure 100 metres in height. The mast will be constructed on a hard-standing area sufficiently large to accommodate the equipment that will be used to erect the mast.

2.2.1.5 Temporary Construction Compound

A temporary construction compound measuring approx. 10,240m² in area will be located in the southern section of the Proposed Wind Farm site, approx. 450m southwest of T01.

The temporary construction compound will include a bunded refuelling and containment area for the storage of lubricants, oils and site generators etc, and full retention oil interceptor, waste storage area, temporary site offices, staff facilities and car-parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off-site by a permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank.

The construction compound will facilitate the temporary storage of some general construction materials, however, turbine components will be brought directly to the proposed turbine locations following their delivery to the Proposed Wind Farm site.

2.2.1.6 Demolition of Existing Derelict Structure

As part of the Proposed Project, there will be demolition works undertaken on an existing derelict structure located approx. 180m southwest of T05 in order to facilitate the construction of new access roads within the Proposed Wind Farm site.

2.2.1.7 Tree Felling and Replanting

2.2.1.7.1 Tree Felling for Construction and Operation of Proposed Wind Farm

Tree felling will be required within and around Proposed Wind Farm infrastructure footprint to allow for the construction of the turbine bases, access roads underground cabling, and the other ancillary infrastructure.

Approx. 0.7ha of conifer plantation will be felled to accommodate Turbine 9 and its associated infrastructure. Turbine 9 is located adjacent to private forestry and as a result, felling of an additional 10.55ha will be required to accommodate enhancement measures (outlined in Section 2.2.3 below). Therefore, a total of 11.25 hectares will be felled as part of the Proposed Wind Farm.

In addition to the commercial forestry felling, segments of hedgerows will require removal to facilitate the construction of wind farms roads and ancillary infrastructure, and to achieve the required Bat foraging buffers from the proposed turbines.

The commercial forestry felling activities required as part of the Proposed Wind Farm will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licences for wind farm developments. The policy requires that a copy of the planning permission for the Proposed Wind Farm be submitted with the felling licence application; therefore, the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Wind Farm.

2.2.1.7.2 Forestry Replanting

In line with the Forest Service's published policy on granting felling licences for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will have to be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the footprint of the infrastructure developments.

The identified 11.25 hectares of commercial forestry that will be permanently felled for the Proposed Wind Farm will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that will be issued in respect of the Proposed Wind Farm. Replanting is a requirement of the Forestry Act and is primarily a matter for the statutory licensing processes that are under the control of the Forest Service. The replacement of the 11.25ha of forestry felled as part of the Proposed Wind Farm may occur on any lands, within the State benefitting from Forest Service Technical Approval³ for afforestation, should the Proposed Wind Farm receive planning permission. Under the Forestry Regulations 2017, all applications for licences for afforestation require the prior written approval (technical approval) of the Minister for Agriculture, Food and the Marine. Before the Minister can grant approval, he/she must first determine if the project is likely to have significant effects on the environment (for EIA purposes) and assess if the development, individually or in combination with other plans or projects is likely to have a significant effect on a European site (for Habitats purposes).

For the balance of the replanting obligation, the Applicant commits to replanting 0.7 hectares of forestry outside the hydrological catchment within which the Proposed Project is located. On this basis, it is reasonable to conclude that there will be no cumulative effects associated with the replanting of 0.7 hectares of forestry. Therefore, the 0.7 hectares of forestry replanting is not considered further in the impact assessment chapters of this EIAR. In addition, the Applicant commits to not commencing the Proposed Project until both a felling and afforestation licence(s) is in place and, therefore, this ensures the afforested lands are identified, assessed and licenced appropriately by the relevant consenting authority.

2.2.1.8 Peat and Spoil Management Areas

It is proposed to manage any excess overburden generated through construction activities locally within the Site, in identified 4 no. peat deposition areas and 5 no. spoil management areas, as shown in Appendix 3 Peat and spoil management plan.

The total capacity of the peat repository areas within the Proposed Wind Farm site is 22,460m³ and the total capacity of spoil repository areas within the Proposed Wind Farm site is 20,530m³. As stated in the Peat and Spoil Management Plan (Appendix 3), a conservative reinstatement volume of 50% (21,920m³) of the total peat excavation has been considered available for placement, reinstatement and re-use across the Proposed Wind Farm site. A conservative estimate of 20% (15,470m³) of the total spoil volumes has been considered as available for re-use in the construction of safety berms across the Proposed Wind Farm site. This provides enough capacity for the total volume of peat and spoil requiring management for the Proposed Wind Farm.

The following, outlined in the Peat and Spoil Management Plan in Appendix 3, particular recommendations/best practice guidelines for the placement of peat with respect to specific aspects of the wind farm will be considered and taken into account during construction.

2.2.1.8.1 Access Roads, Hardstands and Other Infrastructure

Controlled quantities of peat and spoil shall be side-cast adjacent to access roads and other infrastructure, for the purposes of landscaping/reinstatement only where it can be placed in a stable formation, i.e., where the topography and ground conditions allow.

Placed peat material will consist of the acrotelm (upper layer) only, and it will be landscaped and shaped to aid in reinstating the construction into the surrounding environment.

³ All proposed forestry developments where the area involved is greater than 0.1 hectare must receive the prior written approval of the Forest Service. The application for approval is known as Pre-Planting Approval – Form 1.

Peat and spoil will only be cast to safe heights and slope angles, considering the topography and the ground conditions. This height will be no more than 1m, and the slopes will be not greater than 1 (V): 3 (H) unless a site-specific assessment during detailed design indicates a greater height and angle is acceptable.

The effect of drainage or water runoff will be considered when placing landscaping rising adjacent to access tracks. Landscaping material will not interfere with drainage, risk blocking of drainage systems or runoff into drainage systems.

2.2.1.8.2 **Peat Repository Areas**

Peat repository areas (PRAs) have been identified at locations where the topography (slope angle $<5^\circ$), peat depth, resulting stability assessment (FoS of >1.3 for 1m peat surcharge) and other environmental constraints (including 50m buffer from watercourses and 10m buffer from land drains) have allowed. These areas are designated for the permanent placement of up to 1m of peat material.

A cell berm will be constructed similarly to the PRA details outlined in Appendix B of the Peat and Spoil Management Plan (Appendix 3). This cell berm will help to prevent the flow of saturated peat material. The stone cell berm will be constructed with a sufficiently coarse granular material or rock to enable the drainage of the placed peat material and prevent any instabilities within the repository area.

The stone cell berm will require a geotextile separator. The stone cell berm will be constructed using low-ground pressure machinery working from bog mats where necessary. The founding stratum for each stone buttress will be inspected and approved by a competent Geotechnical Engineer.

The height of the cell berm constructed will be greater than the height of the placed peat & spoil to prevent any surface peat runoff. Berms up to a maximum of 1.25m in height will be required, subject to detailed design.

The cell berm is subject to the detail designer's specification; however, some peat excavation or installation of a shear key may be required to prevent instability of the stored material. The shear key will comprise an excavation below the existing ground level, beneath the cell berm to provide resistance against lateral forces. Where repositories are located on peat, the shear key must extend below the base of the in-situ peat.

Where possible, the surface of the placed peat and spoil should be shaped to allow efficient runoff of surface water from the peat repository areas.

A perimeter collector drain will be installed around each repository area. This is shown in Appendix 3. Silt ponds will be required at the repository area's lower side/outfall location. All water passing through the perimeter collector drains will be directed through the site drainage system, including silt fences, settlement ponds and other drainage measures as appropriate.

Intermediate berms or buttresses of spoil material may be installed within the peat repository area to aid in the placement and stability of the peat material. These berms should be shaped to align with the contours of the storage area.

The Contractor shall make every reasonable effort to promote vegetation growth in the PRAs following the placement of peat and completion of construction stage activities. Upper acrotelm layers shall be placed on the surface the right way up to promote vegetation growth. This growth will aid in stabilising the placed peat material and help in preventing it from becoming saturated following heavy periods of rain. Four PRAs have been designated as Biodiversity Enhancement Areas. The Contractor shall follow the methodologies outlined in the Biodiversity Enhancement and Management Plan (BMEP) to promote biodiversity enhancement in these locations.

2.2.1.8.3 Spoil Repository Areas

Cohesive glacial tills considered unsuitable for reuse in the Proposed Project will require placement in separate spoil repository areas.

The spoil repository areas have been identified in locations where the topography (slope angle $<5^\circ$), peat depth, resulting stability assessment (FoS of >1.3 for 1m surcharge) and other environmental constraints (including 50m buffer from all mapped watercourses, and 10m from existing drains) have allowed. These areas are designated for permanently placing up to 1m of non-peat spoil material.

Side slopes of placed spoil material are to be no greater than 1(V):2(H).

Where possible, the surface of the placed spoil will be shaped to allow efficient surface water runoff from the spoil placement areas.

Silt ponds will be required at the repository area's lower side/outfall location. All water passing through the perimeter collector drains will be directed through the site drainage system, including silt fences, settlement ponds and other drainage measures as appropriate.

Intermediate berms or buttresses of granular material may be installed within the spoil repository areas to aid in the placement and stability of the spoil material. These berms will be shaped to align with the contours of the repository area.

The peat and spoil volumes requiring management for the Proposed Grid Connection will be managed within the Site in the areas illustrated on Figure 4-1. However, some of the material (e.g. tar) excavated along the Proposed Grid Connection underground electrical cabling route will go to an appropriate licenced facility, as required.

2.2.1.9 Wind Farm Control Buildings

Two substation control buildings will be located within the substation compound. The Transmission Asset Owner (TSO) Control Building will measure approximately 25 metres by 18 metres and approximately 9.7 metres in height. The Independent Power Producer (IPP) Control Building will measure approximately 19 metres by 12 metres and approximately 7 metres in height.

The substation control buildings will include staff welfare facilities for the operational phase of the project. Bottled water will be supplied for drinking, if required. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the Proposed Grid Connection, there will be a very small water requirement for occasional toilet flushing and hand washing and therefore the water requirement of the Proposed Grid Connection does not necessitate a potable source. It is proposed to either harvest rainwater from the roofs of the buildings or, alternatively, install a groundwater well adjacent to the substation in accordance with the Institute of Geologists Ireland, *Guide for Drilling Wells for Private Water Supplies* (IGI, 2007). The well will be flush to the ground and covered with a standard manhole. A pump house is not required as an in-well pump will direct water to a water tank within the roof space of the control building.

It is not proposed to treat wastewater onsite. Wastewater from the staff welfare facilities in the control buildings will be managed by means of a sealed underground storage tank, with all wastewaters being tankered off site by permitted waste collector to a licenced wastewater treatment plant.

Such a proposal for managing the wastewater arising onsite has become almost standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for onsite treatment would be challenging and has been accepted by numerous Planning Authorities and An Coimisiún Pleanála as an acceptable proposal.

The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system can be submitted to the Planning Authority in advance of any works commencing onsite. The wastewater storage tank alarm will be part of a continuous stream of data from the sites' turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the substation underground storage tank.

2.2.1.10 Battery Storage

A battery-based energy storage system (BESS) will be located adjacent to the 110kV substation compound. The BESS primarily consists of 15 no. steel containers and 6 no. power supply units assembled in rows at the development site.

Prior to installing the steel containers, clearance of the site area, levelling of the ground surface and creation of a hard stand will be undertaken. These containers and the adjacent infrastructure house the batteries, inverters, transformers, fire suppression equipment and associated electrical components. The containers will be mounted onto concrete plinth foundations. The containers shall be spaced to allow airflow around the containers, feeding their climate control systems.

In addition to the modular steel containers, other components of the development include:

- A grid transformer within the electrical compound;
- Above ground cable junction boxes/ cabling cabinets and cable racks/steel trunking facilitating the necessary electrical connections between containers;
- Underground ducting and cabling;
- A security fence around the perimeter of the proposed development;
- Communications equipment; and,
- Lightning protection poles.

The battery storage compound will operate continuously, linked to the on-site substation. It will be monitored in tandem with the overall development and there will be sporadic maintenance visits as required.

2.2.1.11 Proposed Clear-Span Watercourse Crossing

It is proposed to construct a clear-span watercourse crossing at 5 no. locations within the Proposed Wind Farm site where new or upgrades crossings are required. The clear-span watercourse crossing methodologies presented below will ensure that no instream works are necessary. The standard construction methodology for the installation of a clear-span watercourse crossing is as follows:

- The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of each watercourse crossing.
- All drainage measures along the proposed road will be installed in advance of the works.
- A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.

- Once the foundation base has been completed, the pre-cast concrete box culvert will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
- Where the box culvert is installed in sections, the joints will be sealed to prevent granular material entering the watercourse,
- Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.

The watercourse crossings will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

2.2.2 Proposed Grid Connection

2.2.2.1 Onsite 110kV Substation

It is proposed to construct a 110kV electricity substation within the Site. The proposed substation is located at the southwest of the Site, in the townland of Dangan Eighter, Co. Galway. The construction and exact layout of electrical equipment in the onsite electricity substation will be to Eirgrid/ESB Networks specifications. Access to the proposed onsite 110kV substation will be via the operational site access points along an existing local track. Upon decommissioning of the Proposed Wind Farm, the 110kV substation will remain *in situ* and form part of the national grid infrastructure.

The footprint of the onsite 110kV substation compound measures approx. 34,765m² in area and will include 2 no. control buildings and the electrical substation components necessary to consolidate the electrical energy generated by each wind turbine, and export that electricity from the onsite 110kV substation to the national grid.

The onsite 110kV substation compound will include steel palisade fencing (approx. 2.4 metre high or as otherwise required by ESB), and internal fences will also segregate different areas within the main substation.

2.2.2.2 Underground Electrical Cabling Route

It is intended to connect the onsite 110kV substation to the existing 110kV Cloon substation in the townland of Cloonascragh, Co. Galway via 110kV underground electrical cabling. The exact connection node is to be confirmed by Eirgrid and subject to change at their request. The underground electrical cabling route is approx. 20.9km in length and located primarily within the public road corridor, with approx. 2.6km located within the Proposed Wind Farm site.

The underground electrical cabling route will originate at the proposed onsite 110kV substation and run south for approx. 1.2km through a site road before turning west for a further 1.4km towards the R332 Regional Road. The underground cabling route will continue southeast along the R332 road network for approx. 2.2km. The underground cabling route then follows the N63 national road west for 4.2km before continuing northwest underground along the L6234 for approx. 2.4km, continuing straight for another 860m along the L2128. The proposed cable will then travel west 1.1km along the L2115 before turning north for 105m on the L2114 followed by an immediate turn west onto the L2125. The proposed cabling route will continue 2.9km on the L2125 before heading north onto the R347 regional road. The proposed cabling route will continue for 3.9km on the R347 before turning left onto the L6141 for 335m. From the L6141 the cable turns left and travels a final 150m into the existing 110kV Cloon Substation.

2.2.2.3 Underground Cable Watercourse/Culvert Crossings

There are 8 no. identified watercourse crossings along the Proposed Grid Connection underground electrical cabling route, 4 no. of which are referenced on EPA/OSI mapping. The construction methodology for the 8 no. EPA/OSI mapped crossings has been designed to eliminate the requirement for in-stream works on these locations requiring a crossing to be constructed to traverse the watercourse with the cabling ducts. The Proposed Grid Connection will also cross over the Athenry to Tuam railway no longer in use at 1 no. location, located entirely within the public road corridor. Please see Table 2-2 for further detail.

A general description of the various construction methods employed at watercourse crossings are described in the following paragraphs below. Inland Fisheries Ireland have published guidelines relating to construction works along water bodies entitled “*Requirements for the Protection of Fisheries Habitats during Construction and Development Works at River Sites*”, and these guidelines will be adhered to during the construction of the Proposed Project.

Table 2-2 Watercourse crossing detail and structures

Crossing No.	Water Crossing Type	Width of Channel (m)	Cover from Road Level to Top of Bridge/Culvert (m)	Crossing Type Description	Watercourse Crossing Type	Extent of in-channel works
WC 1	Open Channel (no existing watercourse crossing)	1.5	N/A	Clear Span Bridge	N/A	None. No in-stream works required
WC 2	Stone Culvert	2.5	1.4	Standard Formation Crossing under Culvert	Option B	None. No in-stream works required
WC 3	Stone Culvert	2.3	1.3	Standard Formation Crossing under Culvert	Option B	None. No in-stream works required
WC 4	Plastic Pipe	2.5	2.0	Standard Formation Crossing over Culvert	Option A	None. No in-stream works required
WC 5	Stone Arch Bridge	1.5	2.25	Standard Formation Crossing over Culvert	Option A	None. No in-stream works required
WC 6	Stone Culvert	0.7	3.5	HDD	Option D	None. No in-

						stream works required
WC 7	Stone Arch Bridge	1.5	2.6	Standard Formation Crossing over Culvert	Option A	None. No in-stream works required
WC 8	Concrete Clear Span Bridge	8.0	1.55	HDD	Option D	None. No in-stream works required

2.2.2.3.1 **Standard Formation Crossing over Culvert – Option A**

Where adequate cover exists above a culvert or service, the standard aforementioned trench arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench as outlined in Figure 4-31.

Where no crossing currently exists, the cable will pass over the watercourse in a bottomless box culvert or pre-cast concrete slab in a standard trefoil arrangement. Where required existing culvert crossings will be extended using appropriately sized corrippe.

2.2.2.3.2 **Standard Formation Crossing under Culvert – Option B**

Where the culvert or service crossing consists of a socketed concrete or sealed plastic pipe and sufficient depth is not available over the crossing, a trench will be excavated beneath the culvert and cable ducts will be installed in the standard formation 300mm below the existing pipe.

2.2.2.3.3 **Shallow Formation Crossing over Culvert – Option C**

Where cable ducts are to be installed over an existing culvert or service crossing where sufficient cover cannot be achieved, the ducts will be laid in a much shallower trench, the depth of which will be determined by the cover available at the culvert crossing location. The ducts within the shallow formation trench will be encased in 6mm thick steel galvanized plates and backfilled with 35N concrete.

Where sufficient deck cover is not available to fully accommodate the required ducts, it may be necessary to locally raise the footpath level if present, or to locally raise the pavement level. Should the footpath or pavement level be increased, the parapet wall levels will also increase to facilitate the raise in pavement level if required. Any addition of a new pavement will be tied back into the existing road pavement at grade.

2.2.2.3.4 **Directional Drilling – Option D**

In the event that none of the above methods are appropriate, directional drilling (DD) will be utilised.

DD is a method of drilling under obstacles such as bridges, culverts, railways, water courses, etc. in order to install cable ducts under the obstacle. This method is employed where installing the ducts using standard installation methods is not possible.

The DD method of duct installation will be carried out using Vermeer D36 x 50 Directional Drill (approx. 22 tonnes), or similar plant, for the directional drilling at watercourse/culvert crossings listed in

the table above. The launch and reception pits will be approx. 0.55m wide, 2.5m long and 1.5m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod and the operator shall commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore shall continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the Site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exists.

2.2.3 Biodiversity Management and Enhancement Plan

A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project. This plan has been developed to offset the loss of habitats identified within the Proposed Wind Farm site and further enhance the biodiversity of the Proposed Wind Farm and its environs.

2.2.3.1 Offsetting Habitat Loss

Offsetting the loss of Hedgerows

There will be a loss of approximately 3.74km of linear features within the site as a result of turbines and associated bat buffers, wind farm roads and other key infrastructure. Offsetting measures will include replanting approximately 4.70km of hedgerow habitat within the Proposed Wind Farm site which will provide more than a 960m net gain in linear habitat. The hedgerows will be replanted within suitable areas and in consultation with the landowners who are supportive of the hedgerow planting proposals.

Offsetting Woodland Loss and Planting of Native Woodland

Approximately 0.70ha of conifer woodland (WD4) will be lost as a result of the proposed new internal access roads and associated infrastructure. It is proposed to fell an additional approximately 10.55ha of monoculture Sitka spruce conifer woodland within the block immediately adjoining the Alder/Ash plantations. Therefore, there will be a total removal of 11.25ha of conifer woodland (WD4).

In total, approximately 11.5ha of broadleaved woodland will be planted to replace the existing conifer woodland (WD4) that will be removed, as well as plant additional broadleaved woodland between T3 and T5.

2.2.3.2 Enhancement Measures

Development of Bog Woodland/Scrub Communities

A number of uncut raised bog (PB1) and regenerating cutover bog (PB4) habitat areas have started to recolonize with scrub. It is proposed to allow these areas to regenerate into what is expected will become bog woodland habitat. Approximately 18ha is available within the site to provide this habitat enhancement.

Grassland Enhancement

The majority of the existing grassland habitats within the Proposed Project boundaries are highly modified or re-seeded fields consisting of improved agricultural grassland (GA1). Lesser areas of wet grassland (GS4) exist where drainage is poor and the fields are less intensively grazed, resulting in a higher sward height. There are opportunities within the site to enhance existing lower value grassland to encourage long-flowering meadow management with a reduced grazing regime.

Approximately 4.45ha of grassland areas within the Proposed Project site boundaries will be converted into long-flowering meadows with reduced management and allowing to naturally revegetate.

Marsh Fritillary Breeding Habitat

Marsh fritillary habitat has been identified throughout the Site. As part of proposed enhancement measures, existing Marsh Fritillary breeding habitat be safeguarded and maintained within the Proposed Wind Farm site. It has been agreed that these areas will be protected from development, land clearance or use conversion, or significant agricultural works for at least the duration of the BMEP.

Enhancement of existing grasslands to suitable breeding habitat

It is proposed to enhance approximately 3.2ha of existing grassland areas that have existing marsh fritillary suitable habitat and an abundance of devil's bit scabious (*Succisa pratensis*), the larval foodplant of the species, within the Proposed Wind Farm site.

Riparian Vegetation/Replanting

Providing permanent fencing along rivers/drains within fields that are at risk of livestock poaching will be fenced off for the operational life of the Proposed Wind Farm. Preventing livestock access to the riverbank edges will prevent excess nutrients entering into the waterbodies and prevent damage to the stability of the riverbank edge. Encouraging native plants to recolonize in these areas will also improve riverbank stability and preventing soil erosion. Additional replanting of native scrub species will also provide a permanent barrier and increase linear replanting along riverbank edges.

Fen Habitat Enhancement

An existing 0.77ha of rich fen (PF1) habitat has been identified within a stand-alone field to the east of the main area of the Proposed Project. Species recorded within this habitat are indicators species of the Annex 1 habitat *7230 Alkaline Fen*, and therefore there this habitat likely confirms to *7230 Alkaline Fen*. This field has been entirely retained as part of the Proposed Project in order to provide enhancement opportunities with landowner agreements in place to implement.

Embankments and Pollinator Nesting Habitats

Using excavated soils from the construction of the infrastructure associated with the Proposed Project, embankments/berms will be constructed around the wind turbines, the substation and other infrastructure. These berms will be allowed to become recolonised by vegetation naturally to ensure the local seedbank is preserved.

3. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

3.1 Desk Study

The following sections describe the results of a survey of published material that was consulted as part of the desk study for the purposes of the ecological assessment. It provides a baseline for the ecology of the existing environment. Material reviewed includes the Site Synopses for Designated Sites for their conservation importance compiled by the National Parks and Wildlife Service (NPWS), plant distribution atlases and other research publications.

3.1.1 Results of Consultation

MKO undertook a scoping exercise during preparation of this NIS. The recommendations of the consultees have informed the NIS preparation process and the contents of this chapter. Table 3-1 below provides a list of the organisations consulted with regard to biodiversity during the scoping process. Their comments were fully considered in the preparation of this chapter.

Table 3-1 Organisation consulted with regard to biodiversity

Consultee	Response	Response Details
An Taisce	-	Receipt of scoping document confirmed
Bat Conservation Ireland	19/04/2023	Large volume of correspondence and limited resources. Unable to respond to query.
Birdwatch Ireland	-	No response recieved to date
Forest Service (DAFM)	Response received 09/05/2023	<i>The following are the comments from this Division in relation to the proposed development:</i> <i>If the proposed development will involve the felling or removal of any trees, the developer must obtain a Felling License from this Department before trees are felled or removed.</i>
Department of Housing, Local Government and Heritage (NPWS)	Response received 29/05/2023	Birds The Development Applications Unit (DAU) made note that a full suite of bird surveys should be carried out to cover bird usage and facilitate assessment of potential collision risk, habitat loss, barrier effect and displacement for these species and should be based around the daily and seasonal activity patterns of the species being surveyed. Hinterland surveys should include breeding raptor surveys, including roost watches, surveys for nocturnal species and other species-specific surveys as appropriate. Vantage point (VP) surveys should be done in a manner that ensures sufficient data is collected to allow an assessment of the importance

		of all the flight paths into, out of and between sites and assess migratory movements. It is also noted that the cumulative impacts on bird species must be considered within the assessment, for both bird migration routes (day and night) are assessed as well as the flight lines (day and night) of bird species travelling between roosting and feeding areas. Wetlands Wetlands are important areas for biodiversity and ground and surface water quality should be protected during construction and operation of the proposed development. The EIAR should include a detailed assessment of the hydrological impacts on wetlands from the proposed development. Any watercourse or wetland which may be impacted on should be surveyed for the presence of protected species and species listed on Annexes II and IV of the Habitats Directive. One of the main threats identified in the threat response plan for otter is habitat destruction. A 10m riparian buffer on both banks of a waterway is considered to comprise part of the otter habitat. Therefore, any proposed development should be located at least 10m away from a waterway and should consider movements between waterways and waterbodies by otters. Flood Risk and Hydrology Response from the DAU: <i>Flood plains, if present, should be identified in the EIAR and left undeveloped to allow for the protection of these valuable habitats and provide areas for flood water retention (green infrastructure). If applicable, the EIAR should take account of the guidelines for Planning Authorities entitled "The Planning System and Flood Risk Management" published by the Department of the Environment, Heritage and Local Government In November 2009.</i> <i>A detailed hydrological assessment should be carried out in terms of the potential impacts arising from the proposed development on Natura 2000, notably Lough Corrib Special Area of Conservation (SAC) (Site Code: 000297) which has direct hydrological links as well as other Natura sites, Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) within the zone of influence; noting that designated sites at some distance can be intrinsically linked and supported by the surrounding habitats (e.g. agricultural fields) and hydrological processes.</i> Habitats Response from the DAU:
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		<i>The Department notes that the proposed development site contains a number of peatland habitats. Potential loss of these habitats should be considered in light of their ecological significance and importance as wetland habitats and the associated environmental services that they provide with regard to waterflow/flood regulation. Peat stability should be assessed where required.</i> <i>It is also noted that the site has potential for a number of protected species notably Marsh Fritillary due to the presence of its food plant Devil's-bit Scabious, Succisa pratensis along much of the road network and within the peatland areas. Marsh fritillary surveys should be carried out as per standard Marsh Fritillary Larval Web Survey methodology.</i> The DAU also highlights the importance of hedgerows as wildlife corridors, bird nesting habitat, habitat for woodland flora as well as supporting habitat for a number of other species such as bats and badgers. The DAU request that an estimated length of hedgerows proposed to be lost as a result of the Proposed Project is provided, and that suitable planting of native species in mitigation incorporated into the EIAR. <i>Invasive Species</i> <i>The EIAR should also address the issue of invasive alien plant and animal species such as Rhododendron ponticum and Japanese Knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during survey and or construction.</i> <i>Biodiversity Enhancement</i> <i>Such developments, given their scale and duration, can be an opportunity for ecological enhancement. Enhancement measures have been included in similar projects in Ireland. However, any proposed enhancement measures must have sufficient information to be implemented effectively. It is suggested that a Habitat Management Plan (HMP) is carried out, outlining specific enhancement measures to be undertaken, the timescale for implementation, objectives to be achieved and ecological monitoring requirements.</i> <i>The National Biodiversity Action Plan aims to conserve and restore Ireland's biodiversity. A key objective of the plan is to achieve no net contribution to biodiversity loss arising from development projects occurring within the lifetime of the plan. The EIAR should outline how the project will avoid a net loss of biodiversity.</i> <i>Appropriate Assessment</i> The DAU also made note of the requirement to carry out an Appropriate Assessment screening and/or Natura Impact Statement (NIS), as well as the requirement to review all site specific
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		conservation objective (SSCO) documents, or generic conservation objectives documents where SSCO's are not available, to ensure the full ecological implications of a proposal for a site's conservation objective and its integrity are analysed and assessed. <i>The Department advise that pre – consent ground investigations, data gathering infrastructure or testing that take place in a location that may affect an ecological feature (e.g. NHAs/pNHA's and European sites SACs and Special Protections Areas (SPAs), may require consent (i.e. are not exempted development) from the planning authority and or the Ministers consent from this Department.</i>
Inland Fisheries Ireland (IFI)	-	No response recieved
Irish Peatland Conservation Council	-	No response recieved
Irish Wildlife Trust	18/04/2023	IWT does not have the capacity to review documents relating to planning applications.
Irish Raptor Study Group	-	No response recieved
Irish Red Grouse Association	-	No response recieved
Waterways Ireland	-	No response recieved

3.1.2 Regional and Local Hydrology

3.1.2.1 Proposed Wind Farm Site

The Site is located in the regional Lough Corrib (Corrib_030) surface water catchment within Hydrometric Area 30 of the Western River Basin District (WRBD). Lough Corrib is located approximately 36km to the west of the Proposed Wind Farm site.

On a more local scale, the Site is located in the River Clare catchment wherein it exists within two surface water sub-catchments according to WFD/EPA mapping. The northern portion of the Proposed Wind Farm site which includes 7 no. turbine locations (T3, T4, T5, T6, T7, T8 and T9) is located in the Clare[Galway]_SC_040. Within this sub-catchment the Proposed Wind Farm site drains to the River Clare via the Grange River which flows less than 1km to the north of the Proposed Wind Farm site.

The southern portion of the Proposed Wind Farm site is located in the Clare[Galway]_SC_050 where 2 turbines T1 and T2, the temporary construction compound and the Site entrance are proposed. Within this sub-catchment the Proposed Wind Farm site drains to the River Clare via the Abbert River which flows approximately 3km to the south of the Proposed Wind Farm site.

3.1.2.2 Proposed Grid Connection and Turbine Delivery Route

The Proposed Grid Connection passes through both the Clare[Galway]_SC_040 (for 7.5km) and Clare[Galway]_SC_050 (for 13.4km) sub-catchments, while the Substation element is located entirely in the Clare[Galway]_SC_050 sub-catchment at the Proposed Wind farm site. Similar to the Proposed Wind Farm site, the Proposed Grid Connection cable route drains locally to the Grange River and Abbert River within the respective sub-catchments.

The proposed turbine delivery junction works on the N63/R332 junction and on the R332 at the proposed construction site entrance are located in the Clare[Galway]_SC_050 (Abbert River catchment).

3.1.2.3 Surface Water Drainage

3.1.2.3.1 Proposed Wind Farm

The northern portion of the Proposed Wind Farm site, within the Clare[Galway]_SC_040 sub-catchment (i.e. the Grange River), is drained by the Dangan Eighter Stream (EPA Code 30D35) which flows into the Grange River approximately 1km downstream of the Site. There are 3 unnamed streams which merge within the Proposed Wind Farm to form the Dangan Eighter Stream. The proposed turbine locations T3 to T9 drain into the Dangan Eighter Stream via a network of bog and land drains.

The southern portion of the Proposed Wind Farm site is drained by the EPA named Lecarrow 30 Stream (EPA Code 30L49) and the Forty Acres Stream (EPA 30F16), both of which are headwater streams of the Abbert River which flows approximately 5km downstream of the Proposed Wind Farm site. The majority of the southern portion of the Proposed Wind Farm site (including proposed turbine locations T1 and T2 as well as the temporary construction compound) drain to the Lecarrow 30 Stream.

The Lecarrow 30 Stream then flows to the south before discharging into Horseleap Lough which is located 1km to the south of the Proposed Wind Farm site. Horseleap Lough is a wetland with significant reed vegetation. Lecarrow 30 Stream exits from the southern side of Horseleap Lough and flows for approximately 4km prior to merging with the Abbert River.

The southwestern portion of the Proposed Wind Farm site, which includes the Site entrance and access road, drains to the Forty Acres Stream. The Forty Acres Stream flows for approximately 3km prior to

merging with the Lecarrow 30 Stream at a location 3km downstream of Horseleap Lough. The onsite substation element of the Proposed Grid Connection also drains to the Forty Acres Stream.

There is also a high density of man-made drains located within the cutover bog, grassland, and forestry areas of the Proposed Wind Farm site.

3.1.2.3.2 **Proposed Grid Connection**

Along the Proposed Grid Connection cable route there are 4 no. crossings over EPA mapped watercourses within the Clare[Galway]_SC_050 sub-catchment. These include 3 no. crossings on the Forty Acres Stream (1 no. proposed new culvert at Site entrance and 2 no. existing bridge/culvert crossings) and 1 no. existing crossing on the Feagh East Stream (EPA Code 30F17) which is a 1st order tributary of the Abbert River. There are 4 additional water crossing points along tributaries and unnamed streams, making a total of 8 watercourse crossings along the Proposed Grid Connection.

Within the Clare[Galway]_SC_040 sub catchment, there is an existing crossing along the Proposed Grid Connection cable route at 1 EPA mapped watercourse which is the Grange River itself.

3.1.3 **Hydrogeology**

The Proposed Project site is located in the Clare-Corrib Groundwater Body (GWB) (IE_WE_G_0020) which has a mapped surface area of 1,344km². According to WFD mapping this GWB is karstic in nature. Overall, groundwater flow direction within the Clare-Corrib GWB is reported to be to the southwest, with all groundwater flowing towards and discharging to Lough Corrib (GSI, 2004)⁴.

The bedrock type of the Clare-Corrib GWB is predominantly Dinantian Pure Bedded Limestone, which is the same lithology as the mapped bedrock formations that underlie the Proposed Project. Dinantian Pure Bedded Limestone is classified by the Geological Survey Ireland (GSI) as a Regionally Important Karstified Aquifer which is dominated by conduit flow (Rkc).

Groundwater flow directions through karst areas can be very variable due to the heterogenous nature of karstification/weathering within a rock that is otherwise devoid of groundwater. Groundwater flows through a network of solutional enlarged bedding planes, fissures and conduits.

Both point recharge and diffuse recharge occurs in this GWB. Diffuse recharge occurs over the GWB via rainfall percolating through the permeable subsoil. In areas of deep peat and low permeability glacial till, recharge to the underlying aquifer is limited to point recharge such as swallow holes, collapse features/dolines, and losing streams (GSI, 2004).

3.1.3.1 **Karst Features**

No GSI karst features have been mapped within the Site Boundary, however eight karst features ('enclosed depressions') are mapped by the GSI within a 1km buffer of the Proposed Wind Farm site with each of these recorded as enclosed depressions.

A total of 41 potential karst features (not mapped by GSI) have been identified within 1km of the Proposed Wind Farm site boundary, of which 13 are located within the EIAR boundary, and 11 of these have been visually inspected on site. The vast majority of identified features are classified as enclosed depressions/dolines, with two possible spring features identified at the Derrynacrick loughs.

Also, along the Proposed Grid Connection cable route outside the Proposed Wind Farm site there are numerous GSI mapped karst feature within a 100m corridor of the underground cable route. However,

⁴ Geological Survey Ireland (GSI). (2004). 1st Draft Clare-Corrib GWB Description June 2004. Clare Corrib GWB: Summary of Initial Characterisation

due to the nature the proposed route along public roads, with the cable being placed in a shallow trench within the road carriageway, no karst features are likely to be encountered.

The entirety of the Proposed Wind Farm site is mapped as being underlain by limestone bedrock, which is particularly prone to karstification. The Proposed Wind Farm site is split relatively evenly between areas mapped by the GSI as consisting of peat and areas mapped as till. Turbines e.g. T1, T3, T4, T6 and T8 are mapped as till, with T2, T5, T7 and T9 mapped as peat.

A 250m buffer has been used for analysing karst risk as this is considered to provide a localised yet sufficiently broad spatial context to capture nearby karst features that may pose indirect or cumulative risks to infrastructure. A high density of karst features within 250m indicates that the development of karstic features at the location being assessed is more likely.

Karst features were identified within 250m of T1, T2 hardstand, T4, T5 hardstand, T8 handstand, and various sections of access track alignment. The highest density of karst features was recorded in the area surrounding T4 and access track alignment AL6, with >4 features recorded within 250m of these locations (12 features are recorded within 250m of T4). Karst features overlap with the proposed new road north of T4. However, during geophysical surveying carried out in August 2025, no evidence for large karstic cavities beneath this location was found. As a result, these features were removed from the Karst Interaction scoring.

Due to the fixed nature of the proposed infrastructure, the most direct risk factor is the potential for karstic features to interact directly with the proposed infrastructure during construction of the Proposed Wind Farm. Although surface features in the surrounding area can indicate the level of karstification in the bedrock, these do not pose a direct risk to the Proposed Wind Farm, unlike those recorded within the Proposed Wind Farm footprint itself.

The identified karst risk at the Proposed Wind Farm site is generally classed as low; however, portions of the Proposed Wind Farm site, particularly in the vicinity of T1 and T8, are classified as medium hazard. Due to the overall setback distance of potential karst features from most of the key infrastructure locations, the Karst Hazard Rating is mainly Low with two areas of up to Medium. A High Hazard Rating was calculated for the hardstand of the proposed turbine T4 where several potential karst features are located.

3.1.3.2 Groundwater Levels

Groundwater level monitoring was carried out at the Proposed Wind Farm site between October 2022 and February 2025. Groundwater level monitoring results at two borehole locations (BH1 and BH2) can be found below in Table 3-2.

BH1 is located 350m to the west of turbine T1, while BH2 is located 250m to the northeast of turbine T2. Groundwater levels in BH1 over the monitoring period ranged between 72.41m OD (2.59mbgl) and 70.786 m OD (4.21mbgl). Groundwater levels in BH2 over the monitoring period ranged between 77.43m OD (0.57mbgl) and 76.51m OD (1.48mbgl). The low seasonal groundwater level variation is typical of peatland/bog settings where groundwater flows/recharge is generally impeded and groundwater levels are relatively consistent across seasons.

The groundwater levels indicate that there is limited recharge/vertical groundwater flow from the glacial deposits down into the underlying bedrock aquifer at the Proposed Wind Farm site. The presence of drainage features implies there is a need to drain surface water, as it cannot recharge/drain readily to the underlying bedrock aquifer underneath.

No karstified bedrock or conduit/fracture networks were encountered in BH1 and BH2 on the south of the Proposed Wind Farm site.

Table 3-2: Groundwater Level Summary Data (October 2022 – February 2025)

Location	Ground Level (m OD)	Min WL (m OD)	Max WL (m OD)	Range (m)
BH1	75	70.786	72.41	1.620
BH2	78	76.513	77.427	0.914

3.1.4

Baseline Water Quality

Biological Q-rating data for EPA monitoring points on watercourses downstream of the Site are shown below in Table 3-3.

Most recent data available (2012 to present) show that the Q-rating for the Grange (Galway) River and Abbert River is ‘Good’ in the vicinity and downstream of the Site. Further downstream the Clare (Galway) River’s status is also “Good”.

Table 3-3: EPA Biological Q-Rating Data

Waterbody	Station ID	Easting	Northing	EPA Q-Rating Status
Grange (Galway)_010	Bridge near Cloondahamper	155248	251511	(4) Good
Grange (Galway)_020	GRANGE (GALWAY) - Ford N.N.W. of Cornacartan	151020	251647	(4) Good
Grange (Galway)_020	Grange Bridge	148003	249913	(4) Good
Grange (Galway)_030	Cahergal Bridge	147706	247623	(4) Good
Grange (Galway)_040	1.7km u/s Clare River confl.	144054	246094	(4) Good
Clare (Galway)_060	Corrofin Bridge	142639	243390	(4) Good
Abbert_030	Bridge u/s Abbey Bridge	151671	243628	(4) Good
Abbert_040	ABBERT - Pallas Bridge	147305	242292	(4) Good
Abbert_040	Bridge at Bullaun	143625	240781	(4) Good
Clare (Galway)_070	Lackagh Br	141813	236430	(4) Good

3.2 Results of Baseline Ecological Surveys

3.2.1 Description of Habitats and Flora within the Proposed Wind Farm Site

A total of 18 habitats were recorded within the Site, including:

- Wet grassland (GS4)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Arable crops (BC1)
- Buildings and artificial surfaces (BL3)
- Stone walls and other stonework (BL1)
- Recolonizing bare ground (ED3)
- Conifer plantation (WD4)
- Broadleaved woodland (WD1)
- Scrub (WS1)
- Wet grassland/scrub (GS4/WS1)
- Cutover bog (PB4)
- Raised bog (PB1)
- Rich fen (PF1)
- Treelines (WL2)
- Hedgerows (WL1)
- Lowland/depositing rivers (FW2)
- Drainage ditches (FW4)

A habitat map of the site is provided in Figure 3-1. A map showing the Proposed Wind Farm development footprint overlaying the Habitat Map is shown in Figure 3-2 and Figure 3-3.



Map Legend

- EIAR Site Boundary
- Arable crops (BC1)
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Wet grassland/Scrub (GS4/WS1)
- Raised bog (PB1)
- Cutover bog (PB4)
- Broadleaved woodland (WD1)
- Conifer plantation (WD4)
- Scrub (WS1)
- Rich fen and flush (PF1)
- Buildings and Artificial Surfaces (BL3)
- Depositing/ Lowland Rivers (FW2)
- Drainage Ditches (FW4)
- Hedgerows (WL1)
- Treelines (WL2)

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Drawing Title

Habitat Map

Project Title

Cooloo Wind Farm, Co. Galway

Drawn By

EF

Checked By

RW

Project No.

190723

Drawing No.

Figure 3-1

Scale

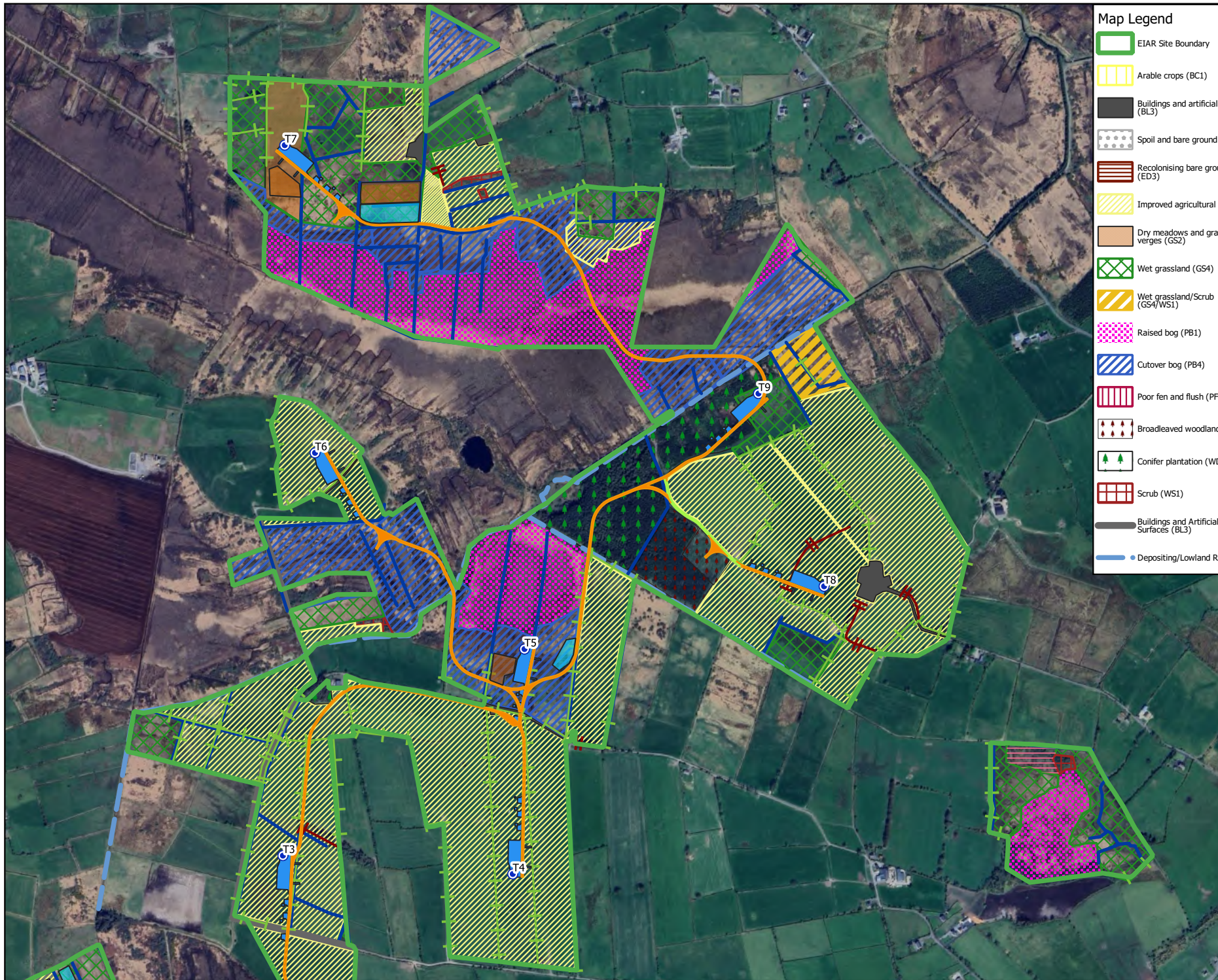
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Map Legend

EIAR Site Boundary	Drainage Ditches (FW4)
Arable crops (BC1)	Hedgerows (WL1)
Buildings and artificial surfaces (BL3)	Treelines (WL2)
Spoil and bare ground (ED2)	Proposed Turbine Layout
Recolonising bare ground (ED3)	Proposed Turbine Crane Platform and Hardstanding
Improved agricultural grassland	Proposed Turbine Foundations
Dry meadows and grassy verges (GS2)	Proposed Substation and BESS Compound
Wet grassland (GS4)	Proposed Met Mast
Wet grassland/Scrub (GS4/WS1)	Proposed Existing Roads to be Upgraded
Raised bog (PB1)	Proposed New Roads
Cutover bog (PB4)	Proposed Construction Compound
Poor fen and flush (PF2)	Proposed Peat Repository Areas
Broadleaved woodland (WD1)	Proposed Spoil Repository Areas
Conifer plantation (WD4)	Proposed Turbine Delivery Route Overrun Area
Scrub (WS1)	Proposed Turbine Delivery Accommodation Area
Buildings and Artificial Surfaces (BL3)	Proposed Grid Connection
Depositing/Lowland Rivers (FW2)	Proposed Turbine Delivery Route

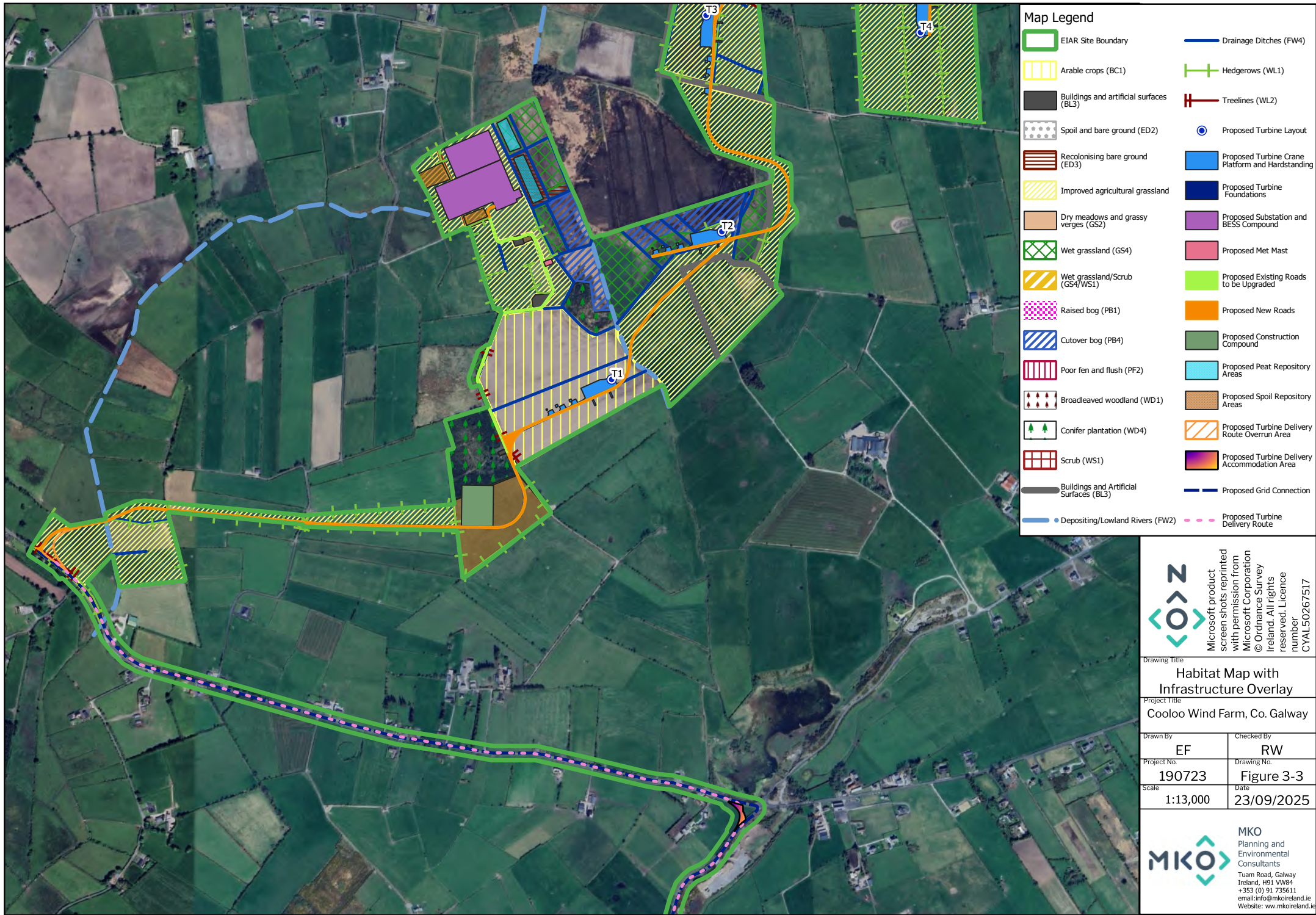
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Drawing Title
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Project Title
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Project No. 190723	Drawing No. Figure 3-2
Scale 1:13,000	Date 23/09/2025

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Map Legend

EIAR Site Boundary	Drainage Ditches (FW4)
Arable crops (BC1)	Hedgerows (WL1)
Buildings and artificial surfaces (BL3)	Treelines (WL2)
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Depositing/Lowland Rivers (FW2)	Proposed Turbine Delivery Route

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Project Title	
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1:13,000	23/09/2025

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3.2.1.1 Grassland Habitats

Grasslands make up a significant area of the habitats within the Proposed Wind Farm site. The Proposed Wind Farm site comprises sizable areas of improved agricultural grassland (GA1) (approx. 140ha) with small areas of wet grassland (GS4) (approx. 37.3ha) and smaller, less intensively managed fields of dry meadows and grassy verges (GS2) (approx. 7.6ha).

3.2.1.1.1 Improved Agricultural Grassland (GA1)

The habitat areas containing improved agricultural grassland (GA1) have primarily been intensively managed for cattle grazing, and many of these fields surveyed have been reseeded with Perennial Rye Grass (*Lolium perenne*). Turbines T2, T3, T4, T6 and T8, temporary construction compound, met mast, and the turbine delivery route accommodation area at the construction site entrance as well as to the west of the junction between N63/R332 (refer to Section 3.2.2.3) are all located within this habitat. Numerous sections of the proposed new access roads can be found through fields containing this habitat. Additionally, two spoil repository areas (SRA3 and SRA5) adjoining the proposed substation will be located within the same GA1 field. This can be seen depicted on Plate 3-1.

These areas are species-poor grassland communities with relatively little recognised conservation value. Other species found within these habitat areas include Docks (*Rumex obtusifolius*, *R. crispus*), Creeping buttercup (*Ranunculus repens*), Creeping thistle (*Cirsium arvense*), Dandelions (*Taraxacum officinale* agg.), Meadow Foxtail (*Alopecurus Pratensis*), White clover (*Trifolium repens*), Soft rush (*Juncus effusus*), Yorkshire fog (*Holcus lanatus*), Meadow grasses (*Poa trivialis*, *P. pratensis*), Mouse ear chickweed (*Cerastium fontanum*) and Bent grasses (*Agrostis stolonifera*, *A. capillaris*). These are relatively species-poor grassland communities with little recognised conservation value.



Plate 3-1 Example of an improved agricultural grassland (GA1) field within the turbine overrun at the construction site entrance

3.2.1.1.2 Wet grassland (GS4)

Some less intensively managed, wetter fields are categorised as wet grassland (GS4). Infrastructure proposed to be located within fields containing this habitat includes T9, as well as numerous sections of proposed new access roads. Additionally, two peat repository areas (PRA1 and PRA4) as well as one spoil repository area (SRA1) are proposed within this habitat.

These grassland areas are relatively species rich, containing Cock's foot (*Dactylis glomerata*), Knapweed (*Centaurea nigra*), Red clover (*Trifolium pratense*), Silverweed (*Potentilla anserina*), Sweet vernal grass (*Anthoxanthum odoratum*), Bush vetch (*Vicia sepium*), Yorkshire fog (*Holcus lanatus*), Meadowsweet (*Filipendula ulmaria*), Nettles (*Urtica dioica*), Sheep's sorrel (*Rumex acetosella*), Soft rush (*Juncus effusus*), False oat grass (*Arrhenatherum elatius*), Sorrel (*Rumex acetosa*), Common bent grass (*Agrostis capillaris*), Creeping bent grass (*Agrostis stolonifera*), Willowherbs (*Epilobium spp.*), Creeping thistle (*Cirsium arvense*), Marsh thistle (*Cirsium palustre*) and occasional low invading scrub, such as Brambles (*Rubus fruticosus agg.*) and Willows (*Salix spp.*). (Plate 3-2)

Some of the areas of wet grassland also contain Devil's bit scabious (*Succisa pratensis*). No infrastructure is proposed within these habitat areas.

Some areas of wet grassland which are found on peat soils grade into bog habitats, where fields have been agriculturally improved in the past. Species such as Purple moor grass (*Molinia caerulea*), Heath bedstraw (*Galium saxatile*), Marsh bedstraw (*Galium palustre*), Ling (*Calluna vulgaris*), Sheep's fescue (*Festuca ovina*), Tormenitil (*Potentilla erecta*) and Hare's tail cotton grass (*Eriophorum vaginatum*) can be found growing intermittently with the species listed above. No proposed infrastructure is located within these habitat areas.



Plate 3-2 Wet grassland (GS4) within the field proposed to accommodate T9

3.2.1.1.3 **Dry meadows and grassy verges (GS2)**

Some smaller areas of less intensively managed fields and roadside verges with a higher sward are categorised as dry meadows and grassy verges (GS2). Infrastructure proposed within these areas include T7 and the proposed temporary construction compound. Additionally, one spoil repository area is proposed within this habitat (SRA2) directly south of T7. (Plate 3-3)

Common species found within these habitat areas include Perennial rye grass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), Sweet vernal grass (*Anthoxanthum odoratum*), Meadow Foxtail (*Alopecurus pratensis*), Cocks foot (*Dactylis glomerata*), Bent grasses (*Agrostis spp.*), Crested Dogs-tail (*Cynosurus cristatus*), Ribwort plantain (*Plantago lanceolata*), Broadleaved Dock (*Rumex obtusifolius*), Knapweed (*Centaurea nigra*), Red clover (*Trifolium pratense*), Silverweed (*Potentilla anserina*), Meadow Buttercup (*Ranunculus acris*) and Creeping Buttercup (*Ranunculus repens*).



Plate 3-3 Dry meadows and grassy verges (GS2) at the location of the proposed temporary construction compound

3.2.1.2 **Woodland Habitats**

3.2.1.2.1 **Conifer plantation (WD4)**

There are four locations within the Proposed Wind Farm site comprising of mature coniferous plantation forestry of Sitka spruce (*Picea sitchensis*). The total of WD4 woodland within the Proposed Wind Farm site boundaries is approximately 15.94ha. The plantations forestry is frequently fringed by broadleaf species, including Sessile oak (*Quercus petraea*), Silver birch (*Betula pendula*), Hawthorn (*Crataegus monogyna*) and Brambles (*Rubus fruticosus agg.*) growing around the boundaries. Given the nature of such densely planted coniferous plantations, few other woody plant species occur within the plantation. (Plate 3-4)

The turbine hardstand of T9 and a section of the proposed new access road between T5 and T9 are located within this habitat. Additionally, approximately 0.13ha of the northwest corner of the proposed temporary construction compound is located within this habitat.



Plate 3-4 Plantation conifer forestry (WD4) occurring within a section of the proposed new road between T5/T8 and T9.

3.2.1.2.2 Broadleaved woodland (WD1)

A small number of areas within the site consist of broadleaf plantation forestry (approx. 3.8ha total). These areas consist of Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*) along the peripheries of the conifer plantation or in small blocks. The forest edges support species including willow (*Salix spp.*), ash (*Fraxinus excelsior*), Alder (*Alnus glutinosa*), hawthorn (*Crataegus monogyna*) and Hazel (*Corylus avellana*). Bracken (*Pteridium aquilinum*), Nettles (*Urtica dioica*) and Brambles (*Rubus fruticosus agg.*) dominate the field level of this habitat.

No infrastructure is located within these habitat areas; however a proposed new turning bay will overlap with a section of the ash monoculture woodland, and a section of the existing access road to be upgraded between T8 and T9 immediately adjoins this habitat area on the northeast side. There will be small losses of the edge of this habitat area associated with widening of the existing road at this location. (Plate 3-5)



Plate 3-5 Broadleaved woodland consisting of Ash (*Fraxinus excelsior*) plantation located to the west of T8

3.2.1.2.3 Scrub (WS1)

Scrub can be found throughout the Proposed Wind Farm site in various habitat pockets. In most instances, scrub forms a mosaic with bog habitats (PB1/PB4) and grassland areas. It can also be found encroaching into fields from hedgerows which have not been regularly maintained.

Species found within scrub habitats include Gorse (*Ulex europaeus*), Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus* agg.), Willows (*Salix* spp.), Blackthorn (*Prunus spinosa*), Hazel (*Corylus avellana*) and occasional Sycamore (*Acer pseudoplatanus*). (Plate 3-6)

Scrub encroaching into poor condition, drained, or partially drained bog habitats can be found at the adjacent and on the fringes of cutover bog (PB4) and uncut raised bog (PB1) habitats. It is likely some of these scrub-dominated habitat areas would convert into bog woodland (WN7) habitats, if peat extraction ceased, and the scrub left unmanaged to naturally recolonize. Species found within these habitats include Downy birch (*Betula pubescens*), Willows (*Salix cinerea*), Holly (*Ilex aquifolium*), with occasional Rowan (*Sorbus aucuparia*). Ground cover is dominated by dwarf shrubs such as Ling (*Calluna vulgaris*), occasional Bilberry (*Vaccinium myrtillus*) in association with Bracken (*Pteridium aquilinum*), Bramble (*Rubus fruticosus* agg.), Ivy (*Hedera hibernica*), Purple Moor-grass (*Molinia caerulea*). No infrastructure is proposed within these habitat areas. The proposed road between T7 and T9 will travel through a relatively small section of a recolonizing scrub habitat directly adjoining the north banks of the Dangan Eighter Stream, northwest of T9.

Scrub associated with peatland habitats within the site do not conform to the Annex I Bog Woodland habitat. The ground within the scrub habitats is predominantly made up of the species composition of the adjoining habitats and low growing scrub species such as Ling (*Calluna vulgaris*), occasional Bilberry (*Vaccinium myrtillus*).



Plate 3-6 Example of Scrub (WS1) habitat within the stand-alone field in the southeast of the Proposed Wind Farm

3.2.1.3 Peatland habitats

The northwest side of the Proposed Wind Farm site is mapped under Article 17 habitat as Annex I Active Raised Bog [7110]. A section of approximately 580m of the proposed new floating road between T7-T9 will be located within the mapped Article 17 habitat. The habitat classifications based on detailed botanical assessments within the peatland areas are described in full detail below.

The remainder of the Proposed Project footprint is located completely outside of any mapped Annex I habitat areas. The margins of the bog have been cut since at least the mid-1990s as evidenced from historic aerial imagery, with turbary cutting ongoing in a large part of the mapped Article 17 habitat area, as well as drainage throughout the habitat area. This has resulted in much of the peatland habitat within the Proposed Wind Farm site falling under the cutover bog (PB4) category (approx. 42.0ha), with areas of relatively uncut but drained bog categorised as uncut raised bog (PB1) (approx. 33.29ha).

3.2.1.3.1 Cutover bog (PB4)

Areas of cutover bog are comprised of vegetation that include ling heather (*Calluna vulgaris*), cross leaved heath (*Erica tetralix*), purple moor-grass (*Molinia caerulea*), tormentil (*Potentilla erecta*), bog asphodel (*Narthecium ossifragum*), saplings of downy birch (*Betula pubescens*) and willow (*Salix sp.*). Some Sitka spruce (*Picea sitchensis*) saplings are also recolonizing small areas of cutover bog where they are close to plantation forestry. (Plate 3-7

These areas of bog have evidently been drained and cut since at least the 1990s based on historic aerial imagery but have since started to revegetate. Areas of cutover bog in the site dominated by bare peat with revegetation are largely concentrated within the middle/west of the Proposed Wind Farm, within the lands between T5 and T6. Peat is still actively being extracted from some areas within the Wind Farm Site, particularly within the fields adjoining T5. Smaller areas of cutover bog can be found along

the road between T7 and T9. There is also one peat repository area proposed immediately east of T5 and one spoil repository located immediately to the west of the T5 hardstand. (Plate 3-8, Plate 3-9)



Plate 3-7 Example of revegetating Cutover bog (PB4) located within the centre of the Proposed Wind Farm site



Plate 3-8 Example of cutover bog with active peat extraction and dominated by bare peat, immediately south of the proposed T5



Plate 3-9 Example of cutover bog (PB4) habitat located within a proposed peat repository area

3.2.1.3.2 Raised Bog (PB1)

As described above, much of the high bog area has been cutaway around the edges and the heavily drained. However, the central section of the high bog area is relatively intact, and historical aerial imagery shows that this area has not been extensively cutaway in the past, however large parallel drainage features have been created throughout much of this habitat. Therefore, this habitat is considered as uncut raised bog.

The uncut areas are surrounded by deep drains and extensive areas of cutover bog, with small pockets of bare peat present. The majority of these habitats are dry in nature, and the vegetation is typically dominated by abundant ling heather (*Calluna vulgaris*), bog asphodel (*Narthecium ossifragum*), bog myrtle (*Myrica gale*) cross-leaved heath (*Erica tetralix*). *Sphagnum* cover is limited throughout, with few hummocks, sparse pool and overall, relatively dry ground. No areas were identified as quaking. The ground became wetter and softer as you move west to east through the bog, with small hummocks becoming more frequent. Uncut and areas that have not been drained are limited in extent throughout this habitat, and areas of high *Sphagnum* areas are fragmented within this habitat.

Based on the condition assessment, the IVC classifications and IWM 128 sub-community classification, it is likely that this habitat is a degraded raised bog habitat with small, fragmented areas of active raised bog. In order to fully assess whether the location of the proposed floating road between T7 and T9 is located within a habitat that corresponds to the Annex 1 habitat 7120 *Degraded raised bogs still capable of natural regeneration*, a full in-depth hydrological assessment of the physical conditions (including surface shape, slope and drainage patterns) must be assessed to determine if it is capable of regeneration. In the absence of this hydrological data within these habitat areas, it is not possible to definitively state whether this habitat would have the capability of regeneration. Therefore, by taking a conservative, precautionary approach, this habitat corresponds to the Annex 1 habitat 7120. (Plate 3-11)



Plate 3-10 Raised bog (PB1) found north of T5



Plate 3-11 Raised bog (PB1) habitat located within the section of the road between T7 and T9

3.2.1.3.3 Rich Fen (PF1)

An area in the north section of the stand-alone field to the east of the Proposed Wind Farm consists of a rich fen (PF1) habitat. This area is depressed from the rest of the field and contains a number of species characteristic of rich fen habitats, including Purple Moor-grass (*Molinia caerulea*), Grass-of-parnassus (*Parnassia palustris*), Marsh Cinquefoil (*Potentilla palustris*), Slender sedge (*Carex lasiocarpa*), Bottle sedge (*Carex rostrata*), Bog bean (*Menyanthes trifoliata*), Bladder sedge (*Carex vesicaria*), Devil's Bit Scabious (*Succisa pratensis*), Sharp-flower rush (*Juncus acutiflorus*), Soft rush (*Juncus effusus*), Marsh Horsetail (*Equisetum palustre*), Common Cottongrass (*Eriophorum angustifolium*), marsh orchid (*Dactylorhiza spp.*), Water mint (*Mentha aquatica*) and Marsh thistle (*Cirsium palustre*). Bryophytes present include *Campylium stellatum* and *Scorpidium scorpioides*. (Plate 3-12)

Species recorded within this habitat are indicator species of the Annex I habitat 7230 *Alkaline Fen*, and therefore there this habitat likely conforms to 7230 *Alkaline Fen*.

There is no infrastructure provided within this habitat area. It is proposed to retain this entire habitat and enhance the habitat, as outlined in the BMEP found in Appendix 6-4 of the accompanying EIAR.



Plate 3-12 Rich fen (PF1) habitat found within the stand-alone field in the east of the Proposed Wind Farm

3.2.1.4 Aquatic habitats

3.2.1.4.1 Lowland Depositing Rivers (FW2)

The watercourses identified within the vicinity of the Proposed Project are typically small, historically modified lowland depositing rivers (FW2).

Two rivers flow directly through the Proposed Wind Farm site, along with the Proposed Grid Connection. The Grange River (Grange(Galway)_010), (EPA Code: IE_WE_30G020200) and the Abbert River (Abbert_030) (EPA code: IE_WE_30A010300). The Grange River flows through the northern part of the site, while the Abbert River flows through two locations of the site in the south. A number of tributaries and unnamed streams that feed into these two rivers can also be found within the Proposed Project.

The Grange River, a major tributary of the Clare River, is a spring-fed river which rises some 5km north of Summerville Lough. It has been extensively deepened in places, as well as historically straightened in places. In-stream enhancement works have been carried out at numerous locations along this river.

The Abbert River is another major tributary of the Clare River. Having previously been modified by arterial drainage, rehabilitation works have restored areas of this river and it is now considered to provide good salmonid habitat (O'Reilly, 2009). Generally, this river within the Site has a semi-natural profile with only localised modifications such as scour protection in vicinity of the N63 road crossing. However, some locations have been historically straightened and/or deepened.

Additionally, the Abbert River, Feagh East Stream and the Grange River can all be found crossing the Proposed Grid Connection. Descriptions of the habitats at each of the watercourse crossing points can be found below.

A full description of watercourses is attached in the Aquatic Baseline Report attached as Appendix 1.

Proposed Wind Farm Watercourse Crossings

There are 5 no. proposed watercourse crossings within the Proposed Wind Farm. All watercourse crossings will consist of clear-span structures which will not require any in-stream works.

The first water crossing is located northeast of the turbine delivery accommodation main construction site entrance. There is no existing structure at this location. This crossing point will cross between two existing improved agricultural grassland (GA1) fields over a tributary of the Forty Acres Stream, classified as a lowland depositing river (FW2). The river profile was made up of a riffle and shallow glide with occasional shallow pools. The substrate largely was made up of mixed gravels, sand and small cobble. (Plate 3-13)



Plate 3-13 Watercourse crossing point 1 on a tributary of the Forty Acres Stream, northeast of the proposed construction site entrance

The second proposed watercourse crossing point is located northeast of T2, which is proposed to cross between a field of arable crops (BC1) and improved agricultural grassland (GA1). This proposed crossing point is located on the Lecarrow Stream (FW2), with an approximately 2m wide and 0.1m deep channel with bank heights of 2m. (Plate 3-14)



Plate 3-14 Proposed watercourse crossing point 2 on the Lecarrow Stream (FW2)

The third watercourse crossing point is located on an unnamed drainage ditch (FW4) that is culverted beneath an existing road. The channel was approx. 2m wide and 0.2-0.4m deep in very slow-flowing glide. (Plate 3-15)



Plate 3-15 Watercourse crossing point 3 located southeast of T6

The fourth watercourse crossing point is located north of T5. This location crosses over the Danagan Eighter Stream tributary (FW2). The channel was 2-2.5m wide with stagnant water of 0.05-0.15m deep. This proposed crossing point is located between peatland (PB1) and existing conifer forestry (WD4). (Plate 3-16)



Plate 3-16 Representative image of watercourse crossing point 4 within the Proposed Wind Farm

The fifth watercourse crossing point has a pre-existing concrete culvert which crosses over the Dangan Eighter Stream (FW2) between a section of conifer forestry (WD4) and cutover/raised bog habitats. The channel is wide (approximately 2-2.5m) and deep with overhanging vegetation. (Plate 3-17)



Plate 3-17 Dangan Eighter Stream (FW2) located northwest of T9, where the fifth proposed watercourse crossing point for the road between T7 and T9 is located

3.2.1.4.2 Drainage Ditches (FW4)

A number of manmade ditches/drains were recorded across the Proposed Wind Farm site. These drains were associated with areas of cutover bog (PB4), uncut raised bog (PB1) and along sections of the existing forestry access roads and field boundaries. Most were heavily vegetated with scrub species such as Bracken (*Pteridium aquifolium*), Brambles (*Rubus fruticosus agg.*) and Gorse (*Ulex europaeus*). Additionally, a number of unnamed streams/drains can be found traversing the proposed Grid Connection. These are described in detail in Appendix 1.

Drainage ditches associated with cutover bog areas have very little to no instream vegetation and are species poor. Species include Common reed (*Phragmites australis*), Gorse (*Ulex europaeus*), and Ling heather (*Calluna vulgaris*). (Plate 3-18)



Plate 3-18 Drain (FW4) located near T5, adjoining a Cutover Bog (PB4) habitat

3.2.1.5 Other Habitats

3.2.1.5.1 Arable Crops (BC1)

Three fields of arable crops can be found in the southwest of the Proposed Wind Farm. The fields contain monoculture cultivated Barley crops. Infrastructure located within these fields includes T01 and its associated hardstand, as well as a section of the proposed internal access road. (Plate 3-19)



Plate 3-19 Field containing Barley crops in the southwest of the Proposed Wind Farm

3.2.1.5.2 Hedgerows (WL1)

Hedgerows (WL1) throughout the Proposed Wind Farm site consist of Sycamore (*Acer pseudoplatanus*), Gorse (*Ulex europaeus*), Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus* agg.), Willows (*Salix* spp.), Elder (*Sambucus nigra*) and Blackthorn (*Prunus spinosa*).

At field level, many of the hedgerows contain Nettles (*Urtica dioica*), Willowherbs (*Epilobium* spp.), Docks (*Rumex* spp.), Cleavers (*Galium aparine*), Woundwort (*Stachys palustris*), Ivy (*Hedera hibernica*), Meadow foxtail (*Alopecurus pratensis*), Yorkshire fog (*Holcus lanatus*), Soft rush (*Juncus effusus*), Cow parsley (*Anthriscus sylvestris*), Bindweed (*Convolvulus arvensis*), False oat grass (*Arrhenatherum elatius*), Bracken (*Pteridium aquilinum*), Bush vetch (*Vicia sepium*), as well as *Dryopteris* spp. (Plate 3-20)



Plate 3-20 Example of hedgerows (WL1) located along field boundaries in the Proposed Wind Farm site

3.2.1.5.3 Treelines (WL2)

Treelines consist of Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Gorse (*Ulex europaeus*), Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus* agg.), Beech (*Fagus sylvatica*) and Alder (*Alnus glutinosa*). In some places there are planted Sitka spruce (*Picea sitchensis*) within the treeline. (Plate 3-21)



Plate 3-21 Treeline located within the Proposed Wind Farm site

3.2.1.5.4 **Buildings and artificial surfaces (BL3)**

Private dwellings, derelict sheds/farm structures as well as agricultural buildings are also present within the Proposed Wind Farm site and are categorised as buildings and artificial surfaces (BL3). Existing roadways within the Proposed Wind Farm site are also categorised as BL3. (Plate 3-22)

3.2.1.5.5 **Recolonising bare ground (ED3)**

Small habitat areas within the Proposed Wind Farm becoming recolonised by ruderal plants are categorised as recolonising bare ground (ED3). These areas are small and are not mapped in detail. Many consist of unbound farm tracks becoming recolonized by plants as well as farmyards and roadside verges with limited plant cover. One of the peat repository areas is proposed to be located within a field containing recolonizing bare ground (ED3) immediately east of the onsite substation.



Plate 3-22 Example of an agricultural structure categorised as Buildings and artificial surfaces (BL3) with Recolonizing bare ground (ED3) within the hardstanding area adjoining the structure.

3.2.1.5.6 Stone walls (BL1)

Stone walls (BL1) frequently line field boundaries within the Proposed Wind Farmand are almost entirely associated with scrub (WS1), hedgerows (WL1) and treelines (WL2) within the Proposed Wind Farm site. (Plate 3-23)



Plate 3-23 Stone walls (BL1) lining a field boundary within the Proposed Wind Farm site

3.2.2 Description of Habitats and Flora within the Proposed Grid Connection

3.2.2.1 Habitats within the Substation and BESS Compound

The proposed Substation and BESS compound are located within an improved agricultural grassland (GA1) field in the southeast of the Proposed Wind Farm Site. A description of the improved grassland habitat and flora species is found above in Section 3.2.1.1.1.

3.2.2.2 Habitats along the 110kV Underground Cabling

It is envisaged to connect the on-site 110kV substation to the existing 110kV Cloon substation in the townland of Cloonascragh, Co. Galway via 110kV underground electrical cabling. The underground electrical cabling route is approximately 20.9km in length and located primarily within the public road corridor, with approx. 2.6km located within the Proposed Wind Farm site. The underground cabling works route is described in in Section 2.2.2.2 and 2.2.2.3 above.

Habitats found alongside the Proposed Grid Connection (which will not be impacted as a result of the proposed GCR) include Improved agricultural grassland (GA1), Buildings and artificial surfaces (BL3), Cutover bog (PB4), Treelines (WL2), Hedgerows (WL1), Wet grassland (GS4), Parkland and scattered trees (WD5), Conifer plantation (WD4), (Mixed) Broadleaved woodland and Dry meadows and grassy verges (GS2). There are eight watercourse crossings over watercourses (FW2) drains (FW4) which pass

beneath the existing road along which the underground cable connection route will be located. (Plate 3-24)



Plate 3-24 Section of the Proposed Grid Connection located along a public road

3.2.2.2.1 **Watercourse crossings**

There are 8 identified watercourse crossings along the Proposed Grid Connection underground electrical cabling route. The construction methodology for the mapped crossings has been designed to eliminate the requirement for in-stream works on these locations requiring a crossing to be constructed to traverse the watercourse with the cabling ducts. A description of the watercourse crossing points can be found below.

Watercourse crossing 1

The first watercourse crossing is located northeast of the TDR overrun area at the site entrance. This crossing point crosses between two existing improved agricultural grassland (GA1) fields over a tributary of the Forty Acres Stream, classified as a lowland depositing river (FW2). The river profile was made up of a riffle and shallow glide with occasional shallow pools. The substrate largely was made up of mixed gravels, sand and small cobble. (Plate 3-25)



Plate 3-25 Watercourse crossing point 1 on a tributary of the Forty Acres Stream, northeast of the construction site entrance

Watercourse crossing 2

The 2nd watercourse crossing point when leaving the construction entrance of the Proposed Wind Farm site is an existing concrete-pipe culvert beneath the R332 over the Forty Acres Stream. It was dry on the upstream side of the road at the time of the survey, with a trickle flow. Further upstream within the Site, this stream is heavily vegetated, overgrown lowland/depositing river (FW2) forming part of the Forty Acres Stream. It is approximately 2-2.5m in width and less than 100cm deep. (Plate 3-26)



Plate 3-26 Watercourse crossing point 2 from the entrance of the Proposed Project over the Forty Acres Stream

Watercourse crossing 3

The 3rd Proposed Grid Connection watercourse crossing point is also part of the Forty Acres Stream (Lowland depositing river – FW2), located directly downstream of the 1st watercourse crossing point. The river is culverted by an existing concrete structure under the N63. The river had a glide flow and was approximately 15cm deep and 1-1.5m in width. (Plate 3-27)



Plate 3-27 Watercourse crossing point 3 beneath the N63, at the Forty Acres Stream

Watercourse crossing 4

The third watercourse crossing point crosses the Feagh East Stream beneath the L6324. This section of the river is classified as a lowland/depositing river (FW2). The stream was 3-4m wide and 0.3-0.6m deep with banks of up to 2m. The river had a very slow-flowing glide at the time of the survey. (Plate 3-28)



Plate 3-28 Fourth watercourse crossing point at the Feagh East Stream beneath the L6324

Watercourse crossing 5

The 5th watercourse crossing structure is an existing stone arch bridge over an unnamed drain (FW4) along the L2128. This watercourse crossing is has a rapid flow and dense vegetation cover. The channel wisth is approx. 1.5m. The stone arch bridge provides an existing culvert within the road. (Plate 3-29)



Plate 3-29 Unnamed stream beneath the road at watercourse crossing 5

Watercourse crossing 6

The 6th watercourse crossing point is located west of the 5th watercourse crossing point, also on the L2128. This watercourse is an unnamed, shallow drain (FW4) with banks approx. 0.5m in height. The drain is culverted beneath the road and heavy vegetated with scrub. (Plate 3-30)



Plate 3-30 Watercourse crossing point number 6

Watercourse crossing 7

The 7th watercourse crossing along the Proposed Grid Connection is located on the R347 and is an unnamed drain (FW4) which flows from conifer forestry (WD4) on either side of the road. The drain was shallow and heavily vegetated by scrub (WS1) on either side of the road. (Plate 3-31)



Plate 3-31 Watercourse crossing point watercourse crossing 7

Watercourse crossing 8

The 8th watercourse crossing point crosses the Grange River (Lowland Depositing River – FW2) at Ballinderry Bridge (R347). This river crossing on the Grange River forms part of the Lough Corrib SAC. The river was 10-12m wide and ranged from 0.5-3m deep with a profile of slow-flowing glide and pool (no riffle). (Plate 3-32 and Plate 3-33)



Plate 3-32 Watercourse crossing point 8 along the Proposed Grid Connection



Plate 3-33 Side view of watercourse crossing point 8

3.2.2.3 Habitats along the Turbine Delivery Route

Accommodation works will be required at only one location along the turbine delivery route, between the Galway City Port and the Proposed Wind Farm site. The turbine delivery route will utilise mainly national and regional roads, with one accommodation area required in the field west of the N63/R332 junction.

Turbine Delivery Accommodation at the N63/R332 Junction

The proposed turbine delivery accommodation is located within an area of Improved agricultural grassland (GA1) surrounded by a low growing Hawthorn (*Crataegus monogyna*) hedgerow at the N63/R332 Junction. The dominant species within this grassland habitat include Perennial Ryegrass (*Lolium perenne*), Broadleaved Dock (*Rumex obtusifolius*) and Common Sorrel (*Rumex acetosa*). Approximately 145m of this hedgerow will be lost to accommodate turbine delivery. (Plate 3-34 and Plate 3-35)



Plate 3-34 Improved Agricultural Grassland (GA1) within turbine delivery route accommodation area



Plate 3-35 Improved Agricultural Grassland (GA1) and low-growing Hawthorn hedgerow (WLI) within turbine delivery route accommodation area

Turbine Delivery Overrun at the Proposed Wind Farm Construction Site Entrance

The habitat within the field at the proposed construction site entrance is made up of improved agricultural grassland (GA1). This habitat is dominated by Perennial Ryegrass (*Lolium perenne*),

Yorkshire fog (*Holcus lanatus*) and Creeping buttercup (*Ranunculus repens*). A treeline (WL2) lines the turbine delivery overrun area at the construction site entrance. All of these trees will be permanently lost to facilitate the overrun area at the construction site entrance. (Plate 3-36)



Plate 3-36 Receiving habitat at of the proposed turbine overrun area at the construction site entrance

3.2.2.4 Protected Habitats/Flora

In summary, as described in the preceding sections, the following habitats which correspond to Annex I habitats are present within the Proposed Wind Farm site:

- Raised Bog (PB1) - Degraded raised bogs still capable of natural regeneration (7120)
- Rich Fen (PF1) - Alkaline Fen (7230)

It should be noted that the habitat corresponding to Alkaline Fen (7230) is located completely outside of the footprint of any infrastructure within the Proposed Project and will be entirely retained.

Peatlands present within the Proposed Wind Farm footprint include cutover raised bog (PB4) and some raised bog (PB1). The proposed new floating road between T7 and T9 crosses through approximately 580m of the mapped Article 17 habitat 'Active Raised Bog'. However, as detailed in Sections 0 and 3.2.1.3.2 and by taking a precautionary approach, approximately 285m of the proposed new floating road between T7 and T9 corresponds to the Annex 1 habitat *degraded raised bog capable of natural regeneration (7120)* within approximately 285m of the proposed road. The Proposed Wind Farm is located completely outside of any SAC and the Annex I habitats are not associated with any Qualifying Interest habitats.

Furthermore, no botanical species listed under the Flora (protection) Order or listed in the Irish Red Data Books were recorded on the Proposed Wind Farm site. All species recorded are common in the Irish landscape. No rare and protected plant species recorded in the desk study, including those obtained from NPWS data request were recorded within the study area.

3.2.2.5 Invasive species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

The Third Schedule invasive species American mink (*Neovision vison*) was recorded on the Lecarrow Stream, directly south of the 3rd water crossing point along the proposed grid connection route, in July 2024 during the Aquatic Surveys carried out.

The Third Schedule invasive species Rhododendron (*Rhododendron ponticum*) was also recorded along the hedgerows and on the edge of a conifer woodland (WD4), south of the 4th watercourse crossing point and within the roadside verges of the Proposed Grid Connection (see Plate 3-37 below). No additional Third Schedule invasive species were recorded within the Proposed Wind Farm site.



Plate 3-37 *Rhododendron (Rhododendron ponticum)* recorded at the edge of an existing Conifer Woodland (WD4) habitat along the northwestern section of the Proposed Grid Connection

3.2.3 Aquatic Surveys

The small streams that flow from the Proposed Project and downstream watercourses were subject to biological evaluation and assessment through fisheries assessments (electro-fishing and or fisheries habitat appraisal), white-clawed crayfish surveys, macrophyte and aquatic bryophyte survey and biological water quality sampling (Q-sampling) or macro-invertebrate sweep sampling (where applicable) between the 24th and the 27th of July 2024. Full details of the results of these surveys are provided in full within the Aquatic Baseline Report – Appendix 1.

3.2.3.1 Kick-sampling and Q-Value

The survey included a general habitat assessment and biological water quality assessment at watercourses within or downstream of the Proposed Project study area boundary. The water quality, as per Q-value (Quality Rating System)⁵, is fully described in Appendix 1. A total of 3 no. sites on the Abbert River (site C4), Dangan Eighter Stream (D2) and Grange River (E4) achieved Q4 (good status) water quality and thus met the target good status ($\geq Q4$) requirements of the European Union

⁵ Toner, P., Bowman, J., Clabby, K., Lucey, J., McGarrigle, M., Concannon, C., & MacGarthaigh, M. (2005). *Water quality in Ireland*. Environmental Protection Agency, Co. Wexford, Ireland.

Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC).

The biological water quality of the survey area was generally of poor status (Q2-3 or Q3) with significant siltation, eutrophication and hydromorphological impacts evidently contributing to a reduction in water quality.

3.2.3.2 Fish Species

The following paragraphs summarise the fish species that were found during the aquatic baseline surveys. The below paragraphs should be read in conjunction with Figure 2.1 (survey locations) found within the Aquatic Baseline Report (Appendix 1):

- Salmonids were present at ten no. sites in total, with Atlantic salmon present at seven of these: A7 (Grange River), A8 (Grange River – Grange Bridge), E4 (Grange River – Ballinderry Bridge), B2 (Aghloragh Stream), C3 (Lecarrow Stream), C4 (Abbert River, N63 crossing).
 - C4 had the highest densities of Atlantic salmon recorded during the survey, as well as provides good nursery habitat for Salmonids.
 - B2 Lecarrow is of high value for salmonids supporting a high density of juvenile trout and lower numbers of salmon.
 - A8 was an excellent salmonid nursery despite historical drainage works, with abundant instream refugia supporting high densities of juvenile salmonids.
- Lamprey was only recorded at site D2 on the Dangan Eighter Stream. There were no other records of lamprey, despite numerous locations providing potentially suitable habitat. This location was also noted as a good quality salmonid nursery.
- No lamprey ammocoetes were recorded within the site boundaries and the quality of lamprey habitat within the site boundaries was generally poor. The peat-dominated and or flocculent soft sediments typically found in the survey area do not provide optimal burial/burrowing habitat for ammocoetes.
- European Eel was not recorded at any of the survey locations, despite numerous locations providing potentially suitable habitat due to suitable depths, foraging habitat and connectivity to higher value rivers and streams.
- Other species recorded include Three-spined stickleback (abundant in site E3), Stone Loach, Brown Trout and Pike.

Despite evident stressors (mainly hydromorphology), the Ahgloragh Stream (a Grange River tributary) was of high value for salmonids and supported the highest density of brown trout in the survey area

During the previous survey (September 2022), the Danagan Eighter Stream, a tributary of the Grange River, was found to support brown trout, lamprey (*Lampetra* sp.), stone loach, three-spined stickleback and non-native roach (*Rutilus rutilus*) (Triturus 2022 data). Three-spined stickleback was the only fish species recorded from the Forty Acres Stream, with no fish recorded from 2 no. sites on the Lecarrow Stream (Triturus 2022 data).

3.2.3.3 White-clawed Crayfish

White-clawed crayfish were only recorded from the Danagan Eighter Stream. Low densities (according to Peay, 2003) were present at site A1, including both juveniles and adults (6-30mm carapace length). The Danagan Eighter Stream is a tributary of the Grange River. Using eDNA sampling, crayfish plague (*Aphanomyces astaci*) was detected within the Grange River (Triturus, 2023) and the downstream Clare River (since 2018; White et al., 2019).

3.2.3.4 Otter

The desk study identified that otter is widespread in the wider area surrounding the Proposed Project. Watercourses within the Proposed Wind Farm along the Proposed Grid Connection provide suitable habitat for otter. As such, all watercourses within the Proposed Wind Farm and along the Proposed Grid Connection were surveyed for signs of otter. Watercourses in the wider study area were also surveyed to inform the aquatic baseline, which included surveying for signs of otter.

Otter surveys undertaken in the wider study area identified a single spraint downstream of the bridge at survey location Site A1 on the Dangan Eighter Stream at a proposed access track crossing within the Proposed Project site boundary. This is located within the Proposed Wind Farm site boundaries, approximately 10m northeast of the proposed road between T5 and T6. A regular spraint containing abundant crayfish and diving beetle remains, was recorded on a boulder at the pipe culvert.

Site D3 was located on the Grange River (30G02) at a local road and was initially proposed as a location for a Grid Connection crossing, however this is no longer part of the Proposed Project, and is now located approx. 488m from the Proposed Project site boundary, and approx. 1.02km northeast off the nearest Wind Farm infrastructure (T7). Otter spraint (fish remains only) was recorded on the grassy banktop adjoining the bridge abutment at this location.

No breeding (holts) or resting (couch) sites were identified either within the Proposed Wind Farm, along the Proposed Grid Connection or in the wider study area where otter surveys were conducted.

3.2.4 Bird Surveys

In order to inform the scope of the bird surveys required for the NIS, a review was undertaken of the location of nearby Special Protection Areas (included in Table 4-1) and associated SCI species so that the survey design would include a focus on target SCI species in addition to all species captured for the purpose of the EIAR chapter. Details of the methodologies used for the bird surveys is provided in Section 1.4.2.4 above.

Where relevant, details of records of SCI designated species observed during the ornithological surveys at the Proposed Wind Farm site are provided below.

Lough Corrib SPA (the SPA boundary is located approximately 14.6km southwest of the Proposed Grid Connection. The SPA boundary is located approximately 23.5km southwest of the Proposed Wind Farm):

- [A051] Gadwall (*Anas strepera*) – The Proposed Wind Farm site is located outside the documented core foraging range of this species (2-3km, Johnston et al, 2013). Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A056] Shoveler (*Anas clypeata*) - The Proposed Wind Farm site is located outside the documented core foraging range of this species (2 – 3 km, Johnson et al. 2013). Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A059] Pochard (*Aythya farina*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A061] Tufted Duck (*Aythya fuligula*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A065] Common Scoter (*Melanitta nigra*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A125] Coot (*Fulica atra*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.

- [A179] Black-headed Gull (*Chroicocephalus ridibundus*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A193] Common Tern (*Sterna hirundo*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A194] Arctic Tern (*Sterna paradisaea*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A395] Greenland White-fronted Goose (*Anser albifrons flavirostris*) - The Proposed Wind Farm is located outside the documented core foraging range of this species (5 to 8km, SNH 2016). Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A140] Golden Plover (*Pluvialis apricaria*) – Golden Plover was recorded utilizing the Proposed Wind Farm site for roosting and foraging. However, the Proposed Wind Farm is located entirely outside the documented wintering foraging range of this species (12km, Gillings and Fuller 1999). Therefore, given the significant distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A082] Hen Harrier (*Circus cyaneus*) - The Proposed Wind Farm is located outside the documented core foraging range of this species (2km, max foraging distance: 10km, SNH 2016). There was no evidence of breeding at the Proposed Wind Farm site during surveys. There was a regularly used roost in a bog at Cloonboo More that was utilised by at least two individuals, however the roost was outside the Proposed Wind Farm site and greater than 700m from the nearest proposed turbine location. Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A182] Common Gull (*Larus canus*) – This species was only recorded twice during vantage point surveys, and there was only one observation within the Proposed Wind Farm site during the breeding season. The observations were largely concentrated to Horseleap Lough, outside of the proposed Wind Farm Site. This is discussed further below.

Inner Galway Bay SPA (the SPA boundary located approximately 21.2km southwest of the Proposed Grid Connection. The SPA boundary is located approximately 27.9km southwest from the Proposed Wind Farm site):

- [A003] Great Northern Diver (*Gavia immer*) – This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site. Furthermore, this species is primarily a coastal species in Ireland, with some birds utilising larger lakes for foraging. There is no suitable habitat within the Proposed Wind Farm site, or its immediate surroundings.
- [A017] Cormorant (*Phalacrocorax carbo*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site. Given the distance from the Proposed Wind Farm site, and that this species can be widely distributed across waterbodies and rivers during winter, it is unlikely that the individuals observed at the Proposed Wind Farm site are associated with the SPA population.
- [A028] Grey Heron (*Ardea cinerea*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site. Given the distance from the Proposed Wind Farm site, and that this species can be widely distributed across waterbodies and rivers during winter, it is unlikely that the individuals observed at the Proposed Wind Farm site are associated with the SPA population.
- [A046] Brent Goose (*Branta bernicla hrota*) - The Proposed Wind Farm is located outside the documented core foraging range of this species (8.2km, Summers and Critchley, 1990). Additionally, there were no records of this species during the dedicated ornithological surveys of the Proposed Wind Farm site. Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A050] Wigeon (*Anas penelope*) - The Proposed Wind Farm is located outside the documented core foraging range of this species (c.3km, Johnson et al. 2013). This species was only recorded in a mixed flock with other duck species outside of the Proposed Wind Farm site. Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.

- [A052] Teal (*Anas crecca*) - The Proposed Wind Farm is located outside the documented core foraging range of this species (0.8-8.4km, Johnson et al. 2013). This species was only recorded in a mixed flock with other duck species outside of the Proposed Wind Farm site. Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A056] Shoveler (*Anas clypeata*) - The Proposed Wind Farm is located outside the documented core foraging range of this species (2 – 3 km, Johnson et al. 2013). Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A069] Red-breasted Merganser (*Mergus serrator*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site. Furthermore, this species is primarily a coastal species in Ireland, with some bird utilising larger lakes for foraging. There is no suitable habitat within the Proposed Wind Farm site, or its immediate surroundings.
- [A137] Ringed Plover (*Charadrius hiaticula*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A140] Golden Plover (*Pluvialis apricaria*) - Golden Plover was recorded utilizing the Proposed Wind Farm site for roosting and foraging. However, the Proposed Wind Farm is located entirely outside the documented core winter foraging range of this species (10-12km, Gillings and Fuller 1999). Therefore, given the significant distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A142] Lapwing (*Vanellus vanellus*) - Lapwing was observed in the breeding and winter season largely concentrated within Horseleap Lough, outside of the Proposed Wind Farm site. Almost all roosting, loafing and foraging flocks were greater than 500m from the proposed turbine locations and outside the Proposed Wind Farm site. The only exceptions were one landed foraging flock of 50 birds and the flight path of one flock of 53 birds coming in to roost, both of which were within 500m of the proposed turbine locations. While published studies do not confirm precise core foraging ranges for lapwing, available data indicate the species has a core foraging range of <20km (Gillings and Fuller 1999). Given the distance between the Proposed Wind Farm and the SPA, potential links with the SCI population are ruled out.
- [A149] Dunlin (*Calidris alpina alpina*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site. The Proposed Wind Farm is located outside the documented core foraging range of this species (0.5 - 3km, SNH 2016). Furthermore, given the distance between the Proposed Wind Farm and the SPA, any links with the SPA population are unlikely.
- [A157] Bar-tailed Godwit (*Limosa lapponica*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A160] Curlew (*Numenius arquata*) the Proposed Wind Farm is located outside the documented core foraging range of this species (1 - 2km, SNH 2016). Furthermore, given the distance between the Proposed Wind Farm and the SPA, any links with the SPA population are unlikely.
- [A162] Redshank (*Tringa tetanus*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site. Furthermore, this species is primarily a coastal species in Ireland, with some bird utilising lakes and rivers for foraging. There is limited suitable habitat for the species within the Proposed Wind Farm site, and its immediate surroundings. However, given the distance from the Proposed Wind Farm site, and that this species can be widely distributed across waterbodies and rivers during winter, it is unlikely that any individuals which may be present within the vicinity of the Wind Farm site would be associated with the SPA population.
- [A169] Turnstone (*Arenaria interpres*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.. Furthermore, this species is primarily a coastal species in Ireland. Therefore, the Proposed Wind Farm site is of no ecological value to this species.
- [A179] Black-headed Gull (*Chroicocephalus ridibundus*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A182] Common Gull (*Larus canus*) - This species was only recorded twice during vantage point surveys, and there was only one observation within the Proposed Wind Farm site during

the breeding season. The observations were largely concentrated to Horseleap Lough, outside of the Proposed Wind Farm site. This is discussed further below.

- [A191] Sandwich Tern (*Sterna sandvicensis*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.
- [A193] Common Tern (*Sterna hirundo*) - This species was not observed during the dedicated ornithological surveys of the Proposed Wind Farm site.

3.2.4.1 Common Gull

Common Gull is designated for breeding SCI populations of Lough Corrib SPA and designated for the wintering SCI population for Inner Galway Bay SPA. Common Gull was recorded in both the breeding and the wintering seasons, however there was no evidence of breeding at the Proposed Wind Farm site during surveys. The survey results are detailed further below.

3.2.4.1.1 Vantage Point

Common gull was recorded two times during vantage point surveys, or on average once every 428 hours of survey. Of these records, one was within 500m of the proposed turbine locations. Only one single bird was observed in the breeding season and a flock of eight was observed in the winter season.

On both occasions, birds were observed travelling over farmland and lakes to the south of the Proposed Wind Farm site, in the area around Horseleap Lough, and not Lough Corrib which suggests not associated with Lough Corrib SPA breeding SCI population.

3.2.4.1.2 Waterbird Distribution and Abundance

Common gull was recorded 4 times during waterbird distribution and abundance surveys, on 4 of 89 survey dates (4%). Between 2 and 16 birds were observed during the winter and passage (August) seasons. The average flock size was 7 birds.

The closest record was ~2.2km from the nearest proposed turbine location. Birds were recorded roosting and foraging in the wider surroundings at Summerville Lough and Gorteenlahard Turlough.

All wintering records were associated with waterbodies in the wider surroundings (Horseleap Lough, Summerville Lough and Gorteenlahard Turlough). There were no observations of birds using the Proposed Wind Farm site. As such, the Proposed Wind Farm site is not considered an important wintering site for this species and due to the limited records and large intervening distance, it is not considered an important wintering site for the SCI designated population of the Inner Galway Bay SPA.

4.

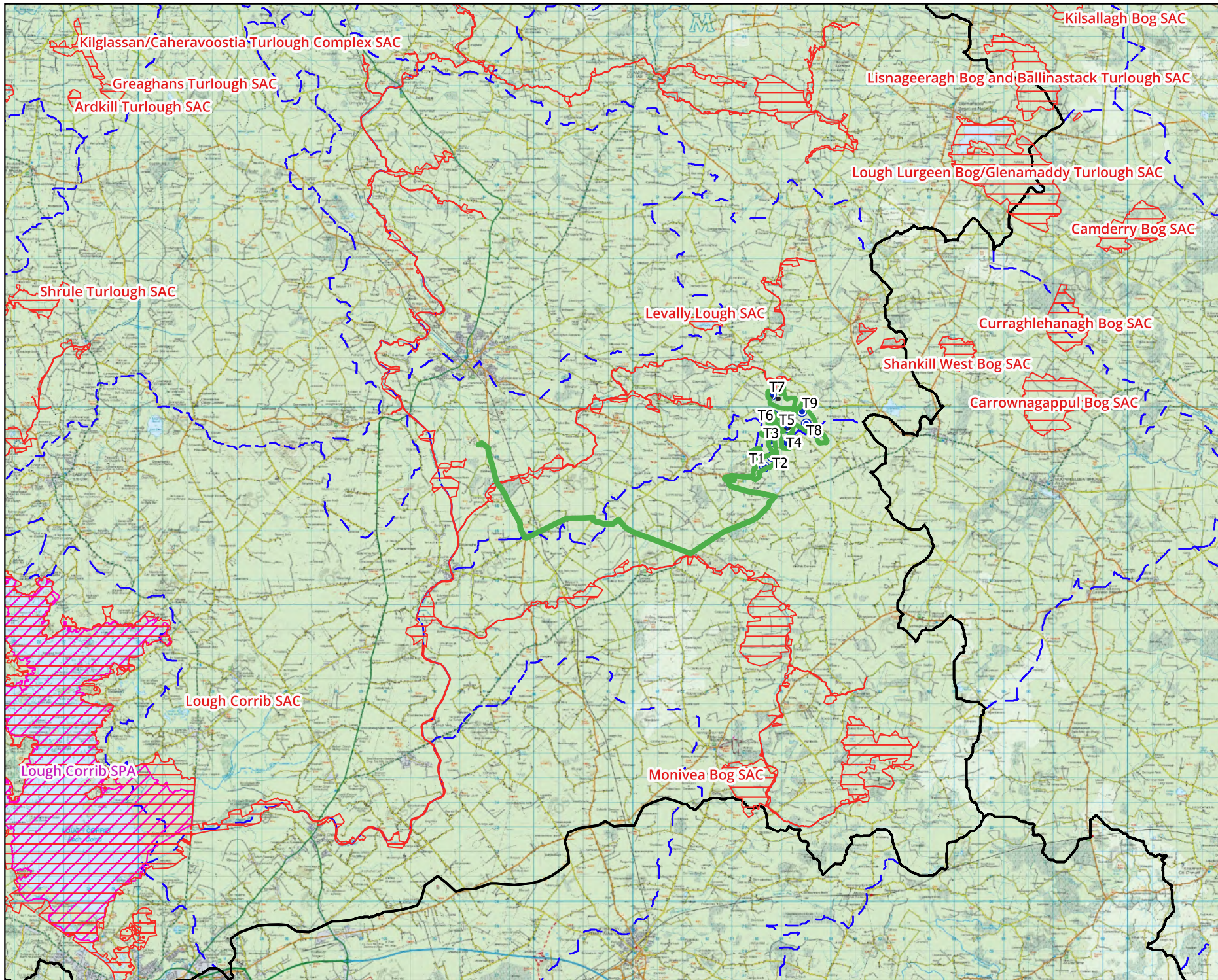
STAGE 1 – APPROPRIATE ASSESSMENT SCREENING

4.1

Identification of Relevant European Sites

The following methodology was used to establish any European Sites upon which there is a potential for a likely significant effect to occur either individually or in combination with other plans and projects as a result of the Proposed Project:

- Initially the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie).
- All European Sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, European Sites surrounding the development site are shown on Figure 4-1. Information on these sites according to the site-specific conservation objectives is provided in Table 4-1. Sites that were further away from the Proposed Project were also considered and are also shown in Figure 4-1 below.
- The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the Proposed Project and any European Sites. The hydrological catchments are also shown in Figure 4-1.
- In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, ‘*Assessing Connectivity with Special Protection Areas (SPA)*’ (2016) was consulted. This document provides guidance in relation to the identification of connectivity between Proposed Project and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
- Table 4-1 provides details of all relevant European Sites as identified in the preceding steps and assesses the potential for likely significant effects on each.
- The assessment considers any likely direct or indirect impacts of the Proposed Project, both alone and in combination with other plans and projects, on European Sites by virtue of criteria including the following: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning were considered in this assessment.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie).
- Where potential pathways for Likely Significant Effect are identified, the site is included within the Likely Zone of Influence and further assessment is required within the NIS.
- The potential for the Proposed Project to result in cumulative impacts on any European Sites in combination with other plans and projects was considered in the assessment that is presented in Table 4-1. Plans and projects considered include those that are listed in Appendix 4.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- WFD Hydrological Subcatchments
- WFD Hydrological Catchments
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)



Drawing Title

European Designated Sites

Project Title

Coolool Wind Farm, Co. Galway

Drawn By

EF

Checked By

RW

Project No.

190723

Drawing No.

Figure 4-1

Scale

1:200,000

Date

18/09/2025



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Table 4-1 Identification of European Sites within the Likely Zone of Influence

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Special Areas of Conservation (SAC)				
Lough Corrib SAC [000297] Distance: The Proposed Grid Connection crosses over the Grange River (at the Ballinderry Bridge), which forms part of this SAC. The Proposed Wind Farm site is located approximately 90m from the SAC boundary at its closest point.	➤ [1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) ➤ [1092] White-clawed Crayfish (<i>Austropotamobius pallipes</i>) ➤ [1095] Sea Lamprey (<i>Petromyzon marinus</i>) ➤ [1096] Brook Lamprey (<i>Lampetra planeri</i>) ➤ [1106] Salmon (<i>Salmo salar</i>) ➤ [1303] Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) ➤ [1355] Otter (<i>Lutra lutra</i>) ➤ [1393] Slender Green Feather-moss (<i>Drepanocladus vernicosus</i>) ➤ [1833] Slender Naiad (<i>Najas flexilis</i>) ➤ [3110] Oligotrophic waters containing very few minerals	Detailed conservation objectives for this site, (Version 1, April 2017⁶), were reviewed as part of the assessment and are available at www.npws.ie	The Proposed Grid Connection directly crosses a section of this SAC on the Grange River at the 8th watercourse crossing point along the Proposed Grid Connection. No in-stream works will be required. Therefore, there is no potential for direct effects associated with the Proposed Grid Connection. The Proposed Wind Farm is also located completely outside of any European Site, therefore there is no potential for direct effect. The watercourse crossings along the Proposed Grid Connection are hydrologically connected downstream to this SAC. The Proposed Wind Farm is hydrologically linked to the SAC via the Grange River, which adjoins the Proposed Wind Farm site in the north and flows into the Lough Corrib SAC 2.6km downstream. Additionally, at the south of the Proposed Wind Farm site the Abbert River flows through Proposed Wind Farm site into the SAC via 4.6km surface water distance downstream. There is potential for a deterioration of water quality as a result of construction and operation of the Proposed Wind Farm which could result in Likely Significant Effects (LSEs) on aquatic dependent QI species and habitats.	Yes

⁶ NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Hydrological distance from the Proposed Wind Farm site: 2.6km via the Grange River 4.6km via the Abbert River Hydrological distance from the Proposed Grid Connection: 1.5km via the Feagh_East stream at the 4th watercourse crossing 2km via the Abbert River at the 3rd watercourse crossing	- of sandy plains (<i>Littorelletalia uniflorae</i>) [3130] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3140] Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i> [3260] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6410] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion</i>		The Proposed Project (Proposed Wind Farm and Proposed Grid Connection) is located within the same ground waterbody as this SAC (Clare-Corrib - IE_WE_G_0020). According to the GSI groundwater body data sheet for the Clare-Corrib GWB⁷ overall, flow directions are to the southwest, with all groundwater discharging to Lough Corrib. Therefore, by taking a precautionary approach, there is potential that significant effects on the groundwater body Clare-Corrib may result in significant effects on the Groundwater Dependant Terrestrial Ecosystems (GWDTE) of the designated habitats and species of this SAC. There is also potential for disturbance of QI species otter as a result of the construction of the Proposed Wind Farm and Proposed Grid Connection. A complete source pathway receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. Therefore, the European Site is located within the Likely Zone of Influence and is considered further in this assessment.	

⁷ GSI. (2004). Clare-Corrib GWB: Summary of Initial Characterisation. 1st Draft Clare-Corrib GWB Description June .2004

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
➤ 4.3km via the Abbert River at the 2nd watercourse crossing	➤ <i>caeruleae</i>) ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion ➤ [7210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>* ➤ [7220] Petrifying springs with tufa formation (<i>Cratoneurion</i>) ➤ [7230] Alkaline fens ➤ [8240] Limestone pavements ➤ [91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles ➤ [91D0] Bog woodland			
Levelly Lough SAC [000295]	➤ [3180] Turloughs*	Detailed conservation objectives for this site, (Version 1, December 2020⁸), were reviewed as part of the	There will be no direct effects as the Proposed Project is located entirely outside the designated site.	No

⁸ NPWS (2020) Conservation Objectives: Levelly Lough SAC 000295. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Distance: 3.2km northwest of the Proposed Wind Farm 8.3km north of the Proposed Grid Connection		assessment and are available at www.npws.ie	The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water. The Proposed Project and this SAC are located within the same ground waterbody (Clare-Corrib - IE_WE_G_0020). However, this SAC is located in an upstream location in the Grange River catchment relative to the Proposed Wind Farm site and therefore no hydrological or hydrogeological pathway/connection is present. Therefore, no potential for Likely Significant Effects (LSEs) exist. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Derrinlough (Cloonkeenleananode) Bog SAC [002197] Distance:	[7120] Degraded raised bogs still capable of natural regeneration	Detailed conservation objectives for this site, (Version 1, July 2023 ⁹), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site.	No

⁹ NPWS (2023) Conservation Objectives: Derrinlough (Cloonkeenleananode) Bog SAC 002197. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
3.2km northeast of the Proposed Wind Farm 7.3km northeast of the Proposed Grid Connection			The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water. The Proposed Project and this SAC are located within the same ground waterbody (Clare-Corrib - IE_WE_G_0020). However, this SAC is located in an upstream location in the Grange River catchment relative to the Proposed Wind Farm site location and therefore no hydrological or hydrogeological pathway/connection is present and therefore no potential for effects. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Shankill West Bog SAC [000326] Distance:	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration	Detailed conservation objectives for this site, (Version 1, November 2015 ¹⁰), were reviewed as part of	There will be no direct effects as the Proposed Project is located entirely outside the designated site.	No

¹⁰ NPWS (2015) Conservation Objectives: Shankill West Bog SAC 000326. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
➤ 5.7km northeast of the Proposed Wind Farm ➤ 8.6km northeast of the Proposed Grid Connection	➤ [7150] Depressions on peat substrates of the Rhynchosporion	the assessment and are available at www.npws.ie	The Proposed Project and this SAC are not hydrologically connected, therefore there is no potential for significant effects exist in terms of surface water impacts. The Proposed Project is located within the ‘Clare-Corrib - IE_WE_G_0020’ groundwater body, while this SAC is located within the ‘Suck South’ - IE_SH_G_225 groundwater body. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Carrownagappul Bog SAC [001242] Distance:	➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration	Detailed conservation objectives for this site, (Version 1, November 2015 ¹¹), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water.	No

¹¹ NPWS (2015) Conservation Objectives: Carrownagappul Bog SAC 001242. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
8.1km east of the Proposed Wind Farm 10.6km northeast of the Proposed Grid Connection	[7150] Depressions on peat substrates of the Rhynchosporion		The Proposed Project is located within the ‘Clare-Corrib - IE_WE_G_0020’ groundwater body, while this SAC is located within the ‘Suck South’ - IE_SH_G_225 and the ‘Ballygar’ - IE_SH_G_028 groundwater bodies. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. The site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Curraghleanagh Bog SAC [002350] Distance: 10.0km northeast of the Proposed Wind Farm	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	Detailed conservation objectives for this site, (Version 1, November 2015¹²), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water. The Proposed Project is located within the ‘Clare-Corrib - IE_WE_G_0020’ groundwater body, while this SAC is located	No

¹² NPWS (2015) Conservation Objectives: Curraghleanagh Bog SAC 002350. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
➤ 12.8km northeast of the Proposed Grid Connection			within the ‘Suck South’ - IE_SH_G_225 and the ‘Ballygar’ - IE_SH_G_028 groundwater bodies. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. The site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Lough Lurleen Bog/Glenamaddy Turlough SAC [000302] Distance: ➤ 11.1km northeast of the Proposed Wind Farm ➤ 15.1km northeast of the Proposed Grid Connection	➤ [3180] Turloughs ➤ [3270] Rivers with muddy banks with <i>Chenopodium rubri p.p.</i> and <i>Bidention p.p.</i> vegetation ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the <i>Rhynchosporion</i>	Detailed conservation objectives for this site, (Version 1, April 2016¹³), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water. The Proposed Project is located within the ‘Clare-Corrib - IE_WE_G_0020’ and the ‘GWDTE-Glenamaddy Turlough (SAC000301) - IE_WE_G_0094’ and the ‘Suck South - IE_SH_G_225’ groundwater bodies. No complete source-pathway-receptor chain exists between the Proposed Project and	No

¹³ NPWS (2016) Conservation Objectives: Lough Lurleen Bog/Glenamaddy Turlough SAC 000301. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects. The site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Lisnageeragh Bog and Ballinastack Turlough SAC [000296] Distance: 14.4km northeast of the Proposed Wind Farm 18.8km northeast of the Proposed Grid Connection	[3180] Turloughs [7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the <i>Rhynchosporion</i>	Detailed conservation objectives for this site, (Version 1, March 2016¹⁴), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water. The Proposed Project is located within the ‘Clare-Corrib - IE_WE_G_0020’ and the ‘GWDTE-Glenamaddy Turlough (SAC000301) - IE_WE_G_0094’ and the ‘Suck South - IE_SH_G_225’ groundwater bodies. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified.	No

¹⁴ NPWS (2016) Conservation Objectives: Lisnageeragh Bog and Ballinastack Turlough SAC 000296. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
			No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Monivea Bog SAC [002352] Distances: 8.7km south of the Proposed Grid Connection 11.3km southwest of the Proposed Wind Farm site	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	Detailed conservation objectives for this site, (Version 1, December 2015¹⁵), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The Proposed Project and this SAC are both located within the same groundwater body groundwater body ('Clare-Corrib' - IE_WE_G_0020)⁴. However, the south-westerly groundwater flow in the Clare-Corrib GWB means this SAC is not within the general flow path from the Proposed Project. Additionally, given the significant intervening distance and the size of the overall groundwater body, there are no predicted likely significant effects to the SAC. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	No

¹⁵ NPWS (2015) Conservation Objectives: Monivea Bog SAC 002352. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Camderry Bog SAC [002347] Distance: 13.4km northeast of the Proposed Wind Farm 16.7km northeast of the Proposed Grid Connection	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	Detailed conservation objectives for this site, (Version 1, November 2015¹⁶), were reviewed as part of the assessment and are available at www.npws.ie	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The Proposed Project and this SAC are not hydrologically connected via surface water, therefore there is no source-pathway-receptor chain for significant effects on surface water. The Proposed Project is located within the 'Clare-Corrib - IE_WE_G_0020' groundwater body, while this SAC is located within the 'Suck South' - IE_SH_G_225 groundwater body. No complete source-pathway-receptor chain exists between the Proposed Project and this SAC and therefore no potential for direct or indirect effects were identified. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	No

¹⁶ NPWS (2015) Conservation Objectives: Camderry Bog SAC 002347. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
Galway Bay Complex SAC [000268] Distance: 20.0km southwest the Proposed Grid Connection 26.4km southwest of the Proposed Wind Farm Site Hydrological distance: >30km from both the Proposed Grid Connection and the Proposed Wind Farm site	[1140] Mudflats and sandflats not covered by seawater at low tide [1150] Coastal lagoons* [1160] Large shallow inlets and bays [1170] Reefs [1220] Perennial vegetation of stony banks [1310] <i>Salicornia</i> and other annuals colonising mud and sand [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1355] Otter <i>Lutra lutra</i> [1365] Harbour seal <i>Phoca vitulina</i> [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [3180] Turloughs*	Detailed conservation objectives for this site, (Version 1, April 2013¹⁷), were reviewed as part of the assessment and are available at www.npws.ie	There is no potential for direct effects as the Proposed Project is located completely outside of the designated site. There is no direct surface water hydrological pathway to this SAC. The Grange and Abbert Rivers within the Proposed Wind Farm site are hydrologically linked to Lough Corrib, which is upstream of this SAC. The only hydrological pathway to this SAC would be via groundwater percolation to Lough Corrib SAC, and subsequently downstream surface water flows to the marine waters of the SAC. Given the number of groundwater bodies and surface waters required to pass through before reaching the SAC, the minimum intervening hydrological distance and the relative insensitivity of the marine based QI habitats to localised sedimentation events, there is no potential for likely significant effects on the SAC. The groundwater dependant QI habitats associated with this SAC are located within a separate groundwater body to the Proposed Project.	No

¹⁷ NPWS (2013) Conservation Objectives: Galway Bay Complex SAC 000268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	> [5130] <i>Juniperus communis</i> formations on heaths or calcareous grasslands > [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites) > [7210] Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae* > [7230] Alkaline fens		No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	
Special Protection Areas (SPA)				
Lough Corrib SPA [004042] Distance:	> [A051] Gadwall (<i>Anas strepera</i>) > [A056] Shoveler (<i>Anas clypeata</i>) > [A059] Pochard (<i>Aythya farina</i>) > [A061] Tufted Duck (<i>Aythya fuligula</i>)	Detailed conservation objectives for this site, (Version 1, November 2023 ¹⁸), were reviewed as part of the assessment and are available at www.npws.ie	No in-stream works are required for any part of the Proposed Grid Connection or the Proposed Wind Farm site. Therefore, there is no potential for direct effects associated with the Proposed Grid Connection. The Proposed Wind Farm is also located completely outside of any European Site, therefore there is no potential for direct effect.	Yes

¹⁸ NPWS (2023) Conservation Objectives: Lough Corrib SPA 004042. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
➤ 14.6km southwest of the Proposed Grid Connection ➤ 23.5km southwest of the Proposed Wind Farm site Hydrological distance from the Proposed Wind Farm site: ➤ 42.4km surface water distance via the Abbert River ➤ 55.3km surface water distance via the Grange River Hydrological distance from the Proposed Grid Connection:	➤ [A065] Common Scoter (<i>Melanitta nigra</i>) ➤ [A082] Hen Harrier (<i>Circus cyaneus</i>) ➤ [A125] Coot (<i>Fulica atra</i>) ➤ [A140] Golden Plover (<i>Pluvialis apricaria</i>) ➤ [A179] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) ➤ [A182] Common Gull (<i>Larus canus</i>) ➤ [A193] Common Tern (<i>Sterna hirundo</i>) ➤ [A194] Arctic Tern (<i>Sterna paradisaea</i>) ➤ [A395] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) ➤ [A999] Wetlands		The watercourse crossings along the Proposed Grid Connection are hydrologically connected downstream to this SPA. The Proposed Wind Farm is hydrologically linked to the SPA via the Grange River, which adjoins the Proposed Wind Farm site in the north and flows into the Lough Corrib SPA 55.3km downstream. Additionally, at the south of the Proposed Wind Farm site the Abbert River flows through Proposed Wind Farm site into the SPA via 42.4km surface water distance downstream. By taking a highly precautionary approach, there is potential for a deterioration of water quality as a result of construction and operation of the Proposed Wind Farm which could result in Likely Significant Effects (LSEs) on aquatic dependent SCI species and associated designated wetland supporting habitat. The Proposed Project (Proposed Wind Farm and Proposed Grid Connection) is located within the same ground waterbody as this SPA (Clare-Corrib - IE_WE_G_0020). According to the GSI groundwater body data sheet for the Clare-Corrib GWB¹⁹ overall, flow directions are to the southwest, with all groundwater discharging to Lough Corrib. Therefore, by taking a precautionary approach, there is potential that significant effects on the groundwater body Clare-Corrib may result in significant effects on the Groundwater Dependant Terrestrial Ecosystems (GWDTE) of the designated habitats and species of this SAC.	

¹⁹ GSI. (2004). Clare-Corrib GWB: Summary of Initial Characterisation. 1st Draft Clare-Corrib GWB Description June .2004

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
➤ 32.4km surface water distance downstream of the 8th watercourse crossing point along the Proposed Grid Connection ➤ 37.6km surface water distance downstream of the 4th watercourse crossing point along the Proposed Grid Connection ➤ 40.0km surface water distance downstream of the 3rd watercourse crossing point along the Proposed Grid Connection ➤ 42.3km surface water distance downstream of the 2nd watercourse crossing point			Additionally, the potential for ex-situ indirect effects on SCI species requires further assessment. A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The European Site is considered to be within the Likely Zone of Influence of the Proposed Project and further assessment is required.	

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
along the Proposed Grid Connection				
Inner Galway Bay SPA [004031] Distance: 21.2km southwest of the Proposed Grid Connection 27.9km southwest of the Proposed Wind Farm site Hydrological distance: >30km from both the Proposed Grid Connection and the Proposed Wind Farm site	[A003] Great Northern Diver <i>Gavia immer</i> [A017] Cormorant <i>Phalacrocorax carbo</i> [A028] Grey Heron <i>Ardea cinerea</i> [A046] Brent Goose <i>Branta bernicla hrota</i> [A050] Wigeon <i>Anas penelope</i> [A052] Teal <i>Anas crecca</i> [A056] Shoveler <i>Anas clypeata</i> [A069] Red-breasted Merganser <i>Mergus serrator</i> [A137] Ringed Plover <i>Charadrius hiaticula</i> [A140] Golden Plover <i>Pluvialis apricaria</i> [A142] Lapwing <i>Vanellus vanellus</i>	Detailed conservation objectives for this site, (Version 1, May 2013²⁰), were reviewed as part of the assessment and are available at www.npws.ie	There is no potential for direct effects as the Proposed Project is located completely outside of the designated site. There is no direct surface water hydrological pathway to this SPA. The Grange and Abbert Rivers within the Proposed Wind Farm site are hydrologically linked to Lough Corrib, which is upstream of this SPA. The only hydrological pathway to this SPA would be via groundwater percolation to Lough Corrib SPA, and subsequently downstream surface water flows to the marine waters of the SPA. Given the number of groundwater bodies and surface waters required to pass through before reaching the SPA, the minimum intervening hydrological distance and the relative insensitivity of the marine based SCI supporting habitats to localised sedimentation events, there is no potential for likely significant effects on the SPA. Additionally, the Proposed Project is located over 20km at its closest point to the SPA. As detailed in Section 3.2.4, the Proposed Wind Farm site does not provide any significant	No

²⁰ NPWS (2013) Conservation Objectives: Inner Galway Bay SPA 004031. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from Proposed Project	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie)	Conservation Objectives	Identification of Source-Pathway-Receptor chain	Potential for Likely Significant Effects (LSEs)
	➤ [A149] Dunlin <i>Calidris alpina alpina</i> ➤ [A157] Bar-tailed Godwit <i>Limosa lapponica</i> ➤ [A160] Curlew <i>Numenius arquata</i> ➤ [A162] Redshank <i>Tringa totanus</i> ➤ [A169] Turnstone <i>Arenaria interpres</i> ➤ [A179] Black-headed Gull <i>Chroicocephalus ridibundus</i> ➤ [A182] Common Gull <i>Larus canus</i> ➤ [A191] Sandwich Tern <i>Sterna sandvicensis</i> ➤ [A193] Common Tern <i>Sterna hirundo</i> ➤ [A999] Wetlands		wintering habitat for any of the designated SCI species. Additionally, following the dedicated ornithological survey effort undertaken from October 2019 to March 2025, there is no evidence that the Proposed Wind Farm site is used by SCI populations associated with this European Site. No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Influence and is not considered further in this assessment.	

4.2

Stage 1 Appropriate Assessment Screening Conclusion

It cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed project, individually or in combination with other plans and projects, would be likely to have a significant effect on the Lough Corrib SAC [000297] and Lough Corrib SPA [004042].

As a result, an Appropriate Assessment is required, and a Natura Impact Statement has been prepared in respect of the Proposed Project.

5.

STAGE 2- NATURA IMPACT STATEMENT (NIS)

The potential for likely significant effects on the following European Sites in the absence of any mitigation, individually or cumulatively with other plans or projects, was identified in the preceding section:

- > Lough Corrib SAC [000297]
- > Lough Corrib SPA [004042]

The following sections consider each European Site individually to:

1. Determine which individual qualifying features have the potential to be adversely affected by the proposed project.
2. Provide information with regard to the Conservation Objectives and site-specific pressures and threats for those qualifying features that have the potential to be adversely affected.

5.1 Identification of relevant Qualifying Features and Desk Study

5.1.1 Lough Corrib SAC [000297]

The potential for impacts on this SAC were identified in Section 4.1 above. The identified pathways for effect include the following:

- A pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction and operation of the Proposed Project.
- Additionally, a potential indirect effect as a result of noise disturbance to the QI species otter was identified.

Table 5-1 below lists the qualifying features of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.1.1.1 Identification of Individual Qualifying Features with the Potential to be Affected

Table 5-1 Assessment of Qualifying features potentially affected

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2017 ²¹),	Rationale	Potential for Adverse Effects Y/N
[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	To restore the favourable conservation condition of Freshwater Pearl Mussel in Lough Corrib SAC	The Freshwater Pearl Mussel population for which this SAC is designated is located in the Owenriff catchment, to the west of Lough Corrib. The Proposed Project is located to the east of Lough Corrib. Therefore, there is no potential for likely adverse effect on the population of freshwater pearl mussel for which this SAC has been designated.	No

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2017 ²¹),	Rationale	Potential for Adverse Effects Y/N
[1092] White-clawed Crayfish (<i>Austropotamobius pallipes</i>)	To maintain the favourable conservation condition of White-clawed Crayfish in Lough Corrib SAC	According to Map 10 of the SSCO document for this SAC⁶, there are records of this species located within the Grange River, downstream of the Proposed Wind Farm and less than 1km upstream of the proposed HDD at the watercourse crossing #8. However, there will be no in-stream works required and therefore no potential risk associated with biosecurity issues and the spread of crayfish plague. Additionally, during the dedicated aquatic surveys carried out within the Site and nearby watercourses, low densities of this species were present within site A1, including both juveniles and adults (6-30mm carapace length). Therefore, there is potential for adverse effects on this species associated with the construction of the Proposed Grid Connection as well as the construction of the Proposed Wind Farm as a result of a deterioration of water quality.	Yes
[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	To restore the favourable conservation condition of Sea Lamprey in Lough Corrib SAC	According to the site-specific conservation objectives, Sea lamprey (<i>Petromyzon marinus</i>) traditionally congregate and build spawning nests in the River Corrib in Galway City, both up- and downstream of the Salmon Weir Bridge. Their further upstream passage is impeded by the regulating weir immediately upstream. Therefore, they are highly unlikely to be found in the upper reaches of the River Corrib, Lough Corrib or its tributaries. However, taking a highly precautionary approach, a potential for likely adverse effect on water quality, and therefore on the supporting habitat of this species has been identified.	Yes
[1096] Brook Lamprey (<i>Lampetra planeri</i>)	To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC	There is no potential for direct effect as no instream works are required. However, a potential for likely indirect adverse effect on the species where it occurs downstream of the Proposed Grid Connection and downstream of the Proposed Wind Farm as a result of deterioration in water quality has been identified.	Yes
[1106] Salmon (<i>Salmo salar</i>)	To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib SAC	There is no potential for direct effect as no instream works are required. However, a potential for likely indirect adverse effect on the species where it occurs downstream of the Proposed Grid Connection and Proposed Wind Farm site as a result of deterioration in water quality has been identified.	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2017 ²¹),	Rationale	Potential for Adverse Effects Y/N
[1303] Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)	To restore the favourable conservation condition of Lesser Horseshoe Bat in Lough Corrib SAC	The QI designated Lesser Horseshoe Bat summer roost and associated foraging grounds is located over 35km northwest of the Proposed Project. The Proposed Project is located entirely outside of the core foraging range of this species (2.5km, NPWS, 2018) ²² and therefore there will be no adverse effects on the QI designated population.	No
[1355] Otter (<i>Lutra lutra</i>)	To maintain the favourable conservation condition of Otter in Lough Corrib SAC	There is no potential for direct effect as no instream works are required. Additionally, no holts or resting places were recorded during the dedicated otter surveys undertaken, although there was evidence that otter may utilise the rivers and streams in proximity of the Proposed Project. However, a potential for likely indirect adverse effect on the species where it occurs downstream of the Proposed Grid Connection and downstream of the Proposed Wind Farm as a result of deterioration in water quality has been identified.	Yes
[1393] Slender Green Feather-moss (<i>Drepanocladus vernicosus</i>)	To maintain the favourable conservation condition of Slender Green Feather-moss (Shining Sicklemoss) in Lough Corrib SAC	Due to the terrestrial nature of this species, there is no source-pathway-receptor chain for adverse effect on this species where it occurs within the SAC. The record is located within a different groundwater body (Ross Lake) and therefore there will be no adverse effects via hydrological pathways as a result of the Proposed Project.	No
[1833] Slender Naiad (<i>Najas flexilis</i>)	To restore the favourable conservation condition of Slender Naiad in Lough Corrib SAC	There is potential for this species to occur within Lough Corrib downstream of the Proposed Project. Therefore by taking a highly precautionary approach, a potential for likely indirect adverse effect as a result in deterioration in water quality was identified.	Yes
[3110] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)	To restore the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) in Lough Corrib SAC	According to Map 3 of the SSCO document ²¹ , this lake habitat occurs within the northwestern portion of Lough Corrib. <i>It is likely to occur elsewhere along the northern or western shoreline of Lough Corrib, in Ballydoo Lough (N. of Corrib) and in small lakes in the Owenriff catchment.</i> However, the Proposed Project, which is located within the Clare River catchment, is upstream of the southeastern portion of the lake only. Therefore, there is no potential for	No

²² NPWS (2018) Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*) Version 1. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2017 ²¹),	Rationale	Potential for Adverse Effects Y/N
		likely adverse effect on this lake habitat which is located upgradient of the catchment within which the Proposed Project is located.	
[3130] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>	To restore the favourable conservation condition of Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> in Lough Corrib SAC	According to map 3 of the SSCO document ²¹ , this habitat is located on the western side of Lough Corrib, upstream of the lake. It is also located within a different groundwater body (Ross Lake) than the Proposed Project. There is no potential for adverse effects on this QI Habitat as a result of the Proposed Project.	No
[3140] Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i>	To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i> in Lough Corrib SAC	According to Map 3 of the SSCO document ²¹ , this habitat is found within the southern basin of Lough Corrib. Therefore, a potential for likely indirect adverse effect on this lake habitat exists as a result of deterioration in downstream water quality. Additionally, as outlined in Section 0, groundwater flow paths generally in a south-westerly direction towards Lough Corrib may lead to a deterioration in groundwater quality at this location within the SAC.	Yes
[3260] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	To maintain the favourable conservation condition of Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation in Lough Corrib SAC	Little is known about the characteristics or sub-types in Lough Corrib SAC. Many of the rivers were included in the SAC for Atlantic salmon (<i>Salmo salar</i>). Most of the rivers are in arterial drainage schemes that have altered aquatic plant distribution and species composition. Given that the full distribution of this aquatic habitat within the SAC is unknown, there is a potential for likely indirect adverse effect on this lake habitat as a result of deterioration in downstream water quality.	Yes
[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)	To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) in Lough Corrib SAC	Due to the terrestrial nature of this habitat, there is no source-pathway-receptor chain for adverse effect on this habitat where it occurs within the SAC.	No

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2017 ²¹),	Rationale	Potential for Adverse Effects Y/N
[6410] <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)	To maintain the favourable conservation condition of <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) in Lough Corrib SAC	Due to the terrestrial nature of this habitat, there is no source-pathway-receptor chain for adverse effect on this habitat where it occurs within the SAC.	No
[7110] Active raised bogs	To restore the favourable conservation condition of Active raised bogs* in Lough Corrib SAC	This habitat is predominantly terrestrial in nature, and given the significant intervening distance between the Proposed Project and the location of this habitat within the SAC, there are no likely source-pathway-receptor chains for adverse effects.	No
[7120] Degraded raised bogs still capable of natural regeneration	The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Lough Corrib SAC	This habitat is predominantly terrestrial in nature, and given the significant intervening distance between the Proposed Project and the location of this habitat within the SAC, there are no likely source-pathway-receptor chains for adverse effects.	No
[7150] Depressions on peat substrates of the Rhynchosporion	Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Lough Corrib SAC	This habitat is predominantly terrestrial in nature, and given the significant intervening distance between the Proposed Project and the location of this habitat within the SAC, there are no likely source-pathway-receptor chains for adverse effects.	No
[7210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> *	To maintain the favourable conservation condition of Calcareous fens with <i>Cladium mariscus</i> and	A potential for indirect adverse effect on these groundwater-dependent habitats has been identified as a result of potential deterioration in groundwater quality associated with the Proposed Project.	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2017 ²¹),	Rationale	Potential for Adverse Effects Y/N
	species of the <i>Caricion davallianae</i> in Lough Corrib SAC		
[7220] Petrifying springs with tufa formation (<i>Cratoneurion</i>)	To maintain the favourable conservation condition of Petrifying springs with tufa formation (<i>Cratoneurion</i>)* in Lough Corrib SAC		Yes
[7230] Alkaline fens	To maintain the favourable conservation condition of Alkaline fens in Lough Corrib SAC		Yes
[8240] Limestone pavements	To maintain the favourable conservation condition of Limestone pavements* in Lough Corrib SAC	Due to the terrestrial nature of this habitat, there is no source-pathway-receptor chain for adverse effect on this habitat where it occurs within the SAC.	No
[91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	To maintain the favourable conservation condition of Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles in Lough Corrib SAC	Due to the terrestrial nature of this habitat, there is no source-pathway-receptor chain for adverse effect on this habitat where it occurs within the SAC.	No
[91D0] Bog woodland	To maintain the favourable conservation condition of Bog woodland* in Lough Corrib SAC	This habitat is predominantly terrestrial in nature, and given the significant intervening distance between the Proposed Project and the location of this habitat within the SAC, there are no likely source-pathway-receptor chains for adverse effects.	No

5.1.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Project. These are provided in Table 5-2.

Table 5-2 Site-specific threats, pressures and activities

Negative Impacts			
Rank	Threats and Pressures		Inside/Outside
High	A02.01	Agricultural intensification	Both
High	C01.03.02	Mechanical removal of peat	Inside
High	G05	Other human intrusions and disturbances	Inside
High	H01.08	Diffuse pollution to surface waters due to household sewage and waste	Outside
High	I01	Invasive non-native species	Inside
Medium	A04.03	Abandonment of pastoral systems, lack of grazing	Inside
Medium	A08	Fertilisation	Both
Medium	A10.01	Removal of hedges and copses or scrub	Inside
Medium	01	Forest planting on open ground	Both
Medium	D01	Roads, paths and railroads	Inside
Medium	D03.01.02	Piers/ tourist harbours or recreational piers Inside	Inside
Medium	E01.01	Continuous urbanisation	Outside
Medium	E01.03	Dispersed habitation	Inside
Medium	J02.01.03	Infilling of ditches, dykes, ponds, pools, marshes or pits	Inside
Medium	J02.15	Other human induced changes in hydraulic conditions	Both
Low	C01.01	Sand and gravel extraction	Outside
Low	E03.01	Disposal of household/ recreational facility waste	Inside

None of the listed threats and pressures are relevant to the Proposed Project.

5.1.1.3 Species Specific Information

5.1.1.3.1 [1092] White-clawed Crayfish (*Austropotamobius pallipes*)

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is 'Deteriorating'.

This species was noted to be in Lough Corrib itself along with many of the rivers that flow into it. The Grange (Galway) River in particular has eleven areas recorded where the species was found downstream of the Proposed Project. The Conservation Objective for this species is to maintain favourable conservation conditions of within the SAC. Specific conservation targets for this species relate to water quality and disease, which refers to crayfish plague which has a 100% mortality rate among White-clawed Crayfish. Deterioration of water quality would undermine the conservation objective to maintain favourable conditions for this species within the SAC.

Targets and Attributes

The Conservation Objective for White-clawed Crayfish is '*To maintain the favourable conservation condition of White-clawed Crayfish in Lough Corrib SAC.*'

The attributes and targets for this species are provided in Table 5-3 below:

Table 5-3: Targets and Attributes for White-clawed Crayfish within Lough Corrib SAC

Attribute	Target
Distribution: rivers	No reduction from baseline.
Distribution: Lough Corrib	No reduction from baseline.
Population structure: recruitment	Juveniles and/or females with eggs in all occupied tributaries and occupied parts of Lough Corrib
Negative indicator species	No alien crayfish species
Disease	No instances of disease
Water quality	At least Q3-4 at all sites sampled by EPA
Habitat quality: heterogeneity	No decline in habitat heterogeneity or habitat quality

5.1.1.3.2 Sea Lamprey (*Petromyzon marinus*)

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Bad' and the overall Conservation Trend is 'Stable'.

This species spawns in rivers and spends time as a juvenile inhabiting lakes and rivers before entering the sea as an adult. Sea lamprey (*Petromyzon marinus*) traditionally congregate and build spawning nests in the River Corrib in Galway city, both up- and downstream of the Salmon Weir Bridge. Their further upstream passage is impeded by the regulating weir immediately upstream. The combination of barriers to passage and low flows can impede further upstream passage in Irish catchments and prevent or reduce penetration and extensive colonisation (Gargan et al., 2011; Rooney et al., 2015). The Conservation Objective is to restore the favourable conservation conditions in Lough Corrib for this species. The Conservation Targets for this species would be greatly impacted by a deterioration of water quality in the SAC.

Targets and Attributes

The Conservation Objective for Sea Lamprey is ‘*To restore the favourable conservation condition of Sea Lamprey in the Lough Corrib SAC.*’

The attributes and targets for this species are provided in Table 5-4 below:

Table 5-4 Targets and Attributes for Sea Lamprey within Lough Corrib SAC

Attribute	Target
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary
Population structure of juveniles	At least three age/size groups present
Juvenile density in fine sediment	Mean catchment juvenile density at least 1/m ²
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	More than 50% of sample sites positive, with a minimum of four positive sites in a catchment, which are at least 5km apart

5.1.1.3.3 Brook Lamprey (*Lampetra planeri*)

Description from the SSCO and Article 17 Report

As per the detailed SSCO document (NPWS, 2017), brook lamprey is known to occur within the aquatic habitat of the SAC. No specific distribution map is available for this species within the SSCO. to the Natura 2000 Form, permanent brook lamprey populations are present within the SAC. Artificial barriers can block or cause difficulties to brook lampreys’ migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007). According to the Article 17 Report (NPWS 2019), the overall Conservation Status for Brook Lamprey is ‘Favourable’, and the overall Conservation Trend is ‘Stable’.

Targets and Attributes

The Conservation Objective for Brook Lamprey is ‘*To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC.*’

The attributes and targets for this species are provided in Table 5-5 below:

Table 5-5 Targets and Attributes for Brook Lamprey within Lough Corrib SAC

Attribute	Target
Distribution	Access to all watercourses down to first order streams
Population structure of juveniles	At least three age/size groups of brook/river lamprey present
Juvenile density in fine sediment	Mean catchment ammocoete density of brook/river lamprey at least 5/m ²
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	More than 50% of sample sites positive

5.1.1.3.4 Atlantic Salmon (*Salmo salar*)

Description from the SSCO and Article 17 Report

According to the site synopsis document for the Lough Corrib SAC (NPWS 2022²³), the area of the Corrib River between Lough Corrib and Galway Bay (IE_WE_30C020600) is designated as an important river for Atlantic Salmon. There are no barriers to migration of salmon (*Salmo salar*) in Lough Corrib SAC. Salmon spawn in the headwaters of Lough Corrib tributaries. There is an artificial canal joining Lough Corrib and Lough Mask where salmon did not have access historically and does not constitute a limit on the distribution of salmon in Lough Corrib SAC. According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Inadequate' and the overall Conservation Trend is 'Stable'.

Targets and Attributes

The Conservation Objectives for Atlantic Salmon is '*To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib SAC*'

The attributes and targets for this species are provided in Table 5-6 below:

Table 5-6 Targets and Attributes for Atlantic Salmon within Lough Corrib SAC

Attribute	Target
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary
Adult spawning fish	Conservation limit (CL) for each system consistently exceeded
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling
Out-migrating smolt abundance	No significant decline

²³ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000297.pdf>

Attribute	Target
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes
Water quality	At least Q4 at all sites sampled by EPA

5.1.1.3.5 Otter (*Lutra lutra*)

Description from the SSCO and Article 17 Report

According to the site synopsis document for Lough Corrib SAC (NPWS, 2022) Lough Corrib is considered one of the best sites in the country for Otter, due to the sheer size of the lake and associated rivers and streams, and also the generally high quality of the habitats. Distribution measure based on standard otter survey technique had a favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al., 2013) According to the Article 17 Report (NPWS 2019), the overall Conservation Status for this species is 'Favourable' and the overall Conservation Trend is 'Improving'.

Targets and Attributes

The Conservation Objectives for Otter is '*To maintain the favourable conservation condition of Otter in Lough Corrib SAC*'

The attributes and targets for this species are provided in Table 5-7 below:

Table 5-7 Targets and Attributes for Otter within Lough Corrib SAC

Attribute	Target
Distribution	No significant decline
Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 1,054ha along riverbanks/ lake shoreline/around ponds
Extent of freshwater (river) habitat	No significant decline. Length mapped and calculated as 314.2km
Extent of freshwater (lake) habitat	No significant decline. Area mapped and calculated as 4,178ha
Couching sites and holts	No significant decline
Fish biomass available	No significant decline
Barriers to connectivity	No significant increase.

5.1.1.3.6 *Slender Naiad (Najas flexilis)*

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall assessment of conservation status of this species is ‘inadequate’. The overall trend in conservation status is ‘deteriorating’.

According to the SSCO supporting document (NPWS, 2017), *Najas flexilis* has been recorded on one occasion from one location in Lough Corrib. The record was made by W. Krause and J.J. King in the north-western bay of the lake between the 7th and the 12th of July 1986. It is possible that the Lough Corrib population of *Najas flexilis* has become extinct since 1986. The single record for the species dates from July 1986 and came from a broad vegetation survey using a boat and grapnel, when it was found at c. 1m depth on stony ground. Routine Water Framework Directive (WFD) macrophyte monitoring has been conducted by the Environmental Protection Agency (EPA) in Lough Corrib since 2007, but again the species has not been recorded.

However, the large size of Lough Corrib means that the species could easily have been missed by surveys and *Najas flexilis* may persist in some localities. It is likely, however, given the condition of the lake habitat, that the population has declined in number and/or become more fragmented. As a consequence, the conservation objective for *Najas flexilis* in Lough Corrib SAC is to restore the population to at least the north-western bay.

Targets and Attributes

The conservation objective for this QI is: *‘To restore the favourable conservation condition of Slender Naiad in Lough Corrib SAC’*

The attributes and targets for this species are provided in Table 5-8 below:

Table 5-8 Targets and attributes associated with nominated site-specific conservation objectives for *Slender Naiad* in Lough Corrib SAC

Attribute	Target
Population extent	Restore the spatial extent of <i>Najas flexilis</i> within the lake, subject to natural processes.
Population depth	Restore the depth range of <i>Najas flexilis</i> within the lake, subject to natural processes
Population viability	Restore plant fitness, subject to natural processes
Population abundance	Restore the cover abundance of <i>Najas flexilis</i> , subject to natural processes
Species distribution	Restore to at least the north-western bay, subject to natural processes
Habitat extent	Restore, subject to natural processes
Hydrological regime: water level fluctuations	Maintain appropriate natural hydrological regime necessary to support the habitat for the species
Lake substratum quality	Restore appropriate substratum type, extent and chemistry to support the population of the species

Water quality	Restore appropriate water quality to support the population of the species
Acidification status	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the population of <i>Najas flexilis</i> , subject to natural processes
Water colour	Restore/maintain appropriate water colour to support the population of <i>Najas flexilis</i>
Associated species	Restore appropriate associated species and vegetation communities to support the population of <i>Najas flexilis</i>
Fringing habitat: area and condition	Maintain the area and condition of fringing habitats necessary to support the population of <i>Najas flexilis</i>

5.1.1.4 Habitat Specific Information

5.1.1.4.1 *Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.*

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall assessment of conservation status for this habitat in Ireland is listed as ‘Bad’, while the overall trend in conservation status in Ireland is listed as ‘Deteriorating’.

This habitat is most notably located in the southern basin of the SAC. It is likely to also extend along the eastern side of the northern basin. Groundwater flows drive the hydrological regimes of lakes with this QI habitat. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. Fluctuations in lake water level are typical in Ireland but can be amplified by activities such as abstraction and drainage. The hydrological regime, particularly the groundwater contribution, must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced.

According to the Article 17 Report, this QI habitat is strongly associated with lowland lakes over limestone bedrock. It is also found on calcareous sand at the landward side of machair plains and in canals. Ireland has some of the best European examples of the hard-water lake habitat and, as a result, particular responsibility for maintaining/restoring this natural habitat at Favourable conservation status within the EU. Movement of pollutants, especially phosphorus, through ground water is a significant concern for this QI habitat.

Targets and Attributes

The Conservation Objectives for Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp.* is ‘*To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. in Lough Corrib SAC*’

The attributes and targets for this habitat are provided in Table 5-9 below:

Table 5-9 Targets and Attributes for Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. within Lough Corrib SAC

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	No decline, subject to natural processes
Typical species	Typical species present, in good condition, and demonstrating typical abundances and distribution
Vegetation composition: characteristic zonation	All characteristic zones should be present, correctly distributed and in good condition
Vegetation distribution: maximum depth	Restore maximum depth of vegetation, subject to natural processes
Hydrological regime: water level fluctuations	Maintain appropriate natural hydrological regime necessary to support the habitat
Lake substratum quality	Restore appropriate substratum type, extent and chemistry to support the vegetation
Water quality: transparency	Restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency
Water quality: nutrients	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species
Water quality: phytoplankton biomass	Maintain appropriate water quality to support the habitat, including high chlorophyll a status
Water quality: phytoplankton composition	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status
Water quality: attached algal biomass	Restore/maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status
Water quality: macrophyte status	Restore high macrophyte status
Acidification status	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes
Water colour	Restore/maintain appropriate water colour to support the habitat
Dissolved organic carbon (DOC)	Restore/maintain appropriate organic carbon levels to support the habitat
Turbidity	Restore/maintain appropriate turbidity to support the habitat
Fringing habitat: area and condition	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3130

5.1.1.4.2 **Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation**

Description from the SSCO and Article 17 Report

According to the site synopsis document for Lough Corrib SAC (NPWS, 2022), several of the rivers in the River Corrib support submerged and floating vegetation of the *Ranunculus fluitantis* and *Callitriche-Batrachion*, including mosses.

The full distribution of this habitat and its sub-types in this site is currently unknown. Due to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. A natural (relatively unmodified) flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003).

According to the Article 17 Report (NPWS 2019), the overall assessment of conservation status for this habitat in Ireland is listed as 'Inadequate', while the overall trend in conservation status in Ireland is listed as 'Deteriorating'.

This annexed habitat has a broad definition, covering from upland, flashy, oligotrophic, bryophyte- and algal-dominated rivers, to tidal reaches dominated by higher plants. In Ireland, the highest riverine conservation interest is associated with lowland depositing and tidal rivers and unmodified, fast-flowing, low-nutrient rivers. The low-nutrient, high-velocity river types are associated with high bryophyte diversity, cascades, riffles and riparian woodland. Important communities also occur in groundwater-fed, base-rich oligotrophic rivers.

Targets and Attributes

The Conservation Objectives for Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation is 'To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation in Lough Corrib SAC'

The attributes and targets for this habitat are provided in Table 5-10 below:

Table 5-10 Targets and Attributes for Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation within Lough Corrib SAC

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	No decline, subject to natural processes
Hydrological regime: river flow	Maintain appropriate hydrological regimes
Hydrological regime: groundwater discharge	Maintain appropriate hydrological regimes
Substratum composition: particle size range	Maintain appropriate substratum particle size range, quantity and quality, subject to natural process
Water quality	Maintain appropriate water quality to support the natural structure and functioning of the habitat

Attribute	Target
Vegetation composition: typical species	Typical species of the relevant habitat sub-type should be present and in good condition
Floodplain connectivity: area	The area of active floodplain at and upstream of the habitat should be maintained
Riparian habitat: area	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types

5.1.1.4.3 **Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae****

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall assessment of conservation status for this habitat in Ireland is listed as ‘Inadequate’, while the overall trend in conservation status in Ireland is listed as ‘Stable’.

This annexed habitat refers to *Cladium mariscus* beds which are in contact with species-rich vegetation of small-sedge fens (i.e. *Cladium mariscus* and species of the *Caricion davallianae*). The habitat is characterised by waterlogged peat soils, a high water table (at or above the surface), and near neutral to alkaline oligotrophic to mesotrophic water. *Cladium* fens are found throughout Ireland, most commonly in lowland areas in the midlands, west and south-east.

According to the Conservation Objectives for Lough Corrib SAC **Error! Bookmark not defined.**, the full distribution of this QI habitat within Lough Corrib SAC is currently unknown. However, their area is extensive and they often occur in association with and transitional to other habitats including *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*), Active raised bogs, Petrifying springs with tufa formation (*Cratoneurion*) and Limestone pavements. Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this Calcareous fens habitat.

Targets and Attributes

The Conservation Objectives for Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* is ‘To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in Lough Corrib SAC’

The attributes and targets for this habitat are provided in Table 5-11 below:

Table 5-11 Targets and Attributes for Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* within Lough Corrib SAC

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	Restore the distribution and variability of active raised bog across the SAC.
Ecosystem function: hydrology	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat

Attribute	Target
Ecosystem function: peat formation	Maintain active peat formation, where appropriate
Ecosystem function: water quality	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat
Vegetation structure: typical species	Maintain vegetation cover of typical species including brown mosses and vascular plants
Vegetation composition: nonnative species	Cover of non-native species less than 1%
Vegetation composition: trees and shrubs	Cover of scattered native trees and shrubs less than 10%
Physical structure: disturbed bare ground	Cover of disturbed bare ground not more than 10%. Where tufa is present, disturbed bare ground not more than 1%
Physical structure: drainage	Areas showing signs of drainage as a result of drainage ditches or heavy trampling not more than 10%
Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat

5.1.1.4.4 **Petrifying springs with tufa formation (Cratoneurion)**

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall assessment of conservation status for this habitat in Ireland is listed as ‘Inadequate’, while the overall trend in conservation status in Ireland is listed as ‘Deteriorating’.

This annex habitat is a lime rich water source which deposits tufa (or travertine). Emerging spring water is rich in carbon dioxide and dissolved calcium carbonate. On contact with the atmosphere, carbon dioxide is outgassed, and calcium carbonate is deposited as tufa. Ecologically significant species which serve as positive indicators of habitat status consists largely of mosses and liverworts, with a small number of vascular plants.

According to the Conservation Objectives for Lough Corrib SAC Error! Bookmark not defined., the full distribution of this QI habitat within Lough Corrib SAC is currently unknown. However, this habitat is likely to occur around Lough Corrib. This QI habitat is associated with other QI habitats of this SAC, including Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, Alkaline fens and Limestone pavements. Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources.

Targets and Attributes

The Conservation Objectives for Petrifying springs with tufa formation (*Cratoneurion*) is ‘*To maintain the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion) in Lough Corrib SAC*’

The attributes and targets for this habitat are provided in Table 5-12 below:

Table 5-12 Targets and Attributes for Petrifying springs with tufa formation (*Cratoneurion*) within Lough Corrib SAC

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	No decline, subject to natural processes
Hydrological regime: height of water table; water flow	Maintain appropriate hydrological regimes
Water quality - nitrate level	No increase from baseline nitrate level and less than 10mg/l
Water quality - phosphate level	No increase from baseline phosphate level and less than 15µg/l
Vegetation composition: positive indicator species	At least three positive/high quality indicator species as listed in Lyons and Kelly (2016) and no loss from baseline number
Vegetation composition: negative indicator species	Potentially negative indicator species should not be Dominant or Abundant; invasive species should be absent
Vegetation structure: sward height	Field layer height between 10cm and 50cm (except for bryophyte-dominated ground <10cm)
Physical structure: trampling/dung	Cover should not be Dominant or Abundant

5.1.1.4.5 Alkaline fens

Description from the SSCO and Article 17 Report

According to the Article 17 Report (NPWS 2019), the overall assessment of conservation status for this habitat in Ireland is listed as ‘Bad’, while the overall trend in conservation status in Ireland is listed as ‘Deteriorating’.

Alkaline fens are groundwater-fed, generally peat-forming systems with extensive areas of species-rich small sedge and brown moss communities. They occur in areas where there is a high water table and a base-rich, often calcareous water supply. Alkaline fens can develop in areas where vertical water movement predominates (topogenous), such as poorly drained basins or hollows and open water transitions; or where horizontal water movement is also important (soligenous), such as flushes, valley fens and the laggs of raised bogs. The most extensive areas of alkaline fens are thought to occur in lowland basins associated with limestone groundwater bodies (often in midland areas). Alkaline fens associated with flushes and open water transitions tend to be smaller but may be more widespread than those in lowland basins.

According to the site synopsis document for Lough Corrib SAC (NPWS, 2022), alkaline fen vegetation is more widespread around the lake margins and includes, amongst the typically diverse range of plants, the Slender Cottongrass (*Eriophorum gracile*), a species protected under the Flora (Protection) Order, 2015. Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat

Targets and Attributes

The Conservation Objectives for Alkaline fens is *‘To maintain the favourable conservation condition of Alkaline fens in Lough Corrib SAC’*

The attributes and targets for this habitat are provided in Table 5-13 below:

Table 5-13 Targets and Attributes for Alkaline Fen within Lough Corrib SAC

Attribute	Target
Habitat area	Area stable or increasing, subject to natural processes
Habitat distribution	No decline, subject to natural processes
Ecosystem function: soil nutrients	Maintain soil nutrient status within natural range
Ecosystem function: peat formation	Maintain active peat formation, where appropriate
Ecosystem function: hydrology	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat
Ecosystem function: water quality	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat
Community diversity	Maintain variety of vegetation communities, subject to natural processes
Vegetation composition: number of positive indicator species (brown mosses)	Number of brown moss species present at each monitoring stop is at least one
Vegetation composition: number of positive indicator species (vascular plants)	Number of positive vascular plant indicator species present at each monitoring stop is at least two for small-sedge flushes and at least three for black bog-rush (<i>Schoenus nigricans</i>) flush and bottle sedge (<i>Carex rostrata</i>) fen
Vegetation composition: cover of positive indicator species	Total cover of brown moss species and positive vascular plant indicator species at least 20% for small-sedge flushes and at least 75% cover for black bog-rush (<i>Schoenus nigricans</i>) flush and bottle sedge (<i>Carex rostrata</i>) fen
Vegetation composition: negative indicator species	Total cover of negative indicator species less than 1%
Vegetation composition: nonnative species	Cover of non-native species less than 1%
Vegetation composition: native trees and shrubs	Cover of scattered native trees and shrubs less than 10%
Vegetation composition: soft rush and common reed cover	Total cover of soft rush (<i>Juncus effusus</i>) and common reed (<i>Phragmites australis</i>) less than 10%
Vegetation structure: height	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 5cm above the ground surface should be at least 50%

Attribute	Target
Physical structure: disturbed bare ground	Cover of disturbed bare ground less than 10%
Physical structure: drainage	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%
Physical structure: tufa formations	Disturbed proportion of vegetation cover where tufa is present is less than 1%
Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat

5.1.2 Lough Corrib SPA [004042]

The potential for impacts on this SPA were identified in Section 4.1 above. Lough Corrib SPA is located approximately 23.5km southwest of the Proposed Wind Farm site. It is also located approximately 32.4km downstream of the Site at its closest point along the Proposed Grid Connection and 42.2km surface water distance from its closest point downstream from the Proposed Wind Farm site. The identified pathways for effect include the following:

- A pathway for indirect effects on the Special Conservation Interest (SCI) species and associated supporting habitat of the SPA exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways during construction and operation of the Proposed Project.
- Additionally, a potential for indirect effect via surface water pathways as a result of the Proposed Grid Connection was identified.

Table 5-14 below lists the qualifying features of this European Site and determines, in the light of their Conservation Objectives, whether there is any complete source-pathway-receptor chain, by which adverse effects may occur.

5.1.2.1 Identification of Individual Qualifying Features with the Potential to be Affected

Table 5-14 Assessment of Qualifying features potentially affected

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2023 ¹⁸),	Rationale	Potential for Adverse Effects Y/N
[A051] Gadwall (<i>Anas strepera</i>)	To restore the favourable conservation condition of gadwall in Lough Corrib SPA.	The Proposed Wind Farm is located outside the 2 to 3km foraging range of this species (Johnson et al., 2014). The Proposed Project is located entirely outside of the core foraging range of these species²⁴. Gadwall was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed	Yes

²⁴ Johnson, W. P., Schmidt, P. M. and Taylor, D. P. (2014). Foraging flight distances of wintering ducks and geese: a review. *Avian Conservation and Ecology*, 9(2): 2. <http://dx.doi.org/10.5751/ACE-00683-090202>

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2023 ¹⁸),	Rationale	Potential for Adverse Effects Y/N
		Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	
[A056] Shoveler (<i>Anas clypeata</i>)	To restore the favourable conservation condition of shoveler in Lough Corrib SPA	The Proposed Wind Farm is located outside the 2 to 3km foraging range of this species (Johnson et al., 2014). Shoveler was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A059] Pochard (<i>Aythya farina</i>)	To restore the favourable conservation condition of pochard in Lough Corrib SPA.	The nearest record of this species was approximately 3.1km from the Proposed Wind Farm site. Two birds were foraging at Carrownabo Turlough in March 2024. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A061] Tufted Duck (<i>Aythya fuligula</i>)	To restore the favourable conservation condition of tufted duck in Lough Corrib SPA.	Tufted Duck was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2023 ¹⁸),	Rationale	Potential for Adverse Effects Y/N
[A065] Common Scoter (<i>Melanitta nigra</i>)	To maintain the favourable conservation condition of common scoter in Lough Corrib SPA.	Common Scoter was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A082] Hen Harrier (<i>Circus cyaneus</i>)	To restore the favourable conservation condition of hen harrier in Lough Corrib SPA.	The Proposed Wind Farm site is located outside the core foraging range of breeding Hen Harrier (2km SNH 2016) as well as outside of the max foraging range of breeding Hen Harrier (10km, SNH 2016). Therefore, no potential for indirect effects through collision risk, disturbance or displacement of these species exists. No further assessment is required.	No
[A125] Coot (<i>Fulica atra</i>)	To restore the favourable conservation condition of coot in Lough Corrib SPA.	Coot was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A140] Golden Plover (<i>Pluvialis apricaria</i>)	To maintain the favourable conservation condition of golden plover in Lough Corrib SPA.	The core foraging range of this species is 3km, and max foraging range is 11km (SNH, 2016). According to Gillings and Fuller (1999), the regular wintering range for Golden Plover were recorded between 10-12km. Therefore, the Proposed Project is located entirely outside of the core foraging and core wintering range of this species. Given that the Proposed Wind Farm site is approximately 23.5km from the SPA, the populations of Golden Plover recorded within the	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2023 ¹⁸),	Rationale	Potential for Adverse Effects Y/N
		Proposed Project are not the SCI designated wintering population of this species. Therefore, no potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	
[A179] Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	To restore the favourable conservation condition of black-headed gull in Lough Corrib SPA.	The Proposed Wind Farm site is outside of the core foraging range of the species, 11.4km (Thaxter et al., 2012). Black-headed gull was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A182] Common Gull (<i>Larus canus</i>)	To restore the favourable conservation condition of common gull in Lough Corrib SPA.	The Proposed Wind Farm site is within the core foraging range of 25km (Thaxter et al., 2012). During breeding season, there was only a single observation of common gull at the Proposed Wind Farm, indicating that the breeding population of Lough Corrib SPA are not utilising the site. Suitable habitats for this species recorded within the Proposed Wind Farm site are common and widespread in the intervening landscape between the Proposed Wind Farm site and the SPA. It is unlikely that the designated SCI population for this SPA are utilising the Proposed Wind Farm site.	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2023 ¹⁸),	Rationale	Potential for Adverse Effects Y/N
		As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of any significant value to this species. No adverse effects are anticipated with this regard. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	
[A193] Common Tern (<i>Sterna hirundo</i>)	To restore the favourable conservation condition of common tern in Lough Corrib SPA.	The Proposed Wind Farm is completely outside of the core foraging range of the species (4.5km, Thaxter et al., 2012). Common Tern was not recorded on any occasion during the dedicated ornithological surveys carried out for the Proposed Project. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A194] Arctic Tern (<i>Sterna paradisaea</i>)	To restore the favourable conservation condition of Arctic tern in Lough Corrib SPA.	The Proposed Wind Farm is outside of the core foraging range of the species, (7.1km) (Thaxter et al., 2012). Additionally, this species was not observed on or near the Proposed Wind Farm site during the ornithological surveys undertaken between 2019 and 2025. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm, and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse	Yes

Qualifying feature	Conservation Objective (NPWS, Version 1, April 2023 ¹⁸),	Rationale	Potential for Adverse Effects Y/N
		effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	
[A395] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>)	To restore the favourable conservation condition of Greenland white-fronted goose in Lough Corrib SPA.	The Proposed Wind Farm is located outside of the core foraging range of 5 to 8km (SNH, 2016). Additionally, this species was not observed on or near the Proposed Wind Farm site during the ornithological surveys undertaken between 2019 and 202. No potential for indirect effects through collision risk, disturbance or displacement of these species exists. However, the SPA is located hydrologically downstream of the Proposed Grid Connection underground cabling route as well as the Proposed Wind Farm, and is within the same groundwater body as the Proposed Wind Farm. Therefore, a potential for indirect adverse effect via deterioration in water quality as a result of construction activities thus affecting SCI supporting habitats was identified.	Yes
[A999] Wetlands	To maintain the favourable conservation condition of wetlands in Lough Corrib SPA.	A potential for deterioration of water quality as a result of construction/operation of the Proposed Wind Farm and the Proposed Grid Connection was identified. The Proposed Wind Farm is also located within the same groundwater body (Clare-Corrib) as the SPA. Due to the underlying groundwater flow paths generally flowing towards Lough Corrib, a potential for indirect adverse effect via deterioration in surface and groundwater quality of the SPA exists and further assessment is required.	Yes

5.1.2.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to impact on the European Site were reviewed and considered in relation to the Proposed Project.

These are provided in Table 5-15 below.

Table 5-15 Site-specific threats, pressures and activities

Negative Impacts			
Rank	Threats and Pressures		Inside/Outside
Medium	A08	Fertilisation	Outside
Medium	A04	Grazing	Inside
Low	F03.01	Hunting	Inside

There are no potential pathways for effect with regard to site-specific threats, pressures and activities which have been identified in relation to the Proposed Project.

5.1.2.3 Species Specific Information

5.1.2.3.1 Gadwall (*Anas strepera*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁵) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Gadwall. During the baseline assessments to inform SPA designation, 48 gadwall were estimated to be using this SPA.

According to Article 12 Report, the number of wintering individuals is estimated to be 560, this population estimate is based on a mean of peak counts with imputation for the overwintering period of 2006 to 2010/ 2011 that was collected as part of the Irish Wetland Bird Survey (I-WeBS). The short-term population trend for wintering Gadwall is increasing and the long-term population trend is also increasing. The main pressures/threats affecting this species in order of impact importance are; Hunting, Pollution to surface waters (limnic & terrestrial, marine & brackish), Outdoor sports and leisure activities, Renewable abiotic energy use, human induced changes in hydraulic conditions, Marine water pollution and Other forms of pollution.

Targets and Attributes

The conservation objective for this SCI is ‘to restore the favourable conservation condition of gadwall in Lough Corrib SPA.’

The attributes and targets for this species are provided in Table 5-16 below:

Table 5-16 Targets and Attributes for Gadwall in Lough Corrib SPA

Attribute	Target
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²⁵ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004042.pdf>

Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target
Disturbance at wintering site	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution
Barriers to connectivity and site use	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target

5.1.2.3.2 Shoveler (*Anas clypeata*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Shoveler. During the baseline assessments to inform SPA designation, 90 shoveler were estimated to be using this SPA.

According to Article 12 Report, the number of wintering individuals is estimated to be 2770, this population estimate is based on a mean of peak counts with imputation for the overwintering period of 2006 to 2010/ 2011 that was collected as part of the Irish Wetland Bird Survey (I-WeBS). The short-term population trend for wintering Shoveler is fluctuating and the long-term population trend is unknown. The main pressures/threats affecting this species in order of impact importance are; Outdoor sports and leisure activities, recreational activities, Hunting and collection of wild animals (terrestrial), Renewable abiotic energy use, Pollution to surface waters (limnic & terrestrial, marine & brackish), Marine water pollution and Other forms of pollution.

Targets and Attributes

The conservation objective for this SCI is *‘to restore the favourable conservation condition of shoveler in Lough Corrib SPA.’*

The attributes and targets for this species are provided in Table 5-17 below:

Table 5-17 Targets and Attributes for Shoveler in Lough Corrib SPA

Attribute	Target
Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target
Disturbance at wintering site	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution

Barriers to connectivity and site use	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target

5.1.2.3.3 Pochard (*Aythya farina*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports internationally important populations of Pochard. During the baseline assessments to inform SPA designation, 10,107 pochard were estimated to be using this SPA.

According to Article 12 Report, the number of wintering individuals is estimated to be 8000, this population estimate is based on a mean of peak counts with imputation for the overwintering period of 2006 to 2010/ 2011 that was collected as part of the Irish Wetland Bird Survey (I-WeBS). The short term population trend for wintering Pochard is decreasing and the long term population trend is unknown. The main pressures/threats affecting this species in order of impact importance are; Outdoor sports and leisure activities, recreational activities, Pollution to surface waters (limnic & terrestrial, marine & brackish), Changes in biotic conditions, Hunting and collection of wild animals (terrestrial), Hunting, Renewable abiotic energy use and Other forms of pollution.

Targets and Attributes

The conservation objective for this SCI is *'to restore the favourable conservation condition of pochard in Lough Corrib SPA'*

The attributes and targets for this species are provided in Table 5-18 below:

Table 5-18 Targets and Attributes for Pochard in Lough Corrib SPA

Attribute	Target
Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target
Disturbance at wintering site	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution
Barriers to connectivity and site use	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target

5.1.2.3.4 Tufted Duck (*Aythya fuligula*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Tufted Duck. During baseline assessments to inform SPA designation, 5,486 tufted duck were estimated to be using this SPA.

According to Article 12 Report, the number of wintering individuals is estimated to be 20,980, this population estimate is based on a mean of peak counts with imputation for the overwintering period of 2006 to 2010/ 2011 that was collected as part of the Irish Wetland Bird Survey (I-WeBS). The short term population trend for wintering Tufted duck is increasing and the long term population trend is unknown. The main pressures/threats affecting this species in order of impact importance are; Outdoor sports and leisure activities, recreational activities, Pollution to surface waters (limnic & terrestrial, marine & brackish), Changes in biotic conditions, Hunting and collection of wild animals (terrestrial), Renewable abiotic energy use and Other forms of pollution.

Targets and Attributes

The conservation objective for this SCI is *‘to restore the favourable conservation condition of tufted duck in Lough Corrib SPA’*

The attributes and targets for this species are provided in Table 5-19 below:

Table 5-19 Targets and Attributes for Tufted Duck in Lough Corrib SPA

Attribute	Target
Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target
Disturbance at wintering site	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution
Barriers to connectivity and site use	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target

5.1.2.3.5 Common Scoter (*Melanitta nigra*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Common Scoter. The site supports approximately half of the national population of nesting Common Scoter. Baseline surveys in 1995 to inform SPA designation recorded an estimated 30 potential breeding pairs in the Lough Corrib SPA.

According to Article 12 Report, the number of breeding pairs is estimated to be 39, this is based on a survey of known and potential breeding loughs during the 2012 pre-breeding season (Hunt et al. 2013²⁶). An estimate of 39 pairs is given which is based on an estimate of total adult females recorded during the pre-breeding period of May 2012. The short-term population trend for breeding common scoter is decreasing and the long term population trend is decreasing. The main pressures/threats affecting this species in order of impact importance are; Pollution to surface waters (limnic & terrestrial, marine & brackish), invasive non-native species, Interspecific faunal relations, Changes in biotic conditions, grazing and Outdoor sports and leisure activities, recreational activities.

Targets and Attributes

The conservation objective for this SCI is *'to maintain the favourable conservation condition of common scoter in Lough Corrib SPA.'*

The attributes and targets for this species are provided in Table 5-20 below:

Table 5-20 Targets and Attributes for Common Scoter in Lough Corrib SPA

Attribute	Target
Breeding population trend	Long term trend is stable or increasing
Productivity rate	Sufficient productivity to maintain the population trend as stable or increasing
Disturbance at nesting habitat	No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation
Extent and condition of nesting habitat	Sufficient area of high quality habitat to support the population target
Disturbance at nesting site	Disturbance occurs at levels that do not significantly impact the achievement of targets for breeding population trend and spatial distribution of nesting habitat
Barriers to connectivity and site use	Barriers do not significantly impact the breeding population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target

5.1.2.3.6 Coot (*Fulica atra*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Coot. During the baseline assessments to inform SPA designation, 14,426 coot were estimated to be using this SPA.

²⁶ Hunt, J., Heffernan, M.L., McLoughlin, D., Benson, C. & Huxley, C. (2013) *The breeding status of Common Scoter, Melanitta nigra in Ireland, 2012. Irish Wildlife Manuals, No. 66. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland*

According to Article 12 Report, the number of wintering individuals is estimated to be 1,940, this population estimate is based on a mean of peak counts with imputation for the overwintering period of 2006 to 2010/ 2011 that was collected as part of the Irish Wetland Bird Survey (I-WeBS). This estimate is to be treated as a conservative one on account of the relatively poorer I-WeBS coverage of some of the areas that this species is distributed over. The short-term population trend for wintering Goldeneye is decreasing and the long-term population trend is decreasing. The main pressures/threats affecting this species in order of impact importance are; Changes in biotic conditions, Pollution to surface waters (limnic & terrestrial, marine & brackish), Outdoor sports and leisure activities, recreational activities, Hunting and collection of wild animals (terrestrial), Renewable abiotic energy use, Marine and Freshwater Aquaculture, Marine water pollution and Other forms of pollution.

Targets and Attributes

The conservation objective for this SCI is *'to restore the favourable conservation condition of coot in Lough Corrib SPA.'*

The attributes and targets for this species are provided in Table 5-21 below:

Table 5-21 Targets and Attributes for Coot in Lough Corrib SPA

Attribute	Target
Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target
Disturbance at wintering site	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution
Barriers to connectivity and site use	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target

5.1.2.3.7 Golden Plover (*Pluvialis apricaria*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Golden Plover. During the baseline assessments to inform SPA designation, 1,727 golden plover were estimated to be using this SPA.

According to Article 12 Report, the estimated number of wintering individuals is estimated to be 99,870. Population estimates are based on a mean of peak counts with imputation for the overwintering period of 2006 to 2011 that was collected as part of the Irish Wetland Bird Survey (I-WeBS). This estimate is to be treated as a conservative one on account of the relatively poorer I-WeBS coverage of some of the areas that this species is distributed over. The short-term trend estimates a decrease in population size and the long term population trend is unknown. The main pressures/threats affecting

the overwintering population in order of impact importance are renewable abiotic energy use, modification of cultivation practices, Marine and Freshwater Aquaculture, Outdoor sports and leisure activities, recreational activities, and Marine water pollution.

Targets and Attributes

The conservation objective for this SCI is ‘*to restore the favourable conservation condition of golden plover in Lough Corrib SPA.*’

The attributes and targets for this species are provided in Table 5-22 below:

Table 5-22 Targets and Attributes for Golden Plover in Lough Corrib SPA

Attribute	Target
Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target
Disturbance at wintering site	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution
Barriers to connectivity and site use	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target
Supporting habitat: area and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA

5.1.2.3.8 **Black-headed Gull (*Chroicocephalus ridibundus*)**

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Black-headed Gull. The most recent SPA population estimate of 400 pairs from one site is based on a 2017 survey.

According to Article 12 Report, the number of breeding pairs is estimated to be 9,318. The last national population estimate for this species was based on the Seabird 2000 Census²⁷. The short-term population trend for breeding black-headed gull is increasing and the long term population trend is also increasing.

²⁷ Mitchell, P. Ian, Newton, S.F., Ratcliffe, N. & Dunn, T.E. (2004) *Seabird populations of Britain and Ireland. Results of the Seabird 2000 Census (1998-2002)*. T & AD Poyser, London.

The main pressures/threats affecting this species in order of impact importance are;; Changes in abiotic conditions and grazing.

Targets and Attributes

The conservation objective for this SCI is ‘to restore the favourable conservation condition of black-headed gull in Lough Corrib SPA.’

The attributes and targets for this species are provided in Table 5-23 below:

Table 5-23 Targets and Attributes for Black-Headed Gull in Lough Corrib SPA

Attribute	Target
Breeding population trend	Long-term population is stable or increasing
Productivity rate	Sufficient to maintain population
Distribution: extent of available nesting options within the SPA	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
Prey biomass available	Sufficient extent of biomass of available prey items across the site to help support the population
Disturbance at the breeding site	Disturbance occurs at levels that do not significantly impact on black-headed gull at the breeding site
Disturbance at areas ecologically connected to the colony	Disturbance occurs at levels that do not significantly impact on black-headed gull at the breeding site
Barriers to connectivity	No significant increase

5.1.2.3.9 Common Gull (*Larus canus*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Black-headed Gull. The most recent SPA population estimate of 137 pairs from 14 sites is based on a 2017 survey (NPWS unpublished data).

According to Article 12 Report, the number of breeding pairs is estimated to be 1,927. The last national population estimate for this species was based on the Seabird 2000 Census (Mitchell et al 2004²⁸). The short-term population trend for breeding Common Common Gull is increasing and the long-term population trend is decreasing. The main pressures/threats affecting this species in order of impact importance are;; Changes in abiotic conditions and grazing.

²⁸ Frederiksen, M., Hearn, R. D., Mitchell, C., Sigfússon, A., Swann, R. L. and Fox, A. D. (2004) The dynamics of hunted Icelandic goose populations: a reassessment of the evidence. *Journal of Applied Ecology*, 41: 315–334. doi: 10.1111/j.0021-8901.2004.00886.x.

Targets and Attributes

The conservation objective for this SCI is *‘to restore the favourable conservation condition of common gull in Lough Corrib SPA.’*

The attributes and targets for this species are provided in Table 5-24 below:

Table 5-24 Targets and Attributes for Common Gull within Lough Corrib SPA

Attribute	Target
Breeding population trend	Long-term population is stable or increasing
Productivity rate	Sufficient to maintain population
Distribution: extent of available nesting options within the SPA	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
Prey biomass available	Sufficient extent of biomass of available prey items across the site to help support the population
Disturbance at the breeding site	Disturbance occurs at levels that do not significantly impact on common gull at the breeding site
Disturbance at areas ecologically connected to the colony	Disturbance occurs at levels that do not significantly impact on breeding common gull
Barriers to connectivity	No significant increase

5.1.2.3.10 Common Tern (*Sterna hirundo*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Common Tern. The most recent SPA population estimate of 6 pairs from two sites is based on a 2017 survey (NPWS unpublished data).

According to Article 12 Report, the number of breeding pairs is estimated to be 4,740, this is based on the Seabird 2000 Census²⁵. The three largest east coast Common Tern colonies are monitored on a near annual basis. Additionally two inland sites were surveyed during the period 2006-2007. Assuming no significant changes occurred to the numbers of breeding birds occurring at these two inland sites since 2007 and assuming no significant changes occurred at the unmonitored colonies since 2002 a national population estimate of 4,740 pairs can be calculated. The short-term population trend for breeding Common Tern is increasing and the long term population trend is also increasing. The main pressures/threats affecting this species in order of impact importance are; Renewable abiotic energy use, invasive non-native species and shipping lanes, ports and marine constructions.

Targets and Attributes

The conservation objective for this SCI is *‘to restore the favourable conservation condition of common tern in Lough Corrib SPA.’*

The attributes and targets for this species are provided in Table 5-25 below:

Table 5-25 Targets and Attributes for Common Tern within Lough Corrib SPA

Attribute	Target
Breeding population trend	Long-term population is stable or increasing
Productivity rate	Sufficient to maintain population
Distribution: extent of available nesting options within the SPA	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
Prey biomass available	Sufficient extent of biomass of available prey items across the site to help support the population
Disturbance at the breeding site	Disturbance occurs at levels that do not significantly impact on common tern at the breeding site
Disturbance at areas ecologically connected to the colony	Disturbance occurs at levels that do not significantly impact on breeding common tern
Barriers to connectivity	No significant increase

5.1.2.3.11 Arctic Tern (*Sterna paradisaea*)

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Arctic Tern. The most recent SPA population estimate of 10 pairs from one site is based on a 2017 survey data).

According to Article 12 Report, the number of breeding pairs is estimated to be 3,183, this is based on the Seabird 2000 Census²⁵. The three east coast Arctic Tern colonies are monitored on a near annual basis. Additionally two sites from the west of Ireland were also monitored during the period 2007 – 2012. Assuming no significant changes occurred at the unmonitored colonies since 2002 a national population estimate of 3,183 pairs can be calculated. The short-term population trend for breeding Arctic Tern is increasing and the long term population trend is also increasing. The main pressures/threats affecting this species in order of impact importance are; Renewable abiotic energy use, invasive non-native species and changes in abiotic conditions.

Targets and Attributes

The conservation objective for this SCI is ‘to restore the favourable conservation condition of arctic tern in Lough Corrib SPA’

The attributes and targets for this species are provided in Table 5-26 below:

Table 5-26 Target and Attributes for Arctic Tern in Lough Corrib SPA

Attribute	Target
Breeding population size	Long-term population is stable or increasing

Productivity rate	Sufficient to maintain population
Distribution: extent of available nesting options within the SPA	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population
Prey biomass available	Sufficient extent of biomass of available prey items across the site to help support the population
Disturbance at the breeding site	Disturbance occurs at levels that do not significantly impact on Arctic tern at the breeding site
Disturbance at areas ecologically connected to the colony	Disturbance occurs at levels that do not significantly impact on Arctic tern at the breeding site
Barriers to connectivity	No significant increase

5.1.2.3.12 **Greenland White-fronted Goose (*Anser albifrons flavirostris*)**

Description from the Article 12 Report and SSCO document

According to the site synopsis document for the Lough Corrib SPA (NPWS 2014²⁷) and Conservation Objective document¹⁸, this SPA supports nationally important populations of Greenland White-fronted Goose. During the baseline assessments to inform SPA designation, 160 geese were estimated to be using this SPA.

According to Article 12 Report, the estimated number of wintering individuals is estimated to be 12,173. The population estimate is based on the Irish data collected as part of the international spring count of the Greenland White-fronted population that winters in Ireland and Britain. The short-term trend estimates a decrease in population size and the long term population trend is increasing. The main pressures/threats affecting the overwintering population in order of impact importance are changes in abiotic conditions, changes in biotic conditions, modification of cultivation practices, annual and perennial non-timber crops, renewable abiotic energy use, utility and service lines, improved access to site, marine and freshwater aquaculture, hunting and collection of wild animals (terrestrial), outdoor sports and leisure activities and recreational activities, marine water pollution, grazing, agricultural activities, forest planting on open ground, other forms of pollution and interspecific faunal relationships

Targets and Attributes

The conservation objective for this SCI is ‘to restore the favourable conservation condition of Greenland white-fronted goose in Lough Corrib SPA.’

The attributes and targets for this species are provided in Table 5-27 below:

Table 5-27 Targets and Attributes for Greenland White-fronted Goose within Lough Corrib SPA

Attribute	Target
Winter population trend	Long term winter population trend is stable or increasing
Winter spatial distribution	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target

Disturbance at wintering site	The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution
Barriers to connectivity and site use	No significant impact on the wintering population's access to the SPA or other ecologically important sites outside the SPA
Forage spatial distribution, extent and abundance	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target
Roost spatial distribution and extent	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target
Supporting habitat: area and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA

5.1.2.4 Habitat Specific Information

5.1.2.4.1 Wetlands

Description from the SSCO document

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest. Potential indirect effects on the supporting wetland habitat of waterbirds within the SPA in the form of degradation of ground water quality was identified.

The following relevant information has been extracted from the NPWS site synopsis for the SPA:

Lough Corrib SPA is an internationally important site that regularly supports in excess of 20,000 wintering waterbirds including an internationally important population of wintering Pochard. The shallow, lime-rich waters of the southern basin of the lake support one of the most extensive beds of Stoneworts (Charophytes) in Ireland. These Chara beds are a very important source of food for waterfowl.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose, Gadwall, Shoveler, Pochard, Tufted Duck, Common Scoter, Hen Harrier, Coot, Golden Plover, Black-Headed Gull, Common Gull, Common Tern and Arctic Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds.'

Targets and Attributes

The conservation objective for this SCI is 'to restore the favourable conservation condition of wetlands in Lough Corrib SPA.'

The attributes and targets for this habitat are provided in Table 5-28 below:

Table 5-28 Targets and Attributes for Wetlands within Lough Corrib SPA

Attribute	Target
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Wetland habitat area	No significant loss to wetland habitat within the SPA, other than that occurring from natural patterns of variation
Wetland habitat quality and functioning	No significant impact on the quality or functioning of the wetland habitat within the SPA, other than that occurring from natural patterns of variation

6. ASSESSMENT OF POTENTIAL EFFECTS & ASSOCIATED MITIGATION

This section of the NIS assesses the potential effects of the Proposed Project on the identified relevant Qualifying Interests/Special Conservation Interests. This assessment is undertaken in the absence of any mitigation and in respect of the conservation objectives of the European Sites. The Conservation Objectives each of the European Sites assessed were reviewed on the 12/09/2025. The Conservation Objectives for these sites are available at the following locations:

- Lough Corrib SAC [000297] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf
- Lough Corrib SPA [0004042] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004042.pdf

Following the initial impact assessment, mitigation is prescribed where necessary to avoid adverse effects on the Conservation Objectives of the relevant QIs/SCIs.

6.1 Potential for Direct Effects on the European Sites

As discussed in Section 3.2.4, ornithological surveys at the Proposed Wind Farm site determined that there was no evidence of recorded SCI populations using the Proposed Wind Farm site or of significant usage of the Proposed Wind Farm site by species designated as SCI for nearby SPAs. Therefore, there is no potential for ex-situ direct effects to any European site.

6.2 Potential for Indirect Effects on the European Sites

6.2.1 SCI Bird Species

As discussed in Section 3.2.4, ornithological surveys at the Proposed Wind Farm site determined that there was no evidence recorded of SCI populations using the Proposed Wind Farm site. Therefore, there is no potential for ex-situ indirect effects as a result of disturbance or habitat loss to any SCI species of any nearby SPA.

6.2.2 Otter

6.2.2.1 Habitat Loss

No otter holts were found within the Site or within 150m of the Proposed Project infrastructure footprint during the surveys undertaken, including along the Proposed Grid Connection underground cabling route.

No instream works are necessary for any element of the Proposed Wind Farm or for the Proposed Grid Connection. The proposed 5 no. watercourse crossing structures required within the Proposed Wind Farm site will be pre-cast, clear span structures and will therefore avoid any loss of riverbed or riverbank habitat. There will be no instream works or new crossing structures required for construction of the Proposed Grid Connection.

There is therefore no potential for adverse effect via habitat loss, displacement or barrier effects to otter.

6.2.2.2 Disturbance

No otter holts or resting places were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection during the dedicated surveys undertaken.

A single spraint downstream of a bridge on the Dangan Eighter Stream at a proposed access track crossing within the Proposed Wind Farm site was recorded. A regular spraint containing abundant crayfish and diving beetle remains was recorded approx. 488m northeast of the Proposed Wind Farm site. A recent otter spraint (fish remains only) was recorded on the grassy banktop adjoining the bridge abutment. Therefore, otter are known to use the wider area for commuting and foraging.

Given the layout of the Proposed Project, no habitat destruction, no loss of breeding or resting places and no direct mortality related impacts on this species are anticipated. Only minor underground cabling installation works are proposed within the public road. Therefore, there is no potential for the Proposed Project to result in any barrier to the movement of otter.

In relation to disturbance, otter are predominantly crepuscular in nature and it is anticipated that construction activity associated with the Proposed Grid Connection and Proposed Wind Farm will be confined to daytime hours, thus minimizing potential disturbance related impacts to the species. Channin P (2003) provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to otters (Jefferies (1987), (Durbin 1993), (Green & Green 1997). Irish Wildlife Manual No 76 (National Otter Survey of Ireland 2010/2012) notes that the occurrence of otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey & Rochford, 2006).

Taking a precautionary approach, it is assumed that otter may occur along the main watercourses downstream of the Proposed Grid Connection and the Proposed Wind Farm. There is potential for the construction activity to result in the run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses. This represents a potential for indirect adverse effect on otter in the form of habitat degradation through water pollution which is considered under Section 6.2.3 below.

A total of 7 no. existing watercourse crossings and 1 no. new watercourse crossing will be traversed along the Proposed Grid Connection. Instream works are not required at any watercourse crossing along the Proposed Grid Connection. Watercourses will not be directly impacted, as no instream works or bridge/culvert alterations are proposed.

Five new watercourse crossing structures are required within the Proposed Wind Farm site. The following mitigations will be in place with regard to construction works within the Proposed Wind Farm and Proposed Grid Connection:

- From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that current activity levels are confirmed prior to commencement of works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Project footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for.
- All conditions of a derogation licence will be implemented in full.
- No works will be undertaken within 150m of any holts at which breeding females or cubs are present.
- No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (TII, 2006).

- All of the above works will be undertaken or supervised by an appropriately qualified ecologist.
- The Proposed Project layout has been designed so that the majority of the key infrastructure are located outside of the delineated 50m natural watercourse (river and stream) buffer zones.
- No in-stream excavation works are proposed, as all watercourse crossings within the Proposed Wind Farm will involve clear span structures where new watercourse crossings are required, and existing watercourse crossings along the Proposed Grid Connection within the public road will either involve HDD, standard formation crossings (above or below culvert) or clear span bridge structure. Therefore, there will be no direct impact on any rivers or streams, and thus no potential barriers to migration for otter.

Residual effect

Following the implementation of the above prescribed mitigation, there is no potential for residual adverse effect to otter.

6.2.3 Hydrological Impacts

6.2.3.1 Construction Phase

6.2.3.1.1 Potential Effects from Tree Felling

A total of approx. 11.25ha of conifer woodland will be permanently felled around the footprint of the Proposed Wind Farm (0.7ha), as well as to incorporate the replanting measures (10.55ha) outlined within the BMEP (Appendix 6-4 of the accompanying EIAR).

Felling of coniferous plantations required as part of the infrastructure associated with the Proposed Wind Farm (0.7ha) as well as felling associated with biodiversity enhancement measures (10.55ha) will be the subject of a Felling Licence application to the Forest Service, in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments.

Potential effects during tree felling occurs mainly from:

- Exposure of soil and subsoils due to vehicle tracking or forwarding extraction methods resulting in a source of suspended sediment which can become entrained in surface water runoff and enter surface watercourses;
- Entrainment of suspended sediment in watercourses due to vehicle tracking through watercourses;
- Damage to roads resulting in a source of suspended sediment which can become entrained in surface water runoff and enter surface watercourses;
- Release of sediment attached to timber in stacking areas; and,
- Nutrient release.

Proposed Mitigation Measures:

All felling operations will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM guidance documents, including the specific guidelines listed below, to ensure that felling, planting and other forestry operations result in minimal potential negative effects to the receiving environment.

- Forestry Standards Manual (Forest Service, 2015)

- Environmental Requirements for Afforestation (Forest Service, 2016a)
- Land Types for Afforestation (Forest Service, 2016b)
- Forest Protection Guidelines (Forest Service, 2002)
- Forest Operations and Water Protection Guidelines (Coillte, 2013)
- Forestry and Water Quality Guidelines (Forest Service, 2000b)
- Forestry and the Landscape Guidelines (Forest Service, 2000c)
- Forestry and Archaeology Guidelines (Forest Service, 2000d)
- Forest Biodiversity Guidelines (Forest Service, 2000e)
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018)
- Coillte Planting Guideline SOP
- A Guide to Forest Tree Species Selection and Silviculture in Ireland (Horgan et al., 2003)
- Management Guidelines for Ireland's Native Woodlands. Jointly published by the National Parks & Wildlife Service (Cross and Collins, 2017)
- Native Woodland Scheme Framework (Forest Service, 2018)
- Code of Best Forest Practice (Forest Service, 2000)

Mitigation by Avoidance:

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "*Forestry and Water Quality Guidelines*" are shown in Table 6-1.

Table 6-1 : Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

During the Proposed Wind Farm construction phase a self-imposed buffer zone of 50 metres will be maintained for all streams where possible. Approximately 1ha of tree felling is required inside a 50m buffer zone.

The large distance between the proposed felling areas and sensitive aquatic zones means that potential poor quality (sediment laden) runoff from felling areas will be adequately managed and attenuated prior to even reaching the aquatic buffer zone and primary drainage routes.

Mitigation by Design:

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows:

- Machine combinations (i.e., handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance;
- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;
- Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (approximately 0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and will avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;
- All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;
- Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall;
- Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites;
- Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;
- Checking and maintenance of roads and culverts will be on-going through the felling operation;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required;
- A permit to refuel system will be adopted;
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors;
- Crossing of streams will not be permitted;
- Trees will be cut manually from along streams and using machinery to extract whole tree; and,
- Travel only perpendicular to and away from stream.

Silt Traps:

Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.

Drain Inspection and Maintenance:

The following items shall be carried out during pre-felling inspections and after:

- Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines;
- Inspection of all areas reported as having unusual ground conditions;
- Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches shall be identified. Ideally the pre-felling inspection shall be carried out during rainfall;
- Following tree felling all main drains shall be inspected to ensure that they are functioning;
- Extraction tracks nears drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground;
- Culverts on drains exiting the site will be unblocked; and,
- All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.

Surface Water Quality Monitoring:

Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The ‘before’ sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The “during” sampling will be undertaken once a week or after rainfall events. The ‘after’ sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown).

Criteria for the selection of water sampling points include the following:

- Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses;
- Select sampling points upstream and downstream of the forestry activities;
- It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry;
- Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and,
- The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.

Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.

6.2.3.1.2 **Potential Effects from Earthworks Resulting in Suspended Solids Entrainment in Surface Waters**

There will be earthworks required for both the Proposed Wind Farm and Proposed Grid Connection (Proposed Project). Proposed Project construction phase activities that will require earthworks resulting in the removal of vegetation cover and excavation of peat and mineral subsoil (where present). Potential sources of sediment laden water include:

- Drainage and seepage water resulting from infrastructure excavation;
- Stockpiled excavated material providing a point source of exposed sediment;
- Construction of the underground cable trench resulting in the entrainment of sediment from the excavations during construction; and,
- Erosion of sediment from emplaced site drainage channels.

These activities can result in the release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. Potential impacts could be significant if not mitigated.

Proposed Mitigation Measures:

Mitigation by Avoidance:

The key mitigation measure during the construction phase of the Proposed Wind Farm is the avoidance of sensitive aquatic areas where possible. All of the key areas of the Proposed Wind Farm infrastructure are located significantly away from the 50m delineated buffer zones with the exception of proposed new roads, 5 no. proposed stream crossings. Additional control measures, which are outlined further on in this section, will be undertaken at these locations. 10m buffers will be maintained for all drains.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operated effectively. The proposed buffer zone will:

- Avoid physical damage to watercourses, and associated release of sediment;
- Avoid excavations within close proximity to surface water courses;
- Avoid the entry of suspended sediment from earthworks into watercourses; and,
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Mitigation by Design:

- Source controls:
 - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
 - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
 - Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.

- Treatment systems:
 - Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Silbuster, and/or other similar/equivalent or appropriate systems.

It should be noted for this Proposed Wind Farm site is that an extensive network of bog, agricultural and roadside drains already exists, and these will be integrated and enhanced as required and used within the Proposed Wind Farm drainage system. The integration of the existing drainage network and the Proposed Wind Farm network is relatively simple. The key elements being the upgrading and improvements to water treatment elements, such as in line controls and treatment systems, including silt traps, stilling ponds and buffered outfalls.

The main elements of interaction with existing drains will be as follows:

- Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the Proposed Wind Farm drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion;
- Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area;
- Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces;
- Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; and,
- Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters.

Pre-commencement Temporary Drainage Works

Prior to the commencement of new road/hardstand (or road upgrades) the following key temporary drainage measures will be installed:

- All existing dry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using temporary check dams/silt traps;
- Clean water diversion drains will be installed upgradient of the works areas;
- Check dams/silt fence arrangements (silt traps) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the 50m watercourse and 10m drain buffer zones such as at watercourse crossings.

Water Treatment Train:

A final line of defence will be provided by a water treatment train such as a “Silbuster”. If the discharge water from construction areas fails to be of a high quality during regular inspections, then a filtration treatment system (such as a ‘Silbuster’ or similar equivalent treatment train (sequence of water

treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase.

Silt Fences:

Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to water courses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be placed within drains down-gradient of all construction areas inside the 50m hydrological buffer zones.

Silt Bags:

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats. Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Settlement Ponds:

The Proposed Wind Farm infrastructure footprint has been divided into drainage catchments (based on topography, outfall locations, and catchment size) and stormwater runoff rates based on the 10-year return period rainfall event were calculated for various catchment areas in order to size the settlement ponds as shown in Table 6-2 below.

The 10-year return period rainfall event is a recommendation of the IFI relating to other recent wind farm projects.

Table 6-2 : Settlement Pond Design

POND SIZE W [M] x L [M] x D [M]			TRACK/HARDSTAND CATCHMENT SIZE (M ²)		
RETURN PERIOD	10 YRS	STORM DURATION	500	1000	2000
6HR RETENTION FOR COARSE SILT		6 HRS	3.4 x 10.6 x 1 M	4.8 x 15.0 x 1 M	6.9 x 21.0 x 1 M
11HR RETENTION FOR MEDIUM SILT		12 HRS	3.8 x 12.0 x 1 M	5.5 x 16.5 x 1 M	7.5 x 24.2 x 1 M
24HR RETENTION FOR FINE SILT		24 HRS	4.2 x 13.8 x 1 M	6.2 x 18.6 x 1 M	8.6 x 27.0 x 1 M

Level Spreaders and Vegetation Filters:

The purpose of level spreaders is to release treated drainage flow in a diffuse manner, and to prevent the concentration of flows at any one location thereby avoiding erosion. Level spreaders are not intended to be a primary treatment component for development surface water runoff. They are not stand-alone but occur as part of a treatment train of systems that will reduce the velocity of runoff prior to be released at the level spreader. In the absence of levelspreaders, the potential for ground erosion is significantly greater than not using them.

Vegetation filters are essentially end-of-line polishing filters that are located at the end of the treatment train. In fact, vegetation filters are ultimately a positive consequence of not discharging directly into watercourses which is one of the mitigation components of the drainage philosophy. This makes use of the natural

vegetation of the Site to provide a polishing filter for the Wind Farm drainage prior to reaching the downstream watercourses.

Again, vegetation filters are not intended to be a single or primary treatment component for treatment of works area runoff. They are not stand alone but are intended as part of a treatment train of water quality improvement/control systems (i.e. source controls→check dams→silt traps→settlement ponds→level spreaders →silt fences→vegetation filters).

Pre-emptive Site Drainage Management

The works programme for the entire construction stage of the Proposed Project will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of peat/subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provides a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e., high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures will be completed:

- Secure all open excavations;
- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

Management of Runoff from Peat and Spoil Repository Areas:

It is proposed that excavated spoil and peat will be used for landscaping where required. The excess material will then be placed in 4 no. dedicated Peat Repository Areas (PRA) and 5 no. Spoil Deposition

Area (SDA). All proposed PRAs and the SDA are located outside of 50m watercourse buffers and also outside of 10m drainage ditch buffers.

During the initial construction of repository/deposition areas, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from works areas.

Where applicable, the vegetative top-soil layer of the peat and spoil management areas will be rolled back to facilitate placement of excavated spoil, following which the vegetative-top soils layer will be reinstated. Where reinstatement is not possible, spoil and peat management areas will be sealed with a digger bucket and seeded as soon possible to reduce sediment entrainment in runoff.

Drainage from peat and spoil storage areas will ultimately be routed to an oversized swale and a number of stilling ponds pond with appropriate storage and settlement designed for a 1 in 10-year return period before being discharged to the on-site drains.

Peat/subsoil reinstatement areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised peat/subsoil reinstatement areas will no longer be a potential source of silt laden runoff.

Timing of Site Construction Works:

Construction of the site drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.

Monitoring:

An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Inspections will also be undertaken after tree felling.

Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. Checks will be carried out on a daily basis.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for each primary watercourse and specifically following heavy rainfall events.

6.2.3.1.3 Potential Effects on Surface Water during Excavation Dewatering

Pumping water from excavations may be required for both the Proposed Wind Farm and Proposed Grid Connection (Proposed Project). Some minor groundwater/surface water seepages will likely occur in turbine base excavations and cabling trenches, and this will create additional volumes of water to be treated by the runoff management system. Cable trenching might require removal of water prior to backfilling.

Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the Site and therefore baseline contamination does not occur.

Proposed Mitigation Measures:

Management of excavation inflows and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters;
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a silt bags or silt buster;
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;
- Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken;
- At the turbine locations adequately sized settlement ponds will be constructed to treat pumped water prior to discharge into a local manmade drain;
- A mobile 'Siltbuster' or similar equivalent specialist treatment system can be made available at turbine locations for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

6.2.3.1.4 **Potential Effects from the Release of Hydrocarbons**

Hydrocarbons will be required for both the Proposed Wind Farm and Proposed Grid Connection (Proposed Project) and therefore both are assessed herein.

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Proposed Mitigation Measures:

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- On site re-fuelling of machinery will be carried out using a dedicated fuel truck. The fuel truck will also carry fuel absorbent material and pads in the event of any accidental spillages;
- Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- On-site refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;
- Fuels stored on site will be minimised. Fuel storage areas if required will be banded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;

- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be included within the Construction and Environmental Management Plan
- Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area.

6.2.3.1.5 **Potential Effects from the Release of Cement-Based Products**

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Peat ecosystems are dependent on low pH hydrochemistry. They are extremely sensitive to introduction of high pH alkaline waters into the system. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Proposed Mitigation Measures:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible pre-cast elements for culverts and concrete works will be used;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds located outside of Mid Galway PWS SPA;
- Weather forecasting will be used to plan dry days for pouring concrete; and,
- The pour site will be kept free of standing water and plastic covers will be ready in case of a sudden rainfall event.

6.2.3.1.6 **Potential Effects on Groundwater and Surface Water Contamination from Wastewater Disposal**

Wastewater management will be required for both the Proposed Wind Farm and Proposed Grid Connection (Proposed Project). Release of effluent from domestic wastewater treatment systems has the potential to impact on groundwater and surface waters if site conditions are not suitable for an on-site percolation unit.

Proposed Mitigation Measures:

- It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. It is not proposed to treat wastewater on-site.

6.2.3.1.7 **Potential Effects on Morphological and Hydrological Alterations within the Proposed Wind Farm site**

New watercourse crossings (i.e. bridges/culverts) or upgrades of existing crossings will only be required at the Proposed Wind Farm site and not along the Proposed Grid Connection. Only the Proposed Wind Farm is assessed herein.

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase.

Construction of 5 no. new watercourse crossing (clear span bridge design) and will be required to facilitate the Proposed Wind Farm site development infrastructure.

Proposed Mitigation Measures:

- All proposed 5 no. new stream crossings will be bottomless or clear span structures and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location;
- Where the proposed cable route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road;
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland²⁹ is incorporated into the design of the proposed crossings;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites”, i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

6.2.3.1.8 **Potential Surface Water Quality Effects of the Proposed Grid Connection Earthworks Works and Watercourse Crossings**

The Proposed Grid Connection comprises a 110kV on-site substation and BESS, approximately 21km of underground cabling route, approximately 1.5km of new access track and 4 no. existing watercourse crossings along public roads. Placement of the cable within the crossing structure or Directional drilling will be used (i.e. no instream works).

²⁹ Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

Proposed Mitigation Measures:

Pre-commencement Temporary Drainage Works:

Prior to the commencement of substation, BESS, cable trenching or access road works the following key temporary drainage measures will be installed:

- All existing roadside drains (where present) that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps;
- Culverts, manholes and other drainage inlets (where present) will also be temporarily blocked; and,
- A double silt fence perimeter will be placed along the road verge on the down-slope side of works areas that are located inside a watercourse 50m buffer zone or a karst feature 30m karst feature buffer zone.

The following mitigation measures are proposed for the underground cabling watercourse crossing works:

- No stock-piling of construction materials will take place along the grid route;
- No refuelling of machinery or overnight parking of machinery is permitted in this area;
- No concrete truck chute cleaning is permitted in this area;
- Works will not take place at periods of high rainfall, and will be scaled back or suspended if heavy rain is forecast;
- Local road drainage, culverts and manholes will be temporarily blocked during the works;
- Machinery deliveries will be arranged using existing structures along the public road;
- All machinery operations will take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur;
- Any excess construction material will be immediately removed from the area and sent to a licenced waste facility;
- No stockpiling of materials will be permitted in the constraint zones;
- Spill kits will be available in each item of plant required to complete the stream crossing; and,
- Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required.

Fracture Blow-out (Frac-out) Prevention and Contingency Plan for HDD

- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e. Clear Bore Drilling Fluid or similar will be used);
- The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;
- One or more lines of silt fencing will be placed between the works area and the adjacent river;
- Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips will be used where temporary storage of arisings are required;
- The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur, then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;
- The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

6.2.3.1.9 **Potential Effects on Downstream Surface Water Quality from the use of Siltbuster**

Both the Proposed Wind Farm and Proposed Grid Connection could benefit from the use of a siltbuster. Therefore, both are assessed herein.

Siltbusters are regularly used to remove suspended sediments on construction sites by means of chemical dosing and sedimentation (i.e. use of coagulants and flocculants to accelerate the settlement process). The benefits of using enhanced settlement systems on downstream surface water quality are widely known and are a positive effect. However, potential overdosing with chemical agents means there is a perceived risk of chemical carryover in post treatment water which could result in negative effects on downstream water quality.

Proposed Project construction water (i.e. surface water runoff or pumped groundwater) has sometimes very fine particles, particularly clays and peat, with slow settling velocities which do not settle out efficiently, even in a lamella clarifier at normal flow rates. In these cases, chemical dosing can be used to aggregate the particles (i.e. force them to combine and become heavier), increasing the particle settling rate and cleaning the water via gravity separation techniques. Agents commonly used include poly aluminium chloride (PAC), aluminium sulphate, ferric iron and ferrous iron. These agents are commonly used in drinking water treatment plants. So their use is widespread, and there is significant scientific knowledge about their use and control.

The benefits of using a Siltbuster system in emergency scenarios where all other water treatment systems have proven ineffective are considerable.

Proposed Mitigation Measures:

Measures employed to prevent overdosing and potential chemical carryover:

- The siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding reagents, so overdosing cannot occur;
- Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system;
- Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment;
- Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover; and,
- Use of biodegradable chemical agents can be used at very sensitive sites (i.e. upstream of SACs).

6.2.3.1.10 **Residual Effect**

Following the implementation of the above prescribed mitigation, there is no potential for residual adverse effect to water quality within downstream European Sites during construction of the Proposed Project.

6.2.3.1 **Operation Phase**

6.2.3.1.1 **Potential Effects from the Removal of Vegetation Cover and Progressive Replacement of Natural Surface with Low Permeability Surfaces**

Hardstand emplacement will be required at both the Proposed Wind Farm site and Proposed Grid Connection. Both assessed herein.

The potential for increased surface water runoff is the primary potential impact during the operational phase of the Proposed Project.

Progressive replacement of the vegetated surface with impermeable surfaces will decrease the permeability of the ground within the Site footprint (i.e., turbine bases, hardstandings, and to a lesser extent the new access roads) and substation. It should be noted that approximately 1.2km of the proposed Site roads already exist and are proposed for upgrade. The permeability along the internal underground cabling route through the Site will not be significantly altered, as the fill material will not be compacted.

The emplacement of the Proposed Project footprint (assuming emplacement of impermeable materials as a worst-case scenario) could result in an average total site increase in surface water runoff of approximately 1,655m³/month. This represents a potential increase of approximately 0.41% in the average daily/monthly volume of runoff from the Site area in comparison to the baseline pre-development site runoff conditions.

This is a very small increase in average runoff and results from a relatively small area of the overall Proposed Project site being developed. Specifically, the Proposed Project footprint is approximately 8.75ha, representing 2.3% of the total EIAR Study Area of 376.5ha.

The additional volume is low due to the fact that the runoff potential from the Site is naturally high (85%). Also, this calculation assumes that all hardstanding areas will be impermeable which considered to be a worst-case scenario. The increase in runoff from most of the development catchment will therefore be imperceptible and this is before mitigation measures will be put in place. This water balance assessment demonstrates that even in the absence of mitigation, the potential to alter the water balance of the Site or downstream hydrology/morphology is imperceptible.

Table 6-3: Baseline Site Runoff V Development Runoff

Baseline Runoff/month (m ³)	Baseline Runoff/day (m ³)	Permanent Footprint Area (m ²)	Footprint Area 100% Runoff (m ³)	Footprint Area 85% Runoff (m ³)	Net Increase/month (m ³)	Net Increase/day (m ³)	% Increase from Baseline Conditions (m ³)
403,552	13,018	87,500	11,034	9,379	1,655	53	0.41

Proposed Mitigation by Design:

The proposed drainage philosophy states that runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the Proposed Project. The first being ‘keeping clean water clean’ and the second involving the collection of any drainage waters from work area and to route them towards stilling ponds prior to controlled diffuse release over vegetated surfaces. The second method relates to proposed design measures that will prevent road surface and other hardstand areas acting as preferential flowpaths. All development site runoff will be collected, attenuated, treated and then released in a diffuse and regular manner that does not significantly change the natural drainage regime/hydrology of the site.

The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work.

- Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it will be re-distributed over the ground by means of a level spreader;
- Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling;
- On steep sections of access road transverse drains (“grips”) will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains;
- Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock;
- Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and,
- Settlement ponds will be designed in consideration of the greenfield runoff rate.

These measures will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstands and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, check dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.

Proposed Mitigation Measures:

The mitigation measures outlined in Section 6.2.3.1.1 and Section 6.2.3.1.2 and will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.

It is proposed that bedrock from off-site sources will be used to construct the sub-base layer of proposed upgraded and new access roads, hardstand areas and turbine base areas. Once installed the subbase layer will be overlain by a clean capping layer of high-grade stone material which will be sourced from local quarries also.

6.2.3.1.2 **Potential Effects from Runoff Resulting in Contamination of Surface Waters**

During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place, and the disturbance of ground and excavation works will be complete. Some minor maintenance works are likely to be completed, such as maintenance of site entrances, internal roads and hardstand areas. These works will be of a very minor scale and will be very infrequent. Potential sources of sediment laden water will only arise from surface water runoff from small areas where new material is added during maintenance works.

These minor activities could, however, result in the release of suspended solids to surface water and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. Potential effects could be significant if not mitigated against.

During such maintenance works there is a low risk associated with release of hydrocarbons from site vehicles, although it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase.

6.2.3.2 Decommissioning Phase

A Decommissioning Plan has been provided as part of the Proposed Project (provided as Appendix 5)

During decommissioning, it will be possible to reverse or at least reduce some of the potential effects caused during construction, and to a lesser extent operation, by rehabilitating constructed areas such as turbine bases and hard standing areas. This will be done by covering with peatland vegetation/scraw or poorly humified peat to encourage vegetation growth and reduce run-off and sedimentation.

The dismantling and removal of wind turbines and met mast of this scale is a specialist operation which will be undertaken by the turbine supplier or competent subcontractor. Turbine dismantling will be undertaken in reverse order to methodology employed during their construction. Cranes will be brought back to the Proposed Wind Farm site utilising the hardstand areas adjacent to each turbine. The dismantling of turbines and met mast will be bound by the same safety considerations as will be the case during construction in terms of weather conditions. Works will not be undertaken during adverse weather conditions and in particular not during high winds.

The turbines and met mast will be removed from the Proposed Wind Farm site in a similar manner to how they will be transported to the Proposed Wind Farm site originally in extended articulated trucks.

On the dismantling of turbines and met mast, it is not intended to remove the concrete foundation from the ground. It is considered that its removal will be the least preferred options in terms of potential effects on the environment. Therefore, the foundations of the 9 no. turbine and met mast will be covered with soil material. If there is usable soil or overburden material on the Proposed Wind Farm site after construction, this material will be used. Alternatively, where material is not readily available on site, soil will be sourced locally and imported to site on heavy good vehicles (HGVs). The imported soil will be spread and graded over the foundation using a tracked excavator and revegetation enhanced by spreading of an appropriate seed mix to assist in revegetation and accelerate the resumption of the natural drainage management that will have existed prior to any construction.

The underground cabling within the Proposed Wind Farm site, connecting the turbines to the onsite 110kV substation, will be pulled from the cable duct using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at each of the pull pits along the cable. The ground above original pulling pits will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible with no environmental impact associated with leaving the ducting in-situ.

Other impacts such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude than the construction phase because of the smaller scale of the works and reduced volumes on-site.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is, therefore:

“best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm”.

Some of the impacts will be avoided by leaving elements of the Proposed Project in place where appropriate. The 110kV substation will be retained by EirGrid as a permanent part of the national grid. The BESS will remain in place. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects.

Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.

No residual adverse effects on the hydrological and hydrogeological environment are envisaged during the decommissioning phase once decommissioning phase mitigations are in place. However, by taking a precautionary approach, mitigation measures to prevent the deterioration of water quality during the decommissioning phase are set out below.

6.2.3.2.1 **Refuelling, Fuel and Hazardous Material Storage**

Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage.

Only designated trained competent operatives will be authorised to refuel plant onsite. Mobile measures such as drip trays and fuel absorbent mats will be used during refuelling operations as required.

The following mitigation measures are proposed to avoid release of hydrocarbons at the Site:

- Road-going vehicles will be refuelled off site wherever possible;
- Fuels volumes stored on site will be minimised;
- Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- Oils or fuels stored in turbines will be drained and disposed of off-site by a licenced waste contractor, to prevent leakage to groundwater or surface water;
- The plant used will be regularly inspected for leaks and fitness for purpose;
- An emergency plan for the decommissioning phase to deal with accidental spillages will be developed (refer to Section 5 of this Decommissioning Plan). Spill kits will be available to deal with an accidental spillage in and outside the refuelling area.
- A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the decommissioning phase.

7.

ASSESSMENT OF RESIDUAL ADVERSE EFFECTS

The potential for residual adverse effects on each of the individual relevant Qualifying Features of the Screened In European Sites following the implementation of mitigation, is assessed in this section of the report.

Based on the above, in view of best scientific knowledge, on the basis of objective information, there is no potential for adverse effect on the identified QIs/SCIs and their associated targets and attributes, or on any European Site Potential pathways for effect have been robustly blocked through measures to avoid impacts and the incorporation of best practice/mitigation measures into the project design.

Taking cognisance of measures to avoid impacts and best practice/mitigation measures incorporated into the project design which are considered in the preceding section, the Proposed Project will not have an adverse effect on the integrity of any European Site.

The Proposed Project will not prevent the QIs/SCIs of European Sites from achieving/maintaining favourable conservation status in the future as defined in Article 1 of the EU Habitats Directive. A definition of Favourable Conservation Status is provided below:

‘conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2; The conservation status will be taken as ‘favourable’ when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.’

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the Proposed Project will not adversely affect the Qualifying Interests/Special Conservation Interests associated with any European Site.

8. ASSESSMENT OF CUMULATIVE EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This assessment focuses on the potential for cumulative in-combination effects on the European Sites where potential for adverse effects was identified in Section 4 of this report. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects. A list of the plans and projects considered is provided in Appendix 4.

- Galway County Development Plan 2022 – 2028
- 4th National Biodiversity Action Plan 2023-2030
- Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032

The review focused on policies and objectives that relate to Natura 2000 sites and natural heritage. Policies and objectives relating to sustainable land use were also reviewed.

8.1 Other Projects

Assessment material for this cumulative assessment was compiled on the relevant developments within the vicinity of the Proposed Project. The material was gathered through a search of relevant online Planning Registers, reviews of relevant documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. All relevant projects were considered in relation to the potential for in-combination effects. All relevant data was reviewed (e.g. individual EISs/ElARs, NISs, layouts, drawings etc.) for all relevant projects where available.

The plans and projects considered include those listed in Appendix 4. The residual construction, operational and decommissioning impacts of the Proposed Project are considered cumulatively with other plans and projects.

Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Project and those that could potentially result in impacts on surface water, groundwater and QI habitats and species. For this reason, other projects within the hydrological catchment have been considered. The assessment of the potential for cumulative effects on nearby SPAs has been restricted to the potential for cumulative hydrological effects. This is due to the lack of a potential for any ex-situ direct or indirect effects to SCI species identified as a result of the Proposed Project, as discussed in Section 6.2.1.

8.1.1 Other Projects within the Hydrological Sub catchment

8.1.1.1 Land Use in the Surrounding Area

8.1.1.1.1 Agriculture

The delineated cumulative study area is a largely agricultural area. Agriculture is the largest pressure on water quality in Ireland. Agricultural practices such as the movement of soil and the addition of fertilizers and pesticides can lead to nutrient losses and the entrainment of suspended solids in local surface watercourses. This can have a negative impact on local and downstream surface water quality.

In an unmitigated scenario the Proposed Project would have the potential to interact with these agricultural activities and contribute to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

However, the mitigation measures detailed in Section 6.2.3 above for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

Given the reported lack of any residual adverse effects to European Sites anticipated as a result of the Proposed Project, no potential for cumulative effects when considered in combination with surrounding agricultural activities are predicted.

8.1.1.1.2 **Commercial Forestry**

The Proposed Wind Farm site and the wider hydrological cumulative study area include some forested areas. The most common water quality problems arising from forestry relate to the release of sediment and nutrients to the aquatic environment and impacts from acidification. Forestry felling may also give rise to modified stream flow regimes caused by associated land drainage.

Given the occurrence of forestry blocks within the Proposed Wind Farm site and in the surrounding lands, and given that they drain to the Grange River, the potential cumulative effects on downstream water quality and quantity need to be assessed.

Additionally, as part of the BMEP measures it is proposed to fell approximately 11.5ha of commercial conifer forestry within the Wind Farm site. In an unmitigated scenario, the Proposed Project would have the potential to interact with additional woodland felling within the wider area, which may also contribute to a deterioration of downstream surface water quality.

However, the mitigation measures detailed in Section 6.2.3 and in particular Section 6.2.3.1.1 for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

8.1.1.1.3 **Turbary Peat Cutting**

Private peat cutting on turbary plots will likely continue at the Proposed Wind Farm site. The construction phase of the Proposed Project may interact with these turbary activities and result in a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

Nevertheless, the mitigation measures detailed in Section 6.2.3 above for the construction, operation and decommissioning phases of the Proposed Project will ensure the protection of downstream surface water quality.

Given there are no reported residual adverse effects anticipated as a result of the Proposed Project, no potential for cumulative effects when considered in combination with surrounding turbary activities are predicted.

8.1.1.2 **Other Wind Farms**

Wind-farms within a 25-kilometre radius of the Proposed Project area are listed in the table below. In total, 7 no. applications relating to wind energy were identified within 25km of the proposed turbines, 4 no. of which relate to single or 2 no. wind turbine developments and a further 4 no. of which relate to larger multiple turbine wind farm development. However, the existing Cloonascragh Single Turbine, Cloonlusk (2 turbines), as well as the proposed Laurcleavagh and Clonberne Wind Farms are located

within the same groundwater body (Clare-Corrib) and hydrological catchment (Corrib) as the Proposed Wind Farm.

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside these existing or proposed wind farms/turbines were considered. The planning files were reviewed on the Galway County Council Planning Register and An Coimisiún Pleanála. Further information is considered below and in Table 8-1.

8.1.1.2.1 **Cloonlusk Wind Farm**

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the 2 no. existing turbines at Cloonlusk Wind Farm was considered. The planning file was reviewed on the Galway County Council Planning Register³⁰. The wind farm consists of 2 no. turbines on agricultural lands. Given the small scale of the Cloonlusk development and distance from the Proposed Wind Farm (6.4km and approx. 8.1km west of the nearest turbine), there is no potential for residual effects identified.

8.1.1.2.2 **Clooncon East**

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the proposed Clonoon East (single turbine) which is proposed to be located approx. 15.5km northeast of the Proposed Wind Farm site.

The planning file for amendments to this development³¹ were also reviewed on the Galway County Council Planning Register. Due to the nature of the amendments, an Environmental Impact Assessment Report was not required for this application. The Appropriate Assessment Screening Report was consulted. The screening report concluded that ‘the proposed amendments, individually or in combination with other plans or projects, will not have a significant effect on any European (Natura 2000) sites’. Therefore, as due to the lack of residual effects predicted as a result of the Proposed Project, there is no potential for cumulative effect.

8.1.1.2.3 **Laurclavagh Wind Farm**

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the proposed Laurclavagh Wind Farm (8 Turbines) which is proposed to be located approx. 9.7km west (11.3km from the closest turbine within the Proposed Project).

A search was made on An Coimisiún Pleanála and the NIS was consulted. The proposed infrastructure associated with the Laurclavagh Wind Farm is all proposed to be located within modified habitats such as improved agricultural grassland. Both the Laurclavagh Wind Farm and the Proposed Project have blocked any potential pathways for residual effects on QI/SCI habitats and species by the implementation of avoidance (mitigation by design), disturbance mitigation. Therefore, as well as the lack of residual effects predicted as a result of the Proposed Project, there is no potential for cumulative effect.

8.1.1.2.4 **Clonberne Wind Farm**

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the Clonberne wind farm (11 Turbines) which is proposed to be located approx. 4.3km north of the Proposed Project (4.6km north of the nearest turbine). A search was made on An Coimisiún Pleanála and the NIS was consulted. It was concluded that the Wind Farm development would not result in any residual effects on any QI/SCI habitats and species of any nearby Natura 2000 sites. Therefore, as there

³⁰ <https://www.eplanning.ie/GalwayCC/AppFileRefDetails/082407/0>

³¹ <https://www.eplanning.ie/GalwayCC/AppFileRefDetails/201617/0>

is a lack of any residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects when considering the in-combination effects of these two applications.

8.1.1.2.5 Cloonascragh Wind Turbine

This project consists of a single turbine on cutover bog (PB4) habitat. The planning file was reviewed on the Galway County Council Planning Register³². However, there were no residual significant effects identified as a result of the Proposed Project. Given the small scale of the single turbine, and the lack of significant residual effects identified as a result of this single turbine project, there is no potential for significant cumulative effects.

8.1.1.2.6 Gannow Wind Farm

The proposed Gannow Wind Farm is at the pre-planning stage and therefore no planning application has been lodged and no impact assessment has been completed. The development is located in bog and farmland, with some areas of forestry.

8.1.1.2.7 Park Athenry

The planning file was reviewed on the Galway County Council Planning Register³³. The existing Athenry Park Turbine is a 20kw domestic wind turbine and therefore a Natura Impact Statement was not required. There is no potential for significant cumulative effects.

8.1.1.2.8 Shancloon Wind Farm

The potential for the Proposed Project to result in significant cumulative effects when assessed alongside the proposed Shancloon Wind Farm was considered.

A search was made on An Coimisiún Pleanála and the NIS was consulted. The European Sites within the Likely Zone of Influence for this project are Lough Mask SPA, Lough Corrib SAC and Lough Corrib SPA. It was concluded that the Wind Farm development would not result in any residual effects on any QI/SCI habitats and species of any nearby Natura 2000 sites with the implementation of the prescribed mitigation measures outlined within the NIS. Therefore, as there is a lack of any residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects when considering the in-combination effects of these two applications.

Other Wind Farms Assessment Conclusion

Therefore, in conclusion, there is no potential for cumulative effects with other wind farm developments identified via hydrological pathways or any other in-combination pathway.

Table 8-1 Wind farm projects within 25km of the Proposed Project

Planning Authority	Wind Farm Name	Decision	Status	No. of turbines	Distance from the Proposed Project
An Coimisiún Pleanála Ref: 307058-20	Clonberne	Proposed	Live Case	11	4.3km north of the Proposed Wind Farm

³² <https://www.eplanning.ie/GalwayCC/searchresults>

³³ <https://www.eplanning.ie/GalwayCC/AppFileRefDetails/2374/0>

					8.1km north of the Proposed Grid Connection
Galway County Council Ref: 082407	Cloonlusk	Granted by GCC	Existing	2	770m north of the Proposed Grid Connection 6.4km west of the Proposed Wind Farm
Galway County Council Ref: Ref: 131139	Clooncon East	Granted by GCC	Existing	1	15.5km northeast of the Proposed Wind Farm 19.9km northeast of the Proposed Grid Connection
An Coimisiún Pleanála Ref: 319307	Laurclavagh	Proposed	Live Case	8	9.7km from the Proposed Wind Farm Laurclavagh Wind Farm GCR adjoins the end of the Proposed Grid Connection
Galway County Council Ref: 22/1175	Cloonascragh	Granted by GCC	Existing	1	500m east of the Proposed Grid Connection 8.9km west of the Proposed Wind Farm
Pre-application	Gannow	Proposed	Pre-application	8	15.3km southeast of the Proposed Grid Connection 17.3km from the Proposed Wind Farm
Galway County Council Ref: 2374	Park Athenry	Granted by GCC	Existing	1	14.7km south of the Proposed Grid Connection 18.2km from the Proposed Wind Farm
An Coimisiún Pleanála	Shancloon	Proposed	Live Case	11	10.2km from the Proposed Grid Connection

					21.3km from the Proposed Wind Farm
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8.1.2 Proposed Grid Connection

A desk-based planning search was undertaken to identify permitted developments within 200m vicinity of the Proposed Grid Connection using the Galway County Council planning portal. A total of 23 projects were identified within this area and consisted predominantly of the construction of individual once-off private dwellings, extensions to existing dwellings, agricultural shed and infrastructure projects. The following additional projects were reviewed:

- To erect 20kw domestic wind turbine and associated site works. (Ref: 2374)
- To upgrade the existing 220kV overhead line between the existing Cashla 220kV Substation in the townland of Barrettspark, Co. Galway, & Tower 138 in the townland of Oughtagh, Co. Galway. The Proposed Project will consist of refurbishment works to the existing overhead Line (approximately 49 km long & comprising of 138no. steel angle masts). The refurbishment works to towers will consist of: installation of replacement parts on the towers including insulators, shield wire, vibration dampeners, arching horns & anti-climbing guards; associated site development works, including temporary work areas, foundation refurbishment /strengthening & recapping/clearing of shear blocks; clearance of shear block bases; & ancillary works; ancillary site preparation works, site clearance & levelling at the 6no. temporary construction compounds & associated temporary works to existing tracks & new temporary access routes to provide internal access routes to each tower with all associated works required to facilitate the development. No works will be undertaken to the overhead line (conductor). The Proposed Project will also consist of upgrades to the Cashla 220kV substation that will consist of: the decommissioning and removal of line bay equipment within the substation boundary; construction of a new adjacent offline like for like line bay & associated bay protection cabinets within the substation boundary; & new overhead lines connection between the end mast & the new line bay. (Ref: 23355)
- For the development consisting of a wind energy development comprising of one electricity generating wind turbine, with an overall blade tip height of up to 168m, construction of c. 150m of permanent access track, 110m of temporary access track, road widening works along the existing local access road from the R327 to the proposed site access track, a crane hardstand, a 20kV substation, site electrical & fibre optic cabling & ancillary site works. (Ref: 221175)
- For the development consisting of an 80-metre-high temporary meteorological mast and all associated works for a period of 5 years (ref: 23119)
- For a ten-year planning permission for an electrical transformer compound comprising (i) a hardcore surfaced compound with a footprint of approximately 1300m² enclosed by a 2.6m high palisade security fence and security gates, (ii) a control room with a gross floor area of approximately 140m², (iii) a 110kV electricity transformer, with associated equipment including cable sealing end, surge arrestor, earth disconnect, current/voltage transformer, house transformer, circuit breaker and lightning mast, (iv) a diesel generator for emergency lighting, (v) the upgrade of an existing access point from the L6141 and the construction of approximately 130m of access track, (vi) underground electrical and communications cabling, (vii) underground electrical cable connecting the transformer compound to the electrical cable permitted as part of the Tuam Energy Park (Galway County Council Planning Register Reference 20/1387) and (viii) all associated and ancillary site development, landscaping and reinstatement works. (Ref: 2560096)

The works along the Proposed Grid Connection are minor and transient, similar to roadworks being completed across the country and have no potential for adverse cumulative effects on downstream European sites.

8.1.3 Other EIA Projects

A total of 8 projects requiring EIA (excluding wind farms) were identified within 10km of the Proposed Project. These included quarrying activities (Harrington Concrete and Quarries, Cloonascragh Sand and Gravel, McTigue Quarries Ltd, Cartron Quarry and Newtown Farming Ltd.), the N63 road realignment scheme, two dwelling houses as well as infrastructure (220kV electrical substation, all associated electrical plant and apparatus and all ancillary works, underground cabling) associated with the Clonberne Wind Farm.

Given the lack of adverse residual effects predicted as a result of the projects listed above according to their respective Appropriate Assessments, and considering the lack of residual adverse effect anticipated as a result of the Proposed Project with the prescribed mitigation in place, no potential for adverse cumulative effect in combination with these EIA projects is predicted.

8.2 Conclusion of Cumulative Impact Assessment

Following the detailed assessment provided in the preceding sections, it is concluded that, the Proposed Project will not result in any residual adverse effects on any of the European Sites, their integrity or their conservation objectives when considered on its own. There is therefore no potential for the Proposed Project to contribute to any cumulative adverse effects on any European Site when considered in-combination with other plans and projects.

In the review of the projects that was undertaken, no connection, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Proposed Project.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site.

9.

CONCLUDING STATEMENT

This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites.

Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the Proposed Project does not adversely affect the integrity of European sites.

Therefore, it can be objectively concluded that the Proposed Project, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

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