# APPENDIX 6-5

## *BIODIVERSITY MANAGEMENT PLAN*

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# 1. INTRODUCTION

## 1.1 Background

MKO have prepared a Biodiversity Management Plan (BMP) to accompany the Environmental Impact Assessment Report (EIAR) for the Proposed Ballydermot Wind Farm in Co. Offaly and Co. Kildare (the Proposed Project), which includes 46 no. turbines and all associated infrastructure and works. The full description of the Proposed Project is detailed in Chapter 4 of the EIAR.

The Proposed Wind Farm is located approximately 2.2km south-southeast of Edenderry Co. Offaly, 3.3km west of Allenwood Co. Kildare, 2km north of Rathangan Co. Kildare and 1.7km east of Clonbullogue Village Co. Offaly. It is located in a peatland setting, comprising a mixture of bare cutaway peat, revegetating cutover bog, areas of remnant uncut raised bog, scrub, and immature woodland. Currently the majority of the Proposed Wind Farm site has been undergoing natural revegetation with small areas of active turbary present. The Proposed Wind Farm site is located within 14 bogs, which are presented in Figure 6 - 5 - 1 Bogs in which the Proposed Wind Farm Site is located below.

This BMP has been prepared to set out the project-specific measures to be implemented within the Proposed Wind Farm site to mitigate and/or offset potentially significant effects on Key Ecological Receptors (KERs) and Key Ornithological Receptors (KORs), as identified in the EIAR for the Proposed Wind Farm. In addition, a number of further biodiversity/habitat enhancement measures to be implemented within the Project Site are also set out in this document. These are not required to offset significant effects on biodiversity but are proposed to further enhance biodiversity within the Proposed Wind Farm site. The BMP describes the existing ecological baseline, sets out the objectives of the proposed mitigation and enhancement measures, and details the methods for their implementation, monitoring and review.

### 1.1.1 Scoping and Consultation

MKO undertook a scoping exercise in 2021 and 2025 during preparation of the EIAR, as described in Section 2.8 of Chapter 2 of the EIAR.

Copies of all scoping responses are included in Appendix 2-1 of the EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this BMP. Table 6-1 of Chapter 6 provides a list of the organisations consulted with regard to biodiversity during the scoping process, notes where scoping responses were received and provides details of the contents of the scoping responses. Pre-planning meetings were held with the National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (IFI), and An Coimisiún Pleanála (ACP). These are detailed in Section 6.2.2.1 of Chapter 6 of the EIAR.

### 1.1.2 Habitat and Species Enhancement and Mitigation

The Proposed Project is located within a predominantly cutaway peatland landscape characterised by bare peat and re-vegetating cutover bog, remnant areas of uncut raised bog, scrub, woodland and early successional vegetation. The current site conditions reflect the legacy of historical peat extraction and extensive drainage.

The measures proposed within this BMP have been informed by the ecological baseline and the potential significant effects on biodiversity that were identified in Chapter 6 of the EIAR and focus on areas where offsetting and/or enhancement potential has been identified.

This BMP primarily includes measures to mitigate and/or offset potentially significant effects on habitats and/or species as identified in Chapter 6 of the EIAR. These offsetting/ mitigation measures include the following:

- Enhancement of existing grassland and grassy verge habitats with potential to support marsh fritillary (*Euphydryas aurinia*);
- Enhancement of areas of bare peatland habitat;
- Native woodland planting within areas of dry cutaway and wetland cutaway; and
- Translocation of basil thyme (*Clinopodium acinos*) and round-leaved wintergreen (*Pyrola rotundifolia ssp. rotundifolia*) from areas where they occur within the construction footprint to areas of suitable habitat outside of the construction footprint.

Additionally, a number of measures are proposed for the purposes of enhancement. These measures are not required to mitigate or offset any potentially significant effects identified in Chapter 6 of the EIAR. They are intended to improve habitat diversity and ecological function within the Project Site through targeted habitat creation and enhancement within a modified peatland environment.

These measures include the following:

- Enhancement and creation of pollinator foraging habitat;
- Creation of log and brash piles to provide microhabitats for invertebrates, small mammals, small birds, other fauna and fungi; and
- Pine marten and red squirrel boxes.

Details of the proposed habitat enhancement measures and measures required to offset potentially significant effects on habitats and species as identified in the EIAR are provided in Section 4 of this BMP.

As outlined in Chapter 7, Section 7.3.7 of the EIAR, a diverse assemblage of birds was recorded during surveys of the Project Site and its wider surroundings. Among these were wintering golden plover (*Pluvialis apricaria*), breeding lapwing (*Vanellus vanellus*), winter roosting hen harrier (*Circus cyaneus*), winter roosting whooper swan (*Cygnus cygnus*) and snipe (*Gallinago Gallinago*) within the area of the Project Site containing the Allen Bog Group (hereafter referred to as the 'Proposed Wind Farm site'). As outlined in Section 7.5 of Chapter 7 of the EIAR, without intervention, there is the potential to significantly impact these species if the development is built. Consequently, a comprehensive mitigation and enhancement plan (the BMP) is proposed to offset the identified significant effects. These offsetting/ mitigation measures include the following:

- Creation of a scrub mosaic habitat within 250m of the Proposed Turbines to mitigate the collision risk to golden plover by making this area unattractive to the species.
- Scrub removal and sward management at Lodge Bog to offset the indirect loss of habitat for golden plover. The creation of wader paddocks, permanent winter waterbodies and reedbeds to offset significant effects on breeding waders, whooper swan and hen harrier, respectively, at Lodge Bog.
- Removal of commercial forestry and sward management at Killina Bog to offset significant effects on golden plover and breeding waders.

Additionally, measures are proposed for the purposes of enhancement which are not required to mitigate or offset any potentially significant effects identified in Chapter 7 of the EIAR. These measures include the following:

- Nest boxes for falcon species.

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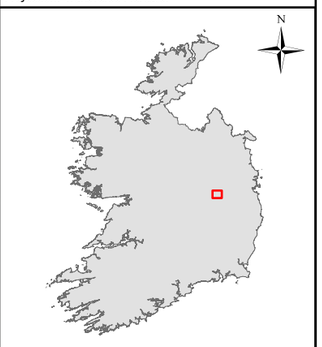
## Map Legend

- Project Site
- 220
- 200
- New Road
- Upgrades to Existing Roads
- Turning Bay
- Amenity Walkway
- Amenity Board Walk
- Equestrian Amenity

Bogs

- Ballydermot North
- Ballydermot South
- Barnaran
- Blackriver
- Codd 1
- Codd 2
- Derrybrennan
- Glashabaun North
- Glashabaun South
- Killina
- Lodge
- Lullybeg
- Lullymore
- Ticknevin

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator




SITE LOCATION - NOT TO SCALE

Drawing Title
Bogs in which the Proposed Wind Farm site is located

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-1 | 1:40,000 |
| Drawn By | Checked By | Date |
| TS | KOD | 20/10/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

## 1.2 Existing Rehabilitation and Management Plan

The Project Site is located on lands that are subject to management as per the requirements of the existing Integrated Pollution Control (IPC) Licence (P0503-01)).

Draft Cutaway Bog Decommissioning and Rehabilitation Plans for the 14 no. bogs (with 1 no. final plan available for Lodge Bog) comprising the Proposed Wind Farm site (i.e., the Draft Rehabilitation Plans) are provided as Appendix 2-4 to Chapter 2 of the EIAR. The Draft Rehabilitation Plans have been prepared to satisfy Condition 10 of the IPC Licence P0503-01. The aim of the Draft Rehabilitation Plans is to stabilise and rehabilitate the peatland habitats within the Proposed Wind Farm site, and it is proposed that natural revegetation will form the basis for the environmental stabilisation of these areas. The targeted rehabilitation works within the Draft Rehabilitation Plans are mandatory and will proceed irrespective of whether the Proposed Project is permitted/developed, in order to ensure compliance with the IPC Licence. The objectives, scope and implementation of the rehabilitation measures are defined separately within the Draft Rehabilitation Plans which are developed for each bog contained within the Allen Bog Group and are regulated by the Environmental Protection Agency (EPA). the

This BMP is a standalone, project-specific plan prepared primarily to detail the measures required to offset potentially significant effects on biodiversity associated with the Proposed Project. Additionally, this BMP details additional biodiversity enhancement measures proposed for the Proposed Wind Farm site. These measures are not required to mitigate or offset any potentially significant effects on biodiversity. They are intended to improve habitat diversity and ecological function within the Project Site through targeted habitat creation and enhancement within a modified peatland environment.

This BMP is distinct from both the targeted rehabilitation measures under the IPC Licence (P0503-01) and measures implemented as part of the completed Peatland Climate Action Scheme (PCAS) works in Lodge Bog. This BMP does not rely on the implementation of those measures to achieve its objectives. All measures implemented within this BMP will not contradict measures within PCAS or the requirements under the IPC Licence.

The BMP has been developed with full cognisance of the fact that rehabilitation and hydrological restoration works will be ongoing within the Project Site. The proposed measures have been designed to be compatible with anticipated changes in site conditions, including rewetting and habitat succession, and implemented at the beginning of the construction phase in order to establish over the 3 year construction period.

## 1.3 Overview of Predicted Significant Effects and Associated Mitigation and Offsetting Measures

This section provides a summary of the likely significant effects on ecological and ornithological receptors as a result of the Proposed Project that require mitigation or offsetting.

### 1.3.1 Golden Plover

Significant collision risk and habitat loss effects are predicted for golden plover, Chapter 7, Section 7.5.2.1 of the EIAR provides further details. To mitigate and/or offset these significant effects, the following is proposed:

- **Collision risk**: to mitigate significant collision risk effects it is proposed to make the habitat near the Proposed Turbines unsuitable, attract golden plover to low risk areas away from the Proposed Turbines and monitor collision risk. If collision rates exceed

a set threshold, curtailment would apply. Section 4.2, 4.3, 4.4 and 5.1.1.2.1 respectively provide full details of how these measures will be implemented.
- Displacement: to offset the significant indirect habitat loss effect, habitat restoration and creation is proposed. This habitat restoration is proposed at Lodge Bog and the creation of habitat is proposed at Killina bog. Section 4.3 and 4.4, respectively, provide full details of how this will be implemented.

### 1.3.2 Lapwing

Significant habitat loss are predicted for lapwing. Please see Chapter 7, Section 7.5.2.15 of the EIAR provides further details. To mitigate and/or offset these significant effects, the following is proposed:

- Habitat loss: to offset the significant direct and indirect habitat loss effect, habitat restoration and creation is proposed within Lodge Bog and Killina Bog, as well as predator proof breeding areas being created within Lodge Bog. Please see Section 4.3 and 4.4, respectively, for full details of how this will be implemented.

### 1.3.3 Whooper Swan

A significant habitat loss effect is predicted for roosting whooper swan. Chapter 7, Section 7.5.2.8 of the EIAR provides further details. To offset this significant effect, habitat restoration and creation is proposed within Lodge Bog, through the creation of suitable waterbodies for roosting whooper swan. Section 4.3 provides full details of how this will be implemented.

### 1.3.4 Hen Harrier

A significant habitat loss effect is predicted for roosting hen harrier. Chapter 7, Section 7.5.2.3 of the EIAR provides further details. To offset this significant effect, habitat restoration and creation is proposed within Lodge Bog. Section 4.3 provides details of how this will be implemented.

### 1.3.5 Snipe

A significant disturbance and displacement effect is predicted for snipe. Chapter 7, Section 7.5.2.16 of the EIAR provides further details. To offset this significant effect, habitat restoration and creation is proposed within Lodge Bog and Killina Bog. Section 4.3 provides details of how this will be implemented.

### 1.3.6 Curlew

As outlined in Chapter 7, Section 7.5.2.12, there are no significant effects anticipated for the breeding population of curlew. Notwithstanding the low rate of predicted collisions and in acknowledgement of the importance of the local population of curlew, enhancement measures are proposed for the benefit of curlew. In particular, measures to increase breeding productivity are proposed through habitat restoration and creation. This enhancement is proposed at Lodge Bog, and the creation of habitat is proposed at Killina Bog.

### 1.3.7 Marsh Fritillary

The EIAR identified potential for significant effects on marsh fritillary as a result of direct loss of marsh fritillary larval webs, fragmentation of marsh fritillary habitat and habitat degradation resulting from dust generation and deposition during construction activities and direct loss of approximately 0.67ha of habitat which was considered to be suitable for marsh fritillary. This is detailed in Chapter 6, Section

6.4.2.3.5 of the EIAR. To offset the potential for significant effect on marsh fritillary, it is proposed to enhance two areas (11.4ha) of existing suitable habitat for marsh fritillary within the Project Site via the planting of devil's-bit scabious (*Succisa pratensis*) (the marsh fritillary larval food plant) and scrub management. Section 4.5 below provides full details of how this will be implemented.

### 1.3.8 Peatland

There will be a loss of approximately 29.4ha of cutover bog habitat which is developing as a mosaic of *Calluna*-dominated vegetation, poor fen communities, and reed and large sedge swamp habitats during the construction phase of the Proposed Project. This revegetating cutover bog habitat, although highly modified from its original state, supports a mosaic of cutover peatland habitats which have high biodiversity value at the local scale. The loss of these cutover habitats has therefore been assessed as a significant effect.

Chapter 6, Sections 6.4.2.1.1 and 6.4.2.1.2 of the EIAR includes further detail on this. It is proposed to undertake drain blocking and rewetting measures across 231.6ha of cutover bog to both offset the loss of cutover bog and to provide for additional peatland enhancement across larger areas within the Proposed Wind Farm site. How this will be implemented is detailed further in Section 4.6 below.

### 1.3.9 Woodland and Scrub

The Proposed Project will result in the loss of approximately 131.7ha of scrub and where scrub forms a mosaic with other habitats including dry meadows and grassy verges, *Calluna*-dominated vegetation and pioneer poor fen communities (hereafter referred to as scrub mosaic areas), and 44.3ha of bog woodland, totalling 176ha of these habitats combined. The loss of these habitats has been assessed as a significant effect in the EIAR and is detailed in Chapter 6, Section 6.4.2.1.3 of the EIAR.

To offset the loss of woodland habitat, it is proposed to plant a total of 45.31ha of native trees which over time will develop into native scrub and woodland habitat. Section 4.7 below details how this will be implemented. Additionally, 242.8ha of scrub mosaic areas will be created as part of the enhancement measures outlined for golden plover in Section 4.2 below.

### 1.3.10 Basil Thyme and Round-leaved Wintergreen

The EIAR identified potential for significant effects on the Red-listed species basil thyme and round-leaved wintergreen as a result of direct loss and habitat degradation resulting from dust generation and deposition during construction activities. This is detailed in Chapter 6, Section 6.4.2.2 of the EIAR. To mitigate the potential for significant effect on these species, it is proposed to translocate these species into suitable translocation areas for each species outside on the construction footprint. Section 4.8 below provides full details of how this will be implemented.

### 1.3.11 Objective Summary

The overarching objective of the BMP is to set out the proposed measures and associated implementation methods to be applied within the Proposed Wind Farm site to mitigate/offset potentially significant effects identified in the EIAR and to deliver biodiversity enhancement with monitoring and adaptive management to ensure their effective delivery and long-term success.

The objectives of this BMP are:

- To mitigate a significant collision risk effect on golden plover by making the habitat around the Proposed Turbines unsuitable for the species through encouraging a scrub mosaic habitat in these areas.

- To enhance the habitats within Lodge Bog to offset significant indirect habitat loss effects on golden plover, breeding lapwing, whooper swan and hen harrier.
- The creation of new open habitat within Killina Bog, through the removal of forestry, to offset a significant habitat loss effect on golden plover. This will also create new habitat for breeding waders within Killina Bog.
- To enhance existing areas of suitable but sub-optimal habitat for marsh fritillary. Small numbers of larval webs were recorded in these areas and they were generally characterised by low abundance of devil's-bit scabious and scrub encroachment making them less suitable for the species than other areas within the Project Site.
- To enhance areas of cutover bog within the Proposed Wind Farm site through rewetting and drain blocking to encourage a diversity of wet cutover bog habitats to establish.
- To encourage native woodland and scrub establishment through the planting of large areas of native tree species in order to offset the loss of approx. 176ha of scrub and bog woodland which have established on areas of cutover bog.
- To mitigate the predicted effects on populations of basil thyme and round-leaved wintergreen through translocation of these red listed species.
- To set out methodologies, monitoring and adaptive management framework to ensure the effective implementation and long-term success of the enhancement measures.

## 1.4 Statement of Authority

MKO has developed extensive expertise and experience over the last 15 years in preparing biodiversity management and enhancement plans for a range of projects, including multiple large scale wind energy development. This BMP was prepared by Kate O'Donnell (BSc, ACIEEM) and Patrick Manley (BSc, MCIEEM) with support from Katy Beckett (MSc) and Kathryn Sheridan (MSc) and has been reviewed by Padraig Cregg (MSc, MCIEEM), Sarah Mullen (PhD, ACIEEM) and Pat Roberts (BSc, MCIEEM).

Kate is a Senior Ecologist with MKO with over 7 years of experience in ecological consultancy. Kate holds a BSc (Hons) in Ecology and Environmental Biology from University College Cork and has also completed a Level 8 Special Purpose Award in Digital Mapping and GIS. Kate's key strengths and areas of expertise are in terrestrial ecology, including vegetation surveys, habitat identification, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. Prior to taking up her position with MKO in February 2022, Kate worked as an Ecologist with RPS where she gained experience in Ecological Impact Assessment, Appropriate Assessment and multidisciplinary ecological surveys for a range of projects including IDA developments, flood relief schemes, road network improvements and greenway developments. She is trained in carrying out non-volant mammal surveys, freshwater pearl mussel surveys, bat surveys and in taking vegetation relevés of vascular plants. Kate has extensive experience in habitat identification and habitat mapping. Since joining MKO, Kate has been responsible for the management, co-ordination and undertaking of flora, fauna and habitat surveys in accordance with NRA Guidelines for projects including wind farm developments, Greenways and housing developments and for the preparation and review of Ecological Impact Assessments, Stage 1 and Stage 2 Appropriate Assessment reports and EIA inputs. Kate is the Lead Ecologist on several large-scale renewable energy and infrastructure projects and manages a team of Ecologists within MKO. She is an Associate member of the Chartered Institute of Ecology and Environmental Management.

Patrick Manley is a Project Director of Ornithology with MKO with over 10 years of experience in environmental consultancy. Patrick holds BSc (Hons) in Geology from University College Dublin. Since joining MKO, Patrick has worked on wind farm projects, solar farm projects, residential developments, data centres, county council projects and National Parks and Wildlife Service projects. He specialises in ornithological consulting, including Environmental Impact Assessments and has specialist knowledge in designing, executing and project managing ornithological assessments, primarily in the renewable industry. Prior to joining MKO in August 2016, Patrick gained experience through his involvement in

several bird conservation projects, including protected curlew, seabirds and waders. Within MKO, Patrick plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIAR chapters.

Katy is a Project Ecologist with MKO with over 3 years' experience in ecological consultancy. Katy holds a B.A. (Hons) in Environmental Science from Trinity College Dublin during which she researched the potential hybridisation of invasive plants with Irish native flora. She also holds an M.Sc. in Biodiversity and Conservation from Trinity College Dublin. During these academic studies she focused on conservation, gaining field and desk skills, and completing a thesis on the impact of wind farms on Irish pollinators with the Nature+ energy research group. Katy's main focus and expertise are in terrestrial ecology and conservation, largely focusing on renewable energy projects since joining MKO. Field skills are a key strength, from high-level constraints mapping to completing detailed multidisciplinary ecological walkover surveys, habitat mapping, mammal surveys and vegetation analyses, as well as specialist surveys for rare and threatened plant species, Annex I habitat condition assessments, marsh fritillary larval web and habitat condition assessments, Odonata and pollinator surveys and both wintering and breeding bird surveys. Katy is also skilled in QGIS mapping, data analysis and scientific communication, preparing detailed Stage 1 Appropriate Assessment Screening Reports, Stage 2 Natura Impact Statements, Ecological Impact Assessments, EIAR Biodiversity and Ornithology Chapters, Biodiversity Management and Enhancement Plans and other site-specific ecological reporting. As a project manager leading a team of ecologists on a number of small, medium and large-scale projects across a number of sectors, she is experienced in handling complex projects and working in interdisciplinary teams. She is a member of the Chartered Institute of Ecology and Environmental Management and continues to upskill through internal trainings as well as external courses and volunteer opportunities with Atlantic Technological University, the Botanical Society of Britain and Ireland, National Biodiversity Data Centre, Birdwatch Ireland and the British Trust for Ornithology.

Kathryn Sheridan is a Senior Ornithologist at MKO. She completed her primary degree in Zoology at Trinity College Dublin in 2016 and her master's degree in Wildlife Conservation and Management in University College Dublin in 2017. Kathryn has over 5 years of experience in ecological consultancy with MKO and has worked on wind farm projects, solar farm projects and residential developments. Prior to joining MKO in November 2020, Kathryn gained experience through her involvement in several bird conservation projects, including breeding curlew and breeding swifts, as well as research into breeding hen harrier and breeding curlew, providing her with extensive experience in a wide variety of bird survey methods, data management and reporting.

Padraig is a Principal Ornithologist with MKO and has over 12 years of experience working in environmental consultancies. In his role, he acts as technical advisor for the ornithology team, helping to take projects through their entire lifecycle, from site selection through survey design, constraints studies, impact assessment and lodgement of the planning application. He is responsible for training the ornithology team and keeping his colleagues updated on all emerging guidance, legislation, policies, initiatives, industry best practices, emerging trends, and market opportunities.

Sarah is a Project Director (Ecology) with MKO with over 10 years' post graduate experience in ecology. Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany. Since joining MKO Sarah has been responsible for the management, co-ordination and undertaking of flora, fauna and habitat surveys for a range of projects including large-scale energy infrastructure projects, residential and commercial developments, tourism projects and biodiversity monitoring and restoration projects. She has overseen the preparation of ecological reports to accompany planning applications including Ecological Impact Assessments, Stage 1 and Stage 2 Appropriate Assessment reports, Invasive Species Management Plans and Biodiversity/Habitat Management Plans. She currently oversees the general Ecology team at MKO. Sarah's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. She holds membership with the Chartered Institute of Ecology and Environmental Management.

Pat Roberts is Principal Ecologist with MKO with over 20 years post graduate experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. Pat holds B.Sc.(Hons) in Environmental Science. Pat has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites. Pats key strengths include his depth of knowledge and experience of a wide range of ecological and biodiversity topics and also in his ability to understand the requirements of the client in a wide range of situations. He is currently responsible for staff development, training and ensuring that the outputs from the ecology team are of a very high standard and meet the requirements of the clients and relevant legislation and guidelines. He is a full member of the Chartered Institute of Ecologists and Environmental Managers (CIEEM). Pat sits on the Irish Policy Group of the CIEEM and reviews and comments on Irish and European Policy and legislation in this capacity. He is also an assessor for CIEEM membership applications.

# 2. CHARACTERISTICS OF THE PROPOSED PROJECT

The Proposed Project comprises 46 No. wind turbines and all associated works. The Proposed Turbines installed on the Proposed Wind Farm site will have the following dimensions:

- 19 no. Proposed Turbines with a maximum turbine tip height of 200m, hub height of 115m, and blade rotor diameter of 170m; and
- 27 no. Proposed Turbines with a maximum turbine tip height of 220m, hub height of 135m, and blade rotor diameter of 170m.

The overall layout of the Proposed Project is shown in Figure 6 - 5 - 2 below.

Full details of the Proposed Project are provided in Chapter 4 of the EIAR.

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Kilometers

**Legend**

- Project Site
- Proposed Turbine Layout
- 220
- 200
- Proposed Relay Mast
- Proposed Met Mast
- Proposed Telecommunications Tower
- Joint Bays
- Existing OHL
- Proposed Internal 33kV Cabling
- Proposed OHL
- Proposed Grid Connection Underground 220KV electrical cabling
- Proposed Construction Haul Routes
- Proposed Turbine Delivery Route
- Temporary Construction Compounds
- Proposed Offsite Substation Tower Build Area
- Proposed Offsite Substation Crane Pad
- Proposed Onsite 110kV GIS Substation
- Proposed Onsite 220kV GIS Substation
- Proposed Offsite 220kV GIS Substation
- Proposed Internal Access Track
- Upgrades to Existing Tracks
- Proposed Turning Bay
- Proposed Dedicated Amenity Track
- Proposed Dedicated Amenity Board Walk
- Proposed Dedicated Amenity Equestrian Track
- Proposed TDR Accommodation Area

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere

SITE LOCATION - NOT TO SCALE

Drawing Title
Proposed Project Layout

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-2 | 1:300,000 |
| Drawn By | Checked By | Date |
| TI | CJ | 01/10/2026 |

MKO
Email: info@mkoireland.ie/ Website: www.mkoireland.ie

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# 3. ECOLOGICAL BASELINE

A detailed desk-based assessment and programme of ecological field surveys, including multidisciplinary walkover surveys, habitat surveys, marsh fritillary surveys, mammal surveys, bat surveys, bird surveys, pollinator surveys and invasive species surveys were undertaken by MKO between 2020 and 2026 as detailed within Chapter 6 and Chapter 7 of the EIAR. A high-level overview of habitats and fauna within the Project Site is provided below.

## 3.1 Habitats and Flora

A detailed account of the habitats, including a habitat map, and associated species recorded within and bordering the Project Site is included in Chapter 6 of the EIAR. The following habitats are present within the Project Site:

- Earth banks (BL2)
- Buildings and artificial surfaces (BL3)
- Recolonising bare ground (ED3)
- Other artificial lakes and ponds (FL8)
- Reed and large sedge swamps (PB4/FS1)
- Lowland depositing rivers (FW2)
- Canals (FW3)
- Drainage ditches (FW4)
- Improved agricultural grassland (GA1)
- Amenity grassland (GA2)
- Dry calcareous and neutral grassland (PB4/GS1)
- Dry meadows and grassy verges (GS2, PB4/GS2)
- Wet grassland (GS4, PB4/GS4)
- Dense bracken (PB4/HD1)
- Raised Bog (PB1)
- Cutover bog (PB4)
- Poor fen and flush (PB4/PF2)
- Mixed broadleaved woodland (WD1)
- Conifer plantation (WD4, WD4/WS1)
- Hedgerows (WL1)
- Treelines (WL2)
- Oak-ash-hazel woodland (WN2)
- Bog woodland (WN7)
- Scrub (PB4/WS1) and scrub mosaic habitats
- Calluna-dominated communities on Cutover bog

### 3.1.1 Annex I Habitats

A number of habitats present within the Proposed Wind Farm site were found to correspond to habitats listed under Annex I of the European Habitats Directive. There are a number of areas of remnant uncut raised bog (PB1) habitat within the Proposed Wind Farm site. Large sections of this habitat are located within Glashabaun South, Blackriver and Ballydermot South Bogs, with smaller remnant areas also present in a number of locations along the margins of the Proposed Wind Farm site.

Within the Biodiversity Chapter and the Botanical Assessment Report (Appendix 6-1), the results of vegetation composition assessments (in line with Fernandez *et al.,* 2014) have been considered alongside eco-hydrological modelling in order to interpret the habitats present and their potential to conform to Annex I Active raised bog [7110] (ARB) and Degraded raised bog still capable of natural regeneration [7120] (DRB). The wettest areas of remnant raised bog within the Project Site were located

within the large area in Ballydermot South Bog (also known as Cloonroosk Bog). Using eco-hydrological modelling, Annex I DRB was identified throughout large sections of Cloonroosk Bog, grading towards pockets of Annex I ARB in the highest quality areas. No other areas of raised bog within the Proposed Wind Farm site were found to conform to ARB, however DRB was also identified in three areas of Blackriver Bog.

The Proposed Project was purposely designed to avoid areas of uncut raised bog and the vast majority of these areas are located outside the infrastructure footprint of the Proposed Project. Approximately 842m of amenity boardwalk will be installed within an area of uncut remnant raised bog in the southernmost section of Ballydermot South Bog above the raised bog. This area was not found to conform to either ARB or DRB, and as such, in line with Article 17 Reporting (NPWS, 2025), this habitat is considered '*Supporting Raised bog habitat*'. As outlined in Section 6.4.2.1.1 of Chapter 6 no significant effects on this habitat are anticipated.

Additionally, the Annex I habitat Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] was identified at the Ballygarret River confluence, approximately 3.5km downstream of the Project Site.

### 3.1.2 Protected Flora

Two species listed on Ireland's Red List of Vascular Plants (Wyse Jackson *et al.,* 2016) were identified within the Project Site.

Round-leaved wintergreen (*Pyrola rotundifolia* subsp. *rotundifolia*) was identified in a number of locations across Lullybeg, Glashabaun South, Glashabaun North and Killina Bogs. Large numbers of plants were identified approximately 50m to the south of the proposed access road to Proposed Turbine 37 as well as within Killina Bog. Smaller populations were also recorded within the hardstands of Proposed Turbines 29, 37 and 44 as well as within and adjacent to the Proposed Turbine 40 hardstand.

Additionally, scattered small populations were recorded approximately 4m and 18m to the south of the internal underground electrical cabling associated with Proposed Turbine 42, approximately 100m to the north of Proposed Turbine 37, and within and adjacent to the proposed roads and internal underground electrical cabling associated with Proposed Turbine 35. This species is listed as Near Threatened (NT) on the Red List of Vascular Plants.

Basil thyme (*Clinopodium acinos*) was identified within the hardstand area of Proposed Turbine 21 and in several other locations throughout the Project Site within Ballydermot North, Ballydermot South, Blackriver, Codd 1, Glashabaun North, Glashabaun South and Lodge Bogs. This species was recorded particularly along the limestone gravel trackways associated with the decommissioned BnM railways through the Project Site, many of which are proposed as new amenity trails or as proposed roads associated with the Proposed Wind Farm. As such, basil thyme was recorded within and adjacent to the proposed construction footprint within and adjacent to the proposed access roads to the north of Proposed Turbine 22, west and southwest of Proposed Turbine 17, east of Proposed Turbine 11, east of Proposed Turbine 14, to the north of Proposed Turbine 9, to the east of Proposed Turbine 39, northwest of Proposed Turbine 42, and along proposed amenity tracks to the southwest of Proposed Turbine 9 and the south of Proposed Turbine 23. This species is also listed as NT on the Red List of Vascular Plants.

Additionally, alder buckthorn (*Frangula alnus*) and blue fleabane (*Erigeron acris*) were recorded within the Proposed Wind Farm site. These species are listed as Least Concern (LC) on Ireland's Red List of Vascular Plants (Wyse-Jackson *et al.,* 2016), however they were listed as Rare (R – alder buckthorn) and Vulnerable (V – blue fleabane), within the Irish Red Data Book 1: Vascular Plants (Curtis and McGough, 1988). Blue fleabane was recorded in four locations in Glashabaun North, Ballydermot South and Blackriver Bogs, primarily along the decommissioned railway tracks. Alder buckthorn was

recorded within bog woodland and scrub habitats within Blackriver and Glashabaun South Bogs. These species are likely present in other locations within the Proposed Wind Farm site.

No species protected under the Flora (Protection) Order 2022 were identified within the Project Site during any of the surveys undertaken.

## 3.2 Fauna

A detailed account of the faunal species (excluding birds) recorded within the Project Site is included in Chapter 6 of the EIAR. A detailed account of the bird species recorded within the Project Site is included in Chapter 7 of the EIAR.

A suite of ornithological surveys undertaken between April 2020 and March 2026 recorded a diverse range of bird species using the Proposed Wind Farm site. The key species that the Proposed Wind Farm site supports includes a regular wintering population of golden plover, winter roosting of whooper swan and hen harrier, and breeding waders (i.e. lapwing, curlew and snipe).

A number of protected fauna were recorded using the Project Site. Evidence of breeding marsh fritillary was recorded within the Proposed Wind Farm site. Active larval webs were identified in nine key areas across the Proposed Wind Farm site during surveys undertaken in 2024 and 2025, in Ballydermot North, Ballydermot South, Barnaran, Blackriver, Glashabaun North, Glashabaun South, Lodge, Lullybeg, Lullymore and Ticknevin Bogs. Over 200 larval webs were identified in 2024 and over 180 in 2025.

- Two larval webs were located within the footprint of the Proposed Project, one at the location of the Proposed Onsite Substation access road, and a second to the west of Proposed Turbine 17. Three webs were located adjacent to (within 10m of) the Proposed Wind Farm, one to the west of Proposed Turbine 17 and two to the southeast of Proposed Turbine 41.
- Habitat condition assessments for marsh fritillary were also undertaken within each area of identified suitable habitat for marsh fritillary within the Project Site. Of these, several of the areas within Lullybeg, Lullymore, Blackriver, Ticknevin and Glashabaun North Bogs were assessed as being in Good Condition per National Biodiversity Data Centre (NBDC) guidelines. Several areas were also classified as Suitable (Under-grazed), particularly in Barnaran, Codd 2 and Lodge Bogs and in marginal habitat areas bordering scrub or Calluna-dominated habitats.
- In addition, bat species, badger (Meles meles), Irish hare (Lepus timidus subsp. hibernicus), otter (Lutra lutra), pine marten (Martes martes), Irish stoat (Mustela ermina subsp. hibernicus), red squirrel (Sciurus vulgaris), common frog (Rana temporaria), smooth newt (Lissotrition vulgaris), common lizard (Zootoca vivipara), small heath (Coenonympha *pamphilus*), large heath (Coenonympha tullia), red-tailed bumblebee (*Bombus lapidarius*), forester (*Adscita statices*), heart and club (*Agrotis clavis*), yellow shell (*Camptogramma bilineata*), garden dart (*Euxoa nigricans*), suspected (*Parastichtis suspecta),* small purple-barred (*Phytometra viridaria*) were also recorded within the Project Site.

## 3.3 Invasive Species

Japanese knotweed (*Reynoutria japonica*) was recorded growing on the margins of an unnamed watercourse located along the southwestern boundary of Ticknevin Bog during the ecological surveys of the Project Site. This species is listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) and the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024). Two large, mature stands were identified which were flowering at the time of survey. Evidence of local spread was observed, with a number of immature individual saplings recorded up to 120m from the main stands. The Japanese knotweed

stands in this location are all located over 380m from the nearest Proposed Project infrastructure, i.e., Proposed Turbine 31.

# 4. OUTLINE OF PROPOSED MITIGATION, OFFSETTING AND ENHANCEMENT MEASURES

## 4.1 Overview

The following sections provide details of the measures proposed within this BMP to mitigate or offset any potentially significant effects on KERs and KORs as identified within the EIAR for the Proposed Project. It also gives an overview of the additional biodiversity enhancement measures proposed for enhancing the quality and connectivity of pollinator foraging habitat within the Proposed Wind Farm site.

The description of each mitigation/offsetting/biodiversity enhancement measure is structured as follows: a clear management objective is set, an outline of the current baseline habitat before intervention (e.g. mitigation, management, enhancement) is provided, and details of the methods to be followed to implement the mitigation/offsetting/enhancement measures and to achieve the management objectives are presented. An adaptive management approach will be implemented across all objectives where monitoring suggests objectives are not being fully met.

A total of seven biodiversity management measures are proposed within the Proposed Wind Farm site, two of which are intended to mitigate and five of which are intended to offset potentially significant effects on KERs and KORs as identified in the EIAR. Additionally, there are seven other measures not required to mitigate or offset any significant effects, but which have been included as additional biodiversity enhancement measures. These are show in

Figure 6 - 5 - 6 below.

- **Scrub Mosaic Creation Areas (242.8ha)**
  - A scrub mosaic habitat will be created within 250m of the Proposed Turbines to make the areas unsuitable for golden plover. This will be achieved by targeted fertilising of elevated fields and rewetting of areas of open habitat greater than 10ha to encourage the germination of the already existent seed bank for scrub species (such as willow and birch spp.). In areas where a seed bank may not be present (e.g. in large open peatland areas where scrub is not currently recolonising yet), saplings may be required to be planted.
- **Lodge Bog Enhancement Area (338.3ha)**
  - The key measure proposed at Lodge Bog is the removal of existing widespread scrub that is present throughout the bog to offset negative effects, and the management of the area (including monitoring and an iterative approach to the timing and frequency of management) to ensure scrub does not re-establish during the lifetime of the Proposed Project. Other measures pertaining to enhancement will include the creation of wader paddocks and the erection of a number of predator proof fence areas for the benefit of breeding waders; Large open areas of permanent deep water (depths of approximately 1.5m) will be created for the benefit of roosting whooper swan; and a reed bed will be established for the benefit of winter roosting hen harrier.
- **Killina Bog Offsetting Area (58.0ha)**
  - The forestry and woodland within this area will be clear-felled and all timber, brash and stumps will be removed from the Project Site, or mulched to waster and left on-site, as appropriate. The area will be reprofiled and managed as an open peatland/grassland habitat for the lifetime of the Proposed Project. The vegetation will be managed through mowing or grazing as required to keep the vegetation height low during the winter periods to ensure its suitability for golden plover. Wader scrapes will also be created in wetter areas to create permanent areas of shallow standing water for the benefit of breeding waders, e.g. lapwing and snipe.
- **Marsh Fritillary Enhancement Areas (11.4ha)**
  - It is proposed to enhance approximately 12ha of cutover bog that currently provides suitable but sub-optimal habitat for marsh fritillary. These areas are characterised by the presence of the MF larval food plant devil's-bit scabious, however the plant is generally present in low densities and scrub encroachment also contributes to reduced suitability for marsh fritillary. It is proposed to manage these areas to make them more suitable for marsh fritillary through targeted scrub removal and plug planting of devil's-bit scabious. The areas being targeted for enhancement are also located adjacent to areas of higher quality marsh fritillary habitat or areas where marsh fritillary have been recorded. Therefore, the measures being proposed are designed to not only enhance habitat suitability for marsh fritillary but also ultimately connect other fragmented areas of more suitable habitat and provide a more continuous network of suitable habitat within the Project Site. This is recognised as important for the long-term viability of marsh fritillary metapopulations.
- **Peatland Enhancement Areas (231.6ha)**
  - It is proposed to enhance approximately 231.55ha of cutover bog habitat that largely consists of bare deep peat and wetland cutaway using a combination of enhancement measures including drain blocking, outflow blocking, berms and field reprofiling to create 45x60m cells. The key objective is to re-wet peat in order to encourage the establishment of cutover

bog vegetation characteristic of wetter peatland habitats improving the overall quality and diversity of cutover bog habitat within the Project Site.

- **Native tree (woodland and scrub) planting Areas (45.3ha)**
  - It is proposed to plant 45.3ha of native trees within the Project Site which over time will establish into scrub and woodland habitat. Woodland planting blocks have been chosen predominantly in areas of cutover bog that would be largely unsuitable for peatland enhancement/rewetting and that are generally located in close proximity to areas of existing birch and willow spp. woodland. Additionally, conifer removal is proposed in one block that will be replanted with native species.
- **Translocation of Basil Thyme and Round-leaved Wintergreen**
  - It is proposed to translocate large turves containing round-leaved wintergreen which overlap with the construction footprint. Additionally, it is proposed to carefully excavate basil thyme plants by hand with a shovel. As this is an annual species subsoil with the seedbank will also be translocated out of the Proposed Project footprint. These species will be translocated into prepared areas with suitable substrate and habitat conditions outside of the construction footprint.

A qualified ecologist will be appointed as the Ecological Clerk of Works (ECoW) for the Proposed Project. The measures outlined above along with the ECoWs role in relation to the implementation of these measures are detailed in the following sections.

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## Map Legend

- Project Site
- 220
- 200

Biodiversity Enhancement Areas

- Scrub Mosaic Creation Area
- Killina Bog Offsetting Area
- Lodge Bog Enhancement Area
- Marsh Fritillary Enhancement Area
- Peatland Enhancement Area
- Pollinator Foraging Habitat Enhancement Area
- Native Tree (Woodland and Scrub) Planting Area

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

N

SITE LOCATION - NOT TO SCALE

Drawing Title
Proposed Biodiversity Measures Overview

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-3 | 1:40,000 |
| Drawn By | Checked By | Date |
| BOC | KOD | 08/10/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

## 4.2 Objective 1: Scrub Mosaic Creation Areas

A potential significant effect has been identified on golden plover as a result of collision risk. To mitigate this effect, it is proposed to make the area around the Proposed Turbines less attractive to golden plover, in order to reduce the flight activity and associated collision risk. In order to achieve this, scrub growth will be encouraged to create a mosaic habitat within 250m of the Proposed Turbines. The origin of the 250m radius of the Proposed Turbines is an adaptation of a 175m avoidance distance discussed in the literature (Hötker *et al.*, 2006), the rationale of which is outlined here. A review of 29 other studies suggests golden plover will approach wind turbines to an average distance of 175m in non-breeding season (Hötker *et al.*, 2006), with turbine height positively correlated with displacement distance. In the present case, displacement is expected to exceed 175m, given that displacement is positively correlated with turbine height, and the Proposed Turbines are larger than those utilised for the study (with hub heights between 20m and 85m). As the 175m displacement distance is unlikely to be reflective of the likely displacement of golden plover from the Proposed Turbines, due to their height, an adjustment was required. An increase of approx. a third, to 250m, was considered appropriate.

Golden plover prefer open areas larger than 20ha and actively avoid areas which are smaller than 10ha (Leitão & Peris, 2015). Areas greater than 10ha within 250m of the Proposed Turbines, or which make up part of an open area greater than 10ha, will have scrub species encouraged through targeted fertilisation or planting to ensure these areas become unattractive to golden plover. Scrub will not be encouraged within the bat buffers (37m and 79m from the Proposed Turbines). However, given these areas are small, between 0.4ha and 2ha, golden plover are unlikely to be attracted to such small open areas that are so close to the Proposed Turbines.

### 4.2.1 Current Baseline Conditions

The current baseline condition within 250m of the Proposed Turbines varies throughout the Proposed Wind Farm site and surveyed habitats include open bare peat, scrub, woodland, recolonising peat and other peatland habitats. A habitat suitability assessment for golden plover was undertaken within 250m of the Proposed Turbines via a site visit and associated mapping exercise in April 2026. During the site visit, habitats within 250m of the Proposed Turbines were assessed, mapped and categorised with regard to suitability for golden plover. The categories were as follows:

- Suitable – a suitably large open habitat that is currently suitable for golden plover (i.e. greater than 10ha).
- Marginal – habitat that is currently suitable for golden plover but is being encroached by young scrub and will therefore likely become unsuitable for golden plover in the next two to five years.
- Unsuitable – currently unsuitable for golden plover (e.g. scrub, woodland, open water, open areas less than 10ha).

Figure 6 - 5 - 4 below outlines the results of this assessment. There was 331.3ha of suitable golden plover within 250m of the Proposed Turbines, and a further 48.5ha of marginally suitable habitat which is likely to become unsuitable for golden plover before the commissioning of the Proposed Project, due to the currently present encroaching scrub becoming more dense before commissioning.

### 4.2.2 Methods to Achieve the Management Objectives

A scrub mosaic will be created in areas of suitable golden plover habitat between the bat buffers and 250m of turbines. The total area requiring intervention to create a scrub mosaic is 242.8ha. Thirty of the Proposed Turbines are involved. These management prescriptions aim to create a mosaic habitat where open areas of greater than 10ha do not exist. This will be achieved by planting or promoting scrub in smaller patches (0.1-5ha) within these larger open areas to fragment these open areas.

Management prescriptions to be implemented by the applicant include:

- Where open areas are adjacent to mature scrub (i.e. in areas where a good seed bank is likely to exist within the peat already), granular lime (calcium carbonate) and slow-release fertilizer (granular rock phosphate) will be applied on a target basis to accelerate the germination and growth of scrub species (e.g. birch and willow spp.).
- In more open habitats (where peat production has most recently been ceased), the natural seed bank may be absent; it is therefore proposed to plant native scrub species (e.g. birch and willow spp.) on a targeted basis, at a density of one plant per square meter.
- Drain blocking may be required where dry cutover peat exists and conditions are not optimal for the germination or success of transplanting of scrub species (e.g. birch and willow spp.).
- Slow-release fertiliser will be applied to all targeted scrub areas to accelerate the establishment of the scrub.
- It is proposed to attract golden plover to alternative, lower risk areas through the creation of attractive habitat plus the use of golden plover lures/decoys, as outlined in Objective 2 and Objective 3 below.
- Monitoring for golden plover carcasses will be undertaken during the operational phase of the Proposed Project, as outlined in Section 5 below. Curtailment will be implemented if the number of golden plover carcasses found are above the threshold set, see Section 5.1.1.2.1 for further details.

Measures will be implemented at the beginning of the construction phase, to allow time for the scrub mosaic to establish over the three-year construction period. This will ensure that the area around the turbines is unsuitable for golden plover at the start of the operational phase.

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## Map Legend

- Project Site
- 220
- 200

Golden Plover Habitat Assessment Final

Suitable

- Marginal
- No
- Yes

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

N

SITE LOCATION - NOT TO SCALE

Drawing Title
Golden Plover Habitat Loss Assessment

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-4 | 1:38,000 |
| Drawn By | Checked By | Date |
| TS | KOD | 07/10/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

## 4.3 Objective 2: Lodge Bog Enhancement

The following four objectives are proposed at Lodge Bog:

1. To create suitable open habitat for winter roosting/loafing golden plover,
2. To create breeding habitat for breeding waders (i.e., lapwing, snipe and curlew),
3. To create roosting habitat for whooper swan and
4. To create roosting habitat for hen harrier.

These objectives are proposed at Lodge Bog to create suitable replacement habitat to offset the significant habitat loss effects for the relevant species resulting from the Proposed Project. Lodge Bog was identified as a suitable location for enhancement given it is located within the Proposed Wind Farm site but not close to the Proposed Turbines, with the nearest Proposed Turbine being 1.8km from the enhancement area and that this area is owned by the Applicant and therefore fully under their control. Lodge Bog is currently utilised by a number of key ornithological receptors for wintering and breeding, including golden plover, lapwing and historically, curlew. However, this area is largely being encroached by scrub, which severely limits the carrying capacity of the bog for open habitat species (e.g., golden plover, lapwing, curlew and snipe) (Hudson et al., 2002). The scrub is present along the majority of drainage ditches, and also within the cutover bog in some areas. This scrub encroachment will make Lodge Bog unsuitable to these key ornithological receptors over time. The total area proposed for enhancement within Lodge Bog is 338.3ha. There is a history of management for the benefit of waders on lands, including at Drinagh Bog, Co. Offaly.

In 2010, Bord na Mona commissioned Birdwatch Ireland to oversee and report on habitat management for breeding waders at Drinagh Bog, Co. Offaly. Methods applied included scrub removal, landscaping and drain blocking. The speed of habitat occupancy by breeding waders (from one pair of Lapwing and one pair of Snipe in 2010 to Four pairs of Lapwing, four pairs of Snipe, two pairs of Redshank and one pair of Ringed Plover in 2011) indicates that the type of habitat management undertaken here can have substantial, short-term benefits (Copland, 2011), but to ensure longer term gains, ongoing management of water levels, and/or management of scrub encroachment was recommended, along with survival monitoring.

### 4.3.1 Current Baseline Conditions

*Lodge bog currently comprises a mosaic of habitats including open water, bare cutover peat, scrub and bog woodland. Lodge bog has undergone peatland rehabilitation through PCAS as part of the IPC licence rehabilitation. The rehabilitation measures were a combination of drain blocking, outflow blocking, berms and field reprofiling to create 45x60m cells and turning off pumps to rewet the cutaway. Table 6 - 5 - 1 outlines each of these measures and*

Figure 6 - 5 - 5 PCAS measures undertaken at Lodge Bogshows the distribution of these measures.

*Table 6 - 5 - 1 PCAS measures undertaken at Lodge Bog*

| PCAS Code | Type | Rehabilitation Measure |
|---|---|---|
| AW2 | Additional land | Minimal Works Required |
| DCT2 | Dry cutaway | More intense drain blocking (7/100m), and blocking outflows and managing overflow |
| DPT2 | Deep peat | More intense drain blocking (7/100m), and blocking outflows and managing overflow with a controlled weir outfall |
| DPT4 | Deep peat | Berms and field reprofiling (45x60m cell), and blocking outfalls and managing overflow, and drainage channels for excess water |
| MLT1 | Marginal land | No works |
| MLT2 | Marginal land | More intense drain blocking (max 7/100m) |
| WLT2 | Wetland | Turn off pumps to rewet cutaway, and blocking outfalls and managing water levels with overflow pipes, and targeted blocking of outfalls within a site |
| WLT4 | Wetland | More intense drain blocking (max 7/100m), and blocking outflows and managing overflows, and transplanting reeds and other rhizomes |

The measures outlined above have been implemented in Lodge Bog and no further intervention as part of the IPC licence rehabilitation is proposed. There is mature scrub present throughout Lodge Bog, particularly along the main drainage ditches, which were not blocked as part of PCAS, throughout the bog. Scrub is also regenerating in other parts of the bog, where the PCAS work has been completed.

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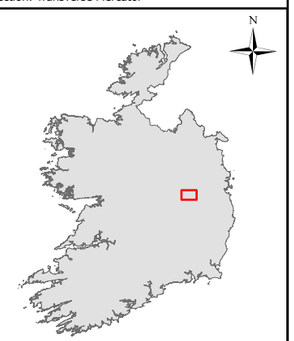
**Map Legend**

Project Site

PCAS Code

- AW2
- DCT2
- DPT2
- DPT4
- MLT1
- MLT2
- WLT2
- WLT4

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator




SITE LOCATION - NOT TO SCALE

Drawing Title

PCAS measures undertaken at Lodge Bog

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-5 | 1:12,000 |
| Drawn By | Checked By | Date |
| JG | KOD | 21/10/2026 |

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670000

### 4.3.2 Methods to Achieve the Management Objectives

The Proposed Enhancement Areas will require, among other things, large-scale landscaping, and the creation of embankments. Such works will borrow from peatland rehabilitation techniques. BnM have considerable in-house expertise in peatland rehabilitation, e.g. cell bunding for the purposes of re-wetting and controlling water levels on their bogs. As the key stakeholder on this project, their practical expertise will be relied upon to implement the proposed enhancement measures. BnM have produced a methodology paper for the enhancement decommissioning, rehabilitation and restoration on BnM peatlands[1], which will inform the implementation of the BMP. Any other best practice guidance will be followed where relevant. The enhancement of Lodge Bog will be achieved through a number of separate measures, each of these measures is described in detail below.

#### 4.3.2.1 Scrub Removal and Management

The key measure proposed at Lodge Bog is the permanent removal of scrub within the enhancement area and the management of the area to ensure scrub does not recolonise over the lifetime of the Proposed Project. Management prescriptions to be implemented by the applicant include:

- All areas of scrub, trees and shrubs will be permanently removed. The timber and brash will be mulched to waste and left on-site. The heavier timber will be removed from site where mulching is not practical. The area will be allowed to revert to peatland habitat and therefore will create suitable habitat for golden plover and breeding waders. Felling/mulching of scrub will be undertaken before the first winter season of the construction phase of the project programme. This will ensure replacement habitat would be available in advance of the operational phase.
- Heavy machinery, e.g. specially adapted tracked excavators and mulching mowers, will be used to clear large areas of dense scrub.
- Scrub will be removed by hand from areas of suitable marsh fritillary habitat to minimize the damage to the underlying habitat. These areas will be identified during a preconstruction habitat survey.
- The vegetation sward will be maintained at the optimal height for waders, including golden plover and lapwing, of approximately 7-10cm (Brough and Bridgman, 1980; Gregory, 1987; Milson *et al.,* 1998). Golden plover tend to avoid areas where the sward height exceeds 10-20cm (Brough and Bridgman, 1980; Gregory, 1987). Therefore, a sward height of between 7-10cm will be maintained in this area during the winter months. This will be achieved through summer and autumn grazing with livestock or through mechanical means using a flail or mulcher. A sward height of 7-10cm will be achieved by the end of August each year to ensure suitable conditions are available when golden plover return for the winter. If there is an extended growing season into September and October of any given year and the vegetation height exceeds 10cm in these months, further mechanical intervention or grazing may be required in October.
- Self-seeding conifers and scrub vegetation originating as windblown seedlings from adjacent and nearby commercial conifer plantations and nearby scrub and bog woodland, are a threat to the viability of the enhancement areas. They gradually take hold, and if unmanaged, would eventually make the area unsuitable for golden plover and breeding lapwing. Habitat maintenance of the area will involve the eradication of self-seeding trees and shrubs, and mulching to waste and left on-site. The frequency of this management intervention will be informed by monitoring. The monitoring outlined in Section 5 below will monitor the level of encroachment by

[1] https://www.bnmpcas.ie/wp-content/uploads/sites/18/2022/11/Methodology%20Report%20v19%20For%20issue.pdf

self-seeding trees and shrubs and will bring the scheduled removal forward as required.

- In the event of any invasive species being recorded within the Proposed Enhancement Area, an invasive species management plan will be put in place to eradicate any stands of such species.
- Herbicides will not be used for the eradication of native scrub or self-seeding trees. However, herbicides may be required for the eradication of invasive species such as Rhododendron or Japanese Knotweed, if required.
- Enhancement and maintenance works will be undertaken outside of the nesting season as per the Wildlife Acts 1976 – 2023 as amended. A suitably qualified ornithologist will be present at the removal of all woody vegetation, to ensure that identified breeding bird sites are avoided. If breeding activity of birds of high conservation concern is identified, no works shall be undertaken within a species-specific buffer (as per Goodship and Furness, 2022) in line with best practice, until it can be demonstrated that the nest is no longer occupied.
- Measures will be implemented during the construction phase. This will ensure that the area is suitable for golden plover at the start of the operational phase.

#### 4.3.2.2 Permanent Waterbodies for Whooper Swan

Two areas are proposed for whooper swan to replace the loss of roosting habitat within the Proposed Project. As detailed in Section 7.3.7.15 of Chapter 7, roosting was recorded across a total of seven areas within the Proposed Wind Farm site across the six winter seasons surveyed, with a maximum of five areas being used in any one season.

Two areas are proposed within Lodge Bog, which are 7.8ha and 5.6 ha, (please see

Figure 6 - 5 - 3 for location details) in areas of wetland which has already undergone the following works under the PCAS scheme: intensive and targeted drain blocking, the creation of berms to control/retain water levels, peat field re-profiling, modifying outfalls and managing overflows. The measures proposed include the creation of open waterbodies to a depth of approximately 1.5m. This will be achieved by creating an encircling embankment to contain the water. The controlled waterbodies will be such that water will be present during the winter months when whooper swan are present (October to March).

As previously outlined, the objective is to create shallow waterbodies of approximately 7.8ha and 5.6ha and 1.5m depth to accommodate winter roosting whooper swan. This will be achieved as follows:

- Wetland management: the proposed approximately 7.8ha and 5.6ha shallow water bodies (wetland) will be created with encircling embankments. The internal embankment height will be approximately 2m to ensure the target depth of 1.5m of water can be accommodated. The top width of the embankment should be a minimum of 5m with a slope of 3:1.
    - The embankment is formed using a bulldozer to push the peat into place, which is then shaped by an excavator. As the peat and subsoil is shaped by the excavator, it should be compacted to make the peat less permeable.
- The top of the embankment, above the target water level of 1.5m, will include overflow pipes to avoid high water levels eroding channels through the top of the embankment.
- Herbicides and pesticides are not permitted within the enhancement area.
- In the event of any invasive species being recorded within the area identified for enhancement measures, an invasive species management plan will be put in place to eradicate any stands of such species. A pre-commencement survey for invasive species will be undertaken as part of preparatory work and if any such species are recorded an invasive species management plan shall be prepared.
- Maintenance is expected to be low. Occasionally, drop boards from the sluice gate may need to be replaced if they are damaged.
- Measures will be implemented during the construction phase. This will ensure that the area is suitable for whooper swan at the start of the operational phase.

#### 4.3.2.3 Breeding Wader Areas

Three enhancement areas for breeding waders are proposed, primarily for lapwing and snipe to replace the breeding habitat lost to the Proposed Project and for breeding curlew which have historically nested in this area. As detailed in Section 7.3.7.21 of Chapter 7, lapwing breeding activity was identified within the Proposed Wind Farm site, with an estimated 23 pairs breeding within the Proposed Wind Farm site in the most recent breeding season surveyed (i.e. 2025).

Lapwing, and other waders, require open habitat in which to breed, and birds avoid fields of less than 5ha (Cramp & Simmons, 1983). While the minimum area of breeding habitat required by one pair of lapwing is 5ha, lapwing regularly breed in loose colonies. Group nesting lapwing nests are typically separated by 10-150m. Therefore, a 5ha plot could host more than a single pair. Lapwing breeding densities can range from zero to 1.33 pairs per hectare in Ireland (Booth Jones *et al.*, 2008). Given that the enhancement areas for lapwing will be managed in an optimal way, it is envisaged that the number of pairs per hectare would be on the higher end of the scale. Taking a precautionary approach, it is assumed that the average density of lapwing within the enhancement areas will be approximately one pair per hectare. Therefore, the estimated quantum of habitat required by 23 breeding pairs of lapwing is 23ha.

The areas proposed within Lodge Bog are 12ha, 7ha and 6ha, which equates to a total proposed area of 25ha. There are two areas (12ha and 6ha) within areas of PCAS which have undergone more intense drain blocking, with outflows blocked and managed. The remaining area (7ha) is within an area

adjacent to wetlands where minimal work was required through the IPC Licence rehabilitation, however, there has historically been waders breeding within or adjacent to this proposed area (see

Figure 6 - 5 - 6 for location details). These proposed areas will be managed by annual mowing to keep the land open for breeding waders and free of avian predator posts (e.g. through scrub encroachment). The annual mowing cycle will be implemented as lapwing (and other waders such as snipe and ringed plover (*Charadrius hiaticula*)) prefer a short open sward. This will ensure a suitably diverse sward is maintained as well as avoiding significant disturbance to invertebrate lifecycles. Mowing will also reduce the dominance of rushes, prevent the creation of dense rush swards and allow the establishment of other rhizomatous grasses and sedges, which is more suited to breeding waders. Drains within these areas have already been blocked as part of the IPC licence rehabilitation, however some drains may require re-profiling and in-filling to allow unfledged chicks to move between dry and damp areas within the enhancement areas. Wader scrapes will be excavated to provide foraging areas for breeding waders and their chicks. Predator-proof fencing will be installed around the perimeter of each of the three enhancement areas (see Plate 6 - 5 - 1 and Plate 6 - 5 - 2 below for examples of this fencing). The NPWS, as part of recent conservation measures within the Termoncarragh Lake and Annagh Marsh SPA, have provided detailed specifications for permanent predator exclusion fencing for this specific purpose[2]. The proposed permanent predator exclusion fencing within the enhancement area has therefore been designed based on these specifications. Several studies in Ireland have confirmed increased wader breeding success following the erection of predator proof fencing (Suddaby et al. (2020); McMonagle, Bell and Donaghy (2017)), particularly where fencing is paired with habitat management as in the present case.

Lapwing show high levels of natal philopatry (i.e. returning to breed in the site where a bird fledged). The enhancement area is considered sufficiently close to act as replacement breeding habitat for any lapwing potentially impacted by the Proposed Wind Farm. The furthest potentially impacted lapwing territories are situated approximately 7.5km from Lodge Bog, with the majority of territories being much closer than this. The majority of lapwing (61%) from a British ringing study returned to breed within 10km from where they were ringed as chicks (Thomson *et al.*, 2008).

As outlined above, the two areas for whooper swan will be managed through controlled rewetting such that water will be present during the winter months and not necessarily during the breeding season. Both of these areas are adjacent to the breeding wader areas and will likely provide additional suitable breeding and foraging habitat for waders not accounted for above. Adaptive management will be applied to the design of the enhancement areas as part of implementation.

The objective is to create good quality breeding wader habitat that is defined as having a stable water table, an open aspect throughout, a short sward and reduced predation. This will be achieved as follows:

- The areas have already undergone PCAS rehabilitation, however there may be the requirement for some areas to be levelled (re-profiled) to stabilise the water table and facilitate the mowing necessary to maintain the required open aspect. A bulldozer will be used to level/remove any remaining camber from the former peat production fields and infill the drains which have not already undergone drain blocking through PCAS. Any remaining drains around the perimeter will be infilled first and as a priority, as the proposed predator-proof fencing would be made ineffectual if mammalian predators could travel under the fence via a drainage channel. If there is not sufficient peat to infill the remaining sections of the drains, the edges will be re-profiled with a tapered edge. This measure will facilitate easy egress for chicks should they fall into a drain. The newly created breeding wader areas should be at least the level of the surroundings peat to avoid large areas of pooling water.

[2] *NPWS (2023). Screening for Appropriate Assessment. Adoption of necessary conservation measures within Termoncarragh Lake and Annagh Marsh Special Protection Area in accordance with Regulation 42A EC (Birds and Natural) Habitats Regulations 2011-2021. Available at* https://assets.gov.ie/static/documents/2023-11-07-eau-adoption-of-ncm-termoncarragh-lake-23-134.pdf

- Using an excavator, wader scrapes will be excavated to a maximum depth of 30-45cm, with gentle sloping edges to provide foraging areas for breeding waders and their chicks. The scrapes will be evenly distributed throughout the breeding wader area, with one wader scrape proposed per hectare, and preferentially placed in locations of existing hollows.
- Slow-release fertiliser will be applied, and a grass nurse crop will be sown to accelerate the revegetation of the area in the first growing season. Reapplication as necessary in subsequent years until 60% of the area has revegetated. As revegetation may be uneven, fertiliser application may need to be targeted to the underperforming areas.
- Mowing will not be required until revegetation exceeds 60% of the lapwing breeding area to a height of 5cm in late winter (before March 1st) as per BTO recommendations[3] and/or when tree seedlings (e.g. birch seedlings) are recorded within the enhancement area. Once the requirement for mowing is triggered, it will be undertaken annually thereafter.
    - Mowing should be undertaken in late winter before March 1st, before earlier breeding birds arrive in March (Joys & Crick 2004). Mowing will be undertaken with low-pressure tracking machinery to avoid damaging the developing sward. The annual mowing is likely to produce permanent grassland, which is an important foraging resource for breeding lapwing (Galbraith, 1988).
- In areas where mowing is not possible, e.g. around wader scrapes, tree seedlings will be hand-pulled or cut to the ground by hand.
- Herbicides and pesticides are not permitted within the Proposed Enhancement Area.
- In the event of any invasive species being recorded within the area identified for enhancement measures, an invasive species management plan will be put in place to eradicate any stands of such species. A pre-commencement survey for invasive species will be undertaken as part of preparatory work and if any such species are recorded an invasive species management plan shall be prepared.
- Measures will be implemented during the construction phase. This will ensure that the area is suitable for breeding waders at the start of the operational phase.

It is noted that this area will also be suitable for wintering waders, such as golden plover.

#### 4.3.2.3.1 *Predator-proof Fencing*

The fence specification has been chosen in order to successfully exclude ground predators potentially present in this area (e.g. Red Fox, Badger, Otter, American Mink, Irish Stoat and Pine Marten). The NPWS, as part of recent conservation measures within the Termoncarragh Lake and Annagh Marsh SPA, have provided detailed specifications for permanent predator exclusion fencing for this specific purpose. The proposed permanent predator exclusion fencing within Lodge Bog Enhancement area has therefore been designed based on these specifications, as detailed below. Images of example permanent predator exclusion fencing to a comparable specification are provided in Plate 6 - 5 - 1 and Plate 6 - 5 - 2 below for illustrative purposes.

- The fence will be installed immediately after the works associated with the bulldozer and excavator.
- The fencing will be installed around the perimeter of the three breeding wader areas (12ha, 7ha and 6ha).
- Strainer posts shall be a minimum of 3.5m long, have a minimum diameter of 15cm and shall be driven a minimum of 90cm into the ground. Strainers shall be placed at the beginning and end of every length of fencing and at ever change of direction where the angle is greater than 30°. Strainers must also be used to accommodate any

[3] https://www.bto.org/sites/default/files/lapwing-habitat-guide.pdf

significant change in gradient and be strutted in the line of the fence. Strainers on 90° corners must be H framed and strutted. Maximum distance between strainer posts shall not exceed 100m. Strainers shall be incised (posts to be treated in accordance with IS 436);

- Intermediate posts shall be around 2.5m long, have a minimum diameter of 10cm and shall be driven a minimum of 60cm into the ground.
- Intermediate posts shall be spaced at no more than 2.5m intervals and be H framed on every change of direction. Posts shall be incised (posts to be treated in accordance with IS 436);
- High tensile 1580mm Tornado badger wire R15/158/5, to a height of 130cm off the ground forms the main body of the fence; the bottom 28cm is to be buried;
- The Tornado badger wire is to be overlain with 16-gauge, hot dipped galvanised 25mm square weld mesh (clipped to the top of the badger wire using hog rings) and both are to be dug in (by pulling back and relaying the sod) to prevent animals digging under the fence.
- Four strands of high tensile 12-gauge electric wire, tensioned and placed along the outside of the fence at 3cm, 15 cm and 25cm height above the top of the badger wire using UV resistant screw insulators. A fourth strand to be attached above these via 20cm UV resistant offset insulators to give total fence height of around 170cm. All strands connected to a single circuit although the second line at 15cm is an Earth wire. An additional live wire, connected to the single circuit, to be attached using UV resistant screw insulators on the inside of the fence at around 100cm to stop stock rubbing on posts;
- All wire to be connected using Gripple wire joiners;
- All access gates should be a minimum of 3.6m wide and at least 1.2 m high. All steel gates shall be hot dip galvanised in accordance with EN 1461 and 12 be overlain with 16-gauge, hot dipped galvanised 25mm square weld mesh, square cornered at bases and with hot dipped galvanised 45° angled brackets attached at top and overlain with same hot dipped galvanised weld mesh. Hot dipped galvanised gate post, concreted in, to be used and these to be independent of any strainer / fence post (two gates already have galvanised gate posts, and these can remain and be used). Gates to be hung using suitably sized proprietary gate hangers and the gate base shall be around 3cm above the ground. The gates also must be fitted with an adequate system which shall securely keep the gate closed. Handle openings must be secured against predators. Each gate to have a poured concrete apron buried (25- 30cm) under the gate to prevent digging;
- Insulated underground cable (IB5) is to be buried under each gate, connecting the electric wires either side and ensuring the fence remains live when gates are opened;
- There are no watercourse flow points within the proposed predator exclusion fence area. However, at any gullies or other similar depressions where deemed required, dams to prevent otter / mink access whilst maintaining flow through will be installed. To use a 300mm twin wall corrugated unperforated drainage pipe and 10-15cm or similar crushed rock. Ensure to incorporate buried Tornado badger wire above. At each pipe ends use hot dipped galvanised 25mm square weld mesh in a frame secured to the pipe to prevent animals gaining access but at same time allows for the mesh to be removed easily to clear debris. In addition, fix a section of Tornado badger wire across the watercourse width, around 5m upstream of the drainage pipe to act as a catch point to keep most debris away from the 25mm square weld mesh panel at the pipe end; and,
- Supply and installation of a solar panelled fencer (PEL Unigizers - High Power Solar Fencers - PE406S or similar) and 4 x 1.5m earth bars.
- A crow trapping regime will be implemented if required to minimise predation.



*Plate 6 - 5 - 1 Example predator-proof fencing broadly in-line with proposed specifications (for illustrative purposes only) .*



*Plate 6 - 5 - 2 Example predator-proof fencing and access gate broadly in-line with proposed specifications (for illustrative purposes only).*

### 4.3.2.4 Permanent Reedbeds for Hen Harrier

It is proposed to create areas of permanent reedbeds for hen harrier, primarily to replace roosting habitats which may be lost through displacement. As detailed in Section 7.3.7.7 of Chapter 7, hen harrier were recorded roosting irregularly throughout the Project Site at suitable roosting habitats, with seven roosting areas identified within the Project Site over the six winter seasons. No communal roosting or regularly used roost site was identified. Roosting was opportunistic; therefore, it is likely that the creation of new roosting habitat will be utilised.

Reedbeds are a readily utilised habitat for roosting hen harrier, with this habitat being the most frequently used (26%) in a review of winter roosts sites across England, Scotland and Wales (Clarke & Watson, 1990). A study of roosting hen harrier in Ireland showed that reedbeds were the second-most used habitat for roosting (16%), after heath/bogs (53%) (O'Donoghue, 2021). It is proposed that a reedbed of Common Reed *(Phragmites australis),* Bulrush *(Typha)* and Saw Sedge *(Cladium mariscus)* will be planted adjacent to one of the permanent waterbodies proposed in Section 4.3.2.2 above, creating a wetland mosaic through simple rewetting or on the margins of PCAS areas which have undergone more intense drain blocking, with outflows blocked and managed. Where there are existing reedbeds, these will be maintained and natural expansion will be encouraged. Where reedbeds need to be planted, nursery-propagated and locally-sourced turves will be used and planted in patches which

will naturally expand. Reedbeds will be planted on shallow gradients with standing vegetation which will be retained throughout winter. The reedbed will be established in shallow waters (5cm) and water levels will be raised gradually. Once established, this reedbed will remain uncut and intact for the winter, as this is more likely to support roosting (Clarke & Watson, 1990). Hen harriers have been documented to use roost habitats in a wide range of sizes, from several hundred square metres to several kilometres' square metres (O'Donoghue, 2021). It is proposed that 5.6ha of reedbed mosaics be established, in line with the average size of contiguous habitats used for roosting within, and adjacent to, the Proposed Wind Farm site. Measures will be implemented at the beginning of the construction phase, to allow time for the reedbed to establish over the three-year construction period. This will ensure that the area is suitable for roosting hen harrier at the start of the operational phase.

672000

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726000

724000

N

6 ha

7 ha

5.6 ha

5.6 ha

7.8 ha

12 ha

294.3 ha

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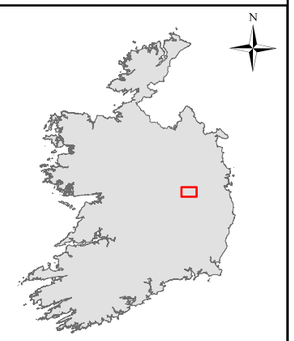
## Map Legend

- Project Site

Lodge Bog Measures

- Whooper Swan Waterbodies
- Wader Paddock
- Hen Harrier Roost Enhancement Area
- Scrub Management

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title

Specific Enhancement Measures within Lodge Bog

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-6 | 1:12,000 |
| Drawn By | Checked By | Date |
| TS | KOD | 22/10/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

## 4.4 Objective 3: Killina Bog Offsetting Area

The objective is to create open habitat suitable for wintering golden plover and breeding waders. This objective is proposed to create (further) suitable replacement habitats to offset the significant habitat loss effects for this species resulting from the Proposed Project. This area was selected for offsetting as it is an area that is wholly unsuitable for golden plover and breeding waders in its current state, it is therefore an ideal area to compensate for the loss of open habitat. The area is currently forestry. Furthermore, it is located at the periphery of the Proposed Wind Farm site and over 900m from the nearest Proposed Turbine. The local population of golden plover at the Proposed Wind Farm are likely part of the population that are resident at the Curragh, and therefore, this offsetting area will not be encouraging golden plover to commute through the Proposed Wind Farm site to access this area as the population resides to the southeast of the Proposed Wind Farm. Furthermore, the separation distance from the nearest Proposed Turbine is such that displacement from the Proposed Turbines within this area is not anticipated.

### 4.4.1 Current Baseline Conditions

The area proposed for enhancement is predominately conifer plantation, with smaller areas of broadleaf woodland. It is adjacent to areas of wetland cutaway and dry cutaway bog which has largely revegetated with scrub, and agricultural farmland which is already suitable habitat for golden plover.

### 4.4.2 Methods to Achieve the Management Objectives

The habitats recorded within this area are detailed in Section 4.4. In summary, this area mostly comprises of conifer plantation. Management prescriptions to be implemented by the applicant include:

- The identified area of existing forestry will be permanently removed. The timber,brash and stumps will be mulched to waste and left on-site. The heavier timber and larger stumps will be removed from site where mulching is not practical. The area will be allowed to revert to peatland habitat. This process will be aided by drain blocking as discussed below. This will create suitable habitat for golden plover. Pre-mature felling of forestry will be undertaken before the first winter season of the construction phase of the project programme. This will allow time for the clear-felled site to revegetate in advance of the operational phase, thereby ensuring replacement habitat would be available should the predicted displacement effect occur.
    - A tracked excavator machine with a shears/ harvester head will cut the trees and a second excavator will remove the timber from the site. Similarly, an excavator will be used to remove the stumps.
    - The ground will be supported by brash in areas where machinery movements are required to facilitate deforestation.
    - Felling will be carried out when ground conditions are dry. It is therefore anticipated that deforestation works will commence in September, in order to both avoid the bird nesting season (i.e. March – August) and coincide with suitable ground conditions. The works are anticipated to be undertaken over a period of one to two months.
- A hydrology/hydrogeology study will be undertaken to map the movement of ground and surface water to inform the requirement for drain blocking. Forestry drainage channels will be blocked where necessary, using peat dams, as appropriate. The area will be levelled (re-profiled) to stabilise the water table and facilitate the mowing necessary to maintain the required open aspect. A bulldozer is used to level/remove any remaining camber from the former peat production fields and/or infill the drains. In flat areas, drain blocks will be placed every 50 meters and more frequently when

accounting for a slope. When drains are blocked this reinstates the waterlogged conditions which are crucial for the survival of peatland plants.

- Wader scraps will be created in suitable areas within the offsetting area.
- The vegetation sward within this area will be maintained at the optimal height for waders, including golden plover, of approximately 7-10cm (Brough and Bridgman, 1980; Gregory, 1987; Milson *et al.,* 1998). Golden plover tend to avoid areas where the sward height exceeds 10-20cm (Brough and Bridgman, 1980; Gregory, 1987). Therefore, a sward height of between 7-10cm will be maintained in this area during the winter months. This will be achieved through summer and autumn grazing with livestock and/or through mechanical means using a flail or mulcher. A sward height of 7-10cm will be achieved by the end of August each year to ensure suitable conditions are available when golden plover return for the winter. If there is an extended growing season into September and October of any given year and the vegetation height exceeds 10cm in these months, further mechanical intervention or grazing may be required in October.
- Decoys of golden plover will be deployed within the offsetting area. The decoys should be positioned tightly together to mimic the natural flocking behaviour of the species, in an open aspect with good views in all directions. The majority of circling flights of golden plover are of birds searching for other flocks on the ground, indicating a safe place to roost. The decoys will encourage golden plover to land within this area and, in theory, attract them to this offsetting area instead of open areas between the Proposed Turbines.
- Self-seeding conifers and scrub vegetation originating as windblown seedlings from adjacent and nearby commercial conifer plantations and nearby scrub and bog woodland, are a threat to the viability of the enhancement areas. They gradually take hold, and if unmanaged, would eventually make the area unsuitable for golden plover. Habitat maintenance of the area will involve the eradication of self-seeding trees and shrubs and mulched to waste and left on-site. It is envisaged that the area will require maintenance every five years during the life of the Proposed Project where annual mowing is not undertaken (e.g. adjacent to drains, areas that are too wet for machinery). The monitoring outlined in Section 5 below will monitor the level of encroachment by self-seeding trees and shrubs and will bring the scheduled removal forward as required.
- In the event of any invasive species being recorded within the Proposed Enhancement Area, an invasive species management plan will be put in place to eradicate any stands of such species.
- Herbicides will not be used for the eradication of self-seeding trees or scrub.
- Enhancement and maintenance works will be undertaken outside of the nesting season as per the Wildlife Acts 1976 – 2023 as amended. A suitably qualified ornithologist will be present at the removal of all woody vegetation, to ensure that identified breeding bird sites are avoided. If breeding activity of birds of high conservation concern is identified, no works shall be undertaken within a species-specific buffer (as per Goodship and Furness, 2022) in line with best practice, until it can be demonstrated that the nest is no longer occupied.
- The requirement for any Felling License will be discussed and agreed with the Forest Service. The felling license, if required, will include management prescriptions for the felling of the forestry. Following felling, these enhancement lands will be managed for the benefit of golden plover.

The specific measures and timelines for the deforestation and restoration of these enhancement lands are outlined in Section 0 below.

## 4.5 Objective 4: Marsh Fritillary Habitat Protection and Enhancement

The objective is for two areas containing fragmented areas of suitable but sub optimal marsh fritillary habitat on site hereafter referred to as Marsh Fritillary Enhancement Block A and Block B to be managed so that they reach Good Condition (per NBDC *Habitat Condition Assessment for Marsh Fritillary*). The Proposed Project infrastructure footprint will result in the loss of approximately 0.67ha of habitat which was considered to be suitable for marsh fritillary. In order to offset these losses it is proposed to enhance Marsh Fritillary Enhancement Block A and Block B. These blocks comprise of a mixture of bare cutaway peat and cutover bog revegetating with grassland and scrub. Block A is located in proximity to a proposed internal site access road northeast of T09. Block B is located along a proposed internal site access road east of T06. These areas contain multiple smaller fragmented areas of suitable habitat characterised by low density of devil's-bit scabious and scrub encroachment which are contributing to the sub-optimal quality of the habitat for marsh fritillary.

Small numbers of larval webs were identified at both of these locations during targeted larval web surveys in 2025. These two areas in particular were identified for enhancement due to their fragmented nature and due to scrub encroachment that may threaten the future potential of these areas to support marsh fritillary. These areas are connected to other areas of more suitable habitat and therefore enhancement will result in better habitat connectivity. Enhancement measures will include targeted scrub removal by hand and plug-planting of devil's-bit scabious with the objective of improving the overall quality and connectivity of the habitat for marsh fritillary within the Proposed Wind Farm site.

The aim of the measures within this BMP is to first offset the minor losses of supporting marsh fritillary habitat required to facilitate the construction of the Proposed Wind Farm but to also ensure that the there is in an overall increase in suitable supporting habitat within the Site.

### 4.5.1 Current Baseline Conditions

The areas proposed for enhancement predominately consist of cutover bog which is revegetating in areas with scrub, wet grassland, dry meadows and grassy verges, poor fen and *Calluna*-dominated communities.

As outlined in Section 6.3.4 of Chapter 6 in relation to the Likely Future Receiving Environment the extent of pioneer poor fen and *Calluna*-dominated communities are anticipated to have increased by the commencement of the construction phase of the Proposed Project. In addition, it is likely that birch and willow scrub will have begun to develop on areas of dry cutaway shallow peat. This natural revegetation primarily consisting of pioneer fen and *Calluna*-dominated communities will result in the creation of additional suitable habitat for marsh fritillary, while scrub colonisation may reduce suitability in other areas.

### 4.5.2 Methods to Achieve the Management Objectives

#### 4.5.2.1 Habitat Protection

The Proposed Project infrastructure footprint has been designed to avoid all key areas where core breeding populations of marsh fritillary butterfly were identified i.e. Ticknevin, Lullymore and Lullybeg. However, some small areas of cutover bog habitat which were identified as providing suitable breeding habitat for marsh fritillary (i.e., habitat containing the foodplant devil's-bit scabious) and one small area of confirmed marsh fritillary breeding habitat (i.e. areas if suitable habitat where marsh

fritillary larval webs were recorded) are located within the construction footprint and therefore will be lost.

Both suitable and confirmed breeding habitat for marsh fritillary that occur adjacent to but outside proposed works areas will be fenced off in advance of construction of the Proposed Wind Farm. These areas were identified during initial ecological surveys of the Proposed Wind Farm site, and the Proposed Wind Farm was designed to avoid the vast majority of these areas. The fencing will contain signage strictly prohibiting entry to these areas. This will demarcate the area where strictly no machinery, storage of materials or entry of construction site personnel will be permitted. The protective fencing will be inspected and signed off by the supervising ECoW prior to commencement of the Proposed Project. As described in Chapter 6 of the EIAR, the following protective measures will be in place:

- Pre-commencement surveys will be carried out by the appointed ECoW to confirm the extent of suitable breeding habitat for marsh fritillary in and within 20m of the Proposed Project construction footprint to determine whether any new areas of suitable habitat for marsh fritillary have been established between planning being granted (if approved) and the commencement of construction works.
- This will be followed by pre-commencement dedicated larval web surveys of areas of identified suitable habitat for marsh fritillary at the appropriate time of year, i.e. August and September in order to determine the extent of confirmed breeding habitat for marsh fritillary.
- Any areas where confirmed and/or suitable breeding habitat for marsh fritillary were identified during surveys to inform the EIAR for the Proposed Project will be temporarily fenced off (including a minimum buffer of 5 metres) prior to the commencement of construction works. Additionally, any new areas of suitable and/or confirmed breeding habitat for marsh fritillary identified during the pre-commencement surveys will also be fenced off. Fencing will be constructed along the margins of these areas.
- The fencing will contain signage strictly prohibiting entry to these areas. This will denote the area where strictly no machinery, storage of materials or entry of construction site personnel will be permitted. The fencing will be maintained throughout construction and will be checked for integrity at regular intervals by the appointed ecologist on site.
- The appointed ECoW will supervise works in close proximity to confirmed and suitable breeding habitat for marsh fritillary.
- Where suitable marsh fritillary habitat occurs in close proximity to the proposed infrastructure, side casting of material will be to the opposite side of the proposed infrastructure to where the suitable habitat occurs. This will ensure that there is no potential for direct or indirect impacts on marsh fritillary habitat. This measure will also protect existing suitable habitat for other Lepidoptera/pollinator species of local importance.

The locations of marsh fritillary habitat are shown in

Figure 6 - 5 - 6 below. Fencing will be erected around these areas and any other suitable or confirmed breeding habitat identified during pre-commencement surveys. Further protective mitigation measures for marsh fritillary and other habitats during construction phase of the Proposed Project are outlined in Chapter 6 of the EIAR.

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## Map Legend

- Project Site
- 220
- 200
- Marsh Fritillary Habitat

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

SITE LOCATION - NOT TO SCALE

Drawing Title
Marsh Fritillary Habitat

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-7 | 1:40,000 |
| Drawn By | Checked By | Date |
| BOC | KOD | 08/10/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

#### 4.5.2.2 Habitat Enhancement

It is also proposed to enhance areas of identified suitable but sub-optimal habitat for marsh fritillary near a proposed internal site access road northeast of T09 and a proposed internal site access road east of T06 to improve the quality of and connectivity of the habitat for marsh fritillary. This will be achieved through targeted scrub removal and plug-planting of devil's-bit scabious. The areas identified for enhancement are currently characterised by scrub encroachment and low densities of devil's-bit scabious and small numbers of larval webs were recorded in these areas during surveys undertaken. The areas identified for enhancement are also located adjacent to areas of higher quality and confirmed breeding habitat, i.e. areas where numerous marsh fritillary larval webs were recorded during surveys. The measures proposed therefore present the opportunity to not only improve the suitability of the habitat for marsh fritillary but also to connect up areas of fragmented suitable habitat thereby improving overall connectivity of suitable marsh fritillary habitat within the Proposed Wind Farm site.

Devils bit scabious is a slow-growing perennial and may take several years to reach maturity and flower. If grown from seed, it can take 5-6 years to germinate. Therefore, plug planting with plants from a certified native source will be the preferred method[4]. An off-site nursery will be used to grow and source the plugs. However, sewing with devil's-bit scabious seed will also be considered if sourcing plug plants is a limiting factor to the Plan.

The marsh fritillary enhancement measures will be implemented as follows:

- Enhancement areas will be clearly marked/fenced off to prevent inadvertent encroachment by construction activities and to ensure management actions are confined to the defined areas.
- Planting will be undertaken to increase the abundance and distribution of devil's-bit scabious within the enhancement areas using an appropriate native source.
- Management will aim to maintain a heterogeneous sward structure, comprising a mosaic of shorter and taller vegetation, rather than a uniform sward. It will also maintain the abundance of devil's-bit scabious within the enhancement areas by preventing competitive exclusion by rank grasses or scrub.
- Where vegetation becomes overly rank or scrub encroachment occurs, targeted and localised management (e.g. selective cutting or clearance by hand) will be undertaken to retain open conditions.
- No fertilisers, slurry, herbicides or pesticides will be applied within the marsh fritillary enhancement areas.
- Field operations such as rush or scrub control should only be carried out November to February when caterpillars are in hibernation and less vulnerable to disturbance.
- In addition to this it is proposed to create additional 'stepping stone' habitat which is key for the survival of the meta populations of the species and to increase its distribution across the landscape. This will not only benefit marsh fritillary but a wide range of other pollinators.

[4] https://www.plantlife.org.uk/learning-resource/managing-meadows/

## 4.6 Objective 5: Peatland Habitat Enhancement Areas

The objective is to facilitate the establishment of wet peatland habitat. There will be a loss of 31.75ha of cutover bog to facilitate the Proposed Project. To offset this loss four areas have been identified for enhancement through drain blocking and rewetting measures.

These include Blocks A, B, C and D as shown in Figure 6 - 5 - 8 which have a combined total area of 231.6ha. Block A is located in Ticknevin, north of T30 and T32, Block B is located in Codd 2 north west of T26, Block C is located in Codd1 north west of T22 and Block D is located along the boundary of Ballydermot North and Ballydermot south west of T16. The objective of the enhancement measures is to offset the loss of cutover bog habitat identified in the EIAR and to encourage the establishment of wet cutover bog habitats.

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Peatland Enhancement Block A

Peatland Enhancement Block B

Peatland Enhancement Block C

Peatland Enhancement Block D

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## Map Legend

- Project Site
- 220
- 200
- Peatland Enhancement Area

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

N

SITE LOCATION - NOT TO SCALE

Drawing Title

Peatland Enhancement Blocks

Project Title

Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-8 | 1:42,000 |
| Drawn By | Checked By | Date |
| JG | KOD | 21/10/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

## 4.6.1 Current Baseline Conditions

The areas proposed for enhancement are located primarily within areas of deep peat and wetland cutaway within cutover bog which have been identified as suitable for rewetting and drain blocking. These areas of cutover bog are primarily dominated by bare peat with small areas revegetating with *Calluna*-dominated communities.

As outlined in Section 6.3.4 of Chapter 6 in relation to the Likely Future Receiving Environment the extent of pioneer poor fen and *Calluna*-dominated communities are anticipated to have increased by the commencement of the construction phase of the Proposed Project. In addition, it is likely that birch and willow scrub will have begun to develop on areas of dry cutaway shallow peat. However, as industrial peat extraction has ceased within the Proposed Wind Farm site for over 6 years at the time of writing, and significant areas of the Proposed Wind Farm site remain dominated by bare peat, it has been shown that these habitats are slow to develop in many areas.

## 4.6.2 Methods to Achieve the Management Objectives

This BMP includes for peatland enhancement measures including re-wetting through drain blocking, to aid in the enhancement of peatland habitat within the Proposed Wind Farm site and encourage cutover bog habitats to establish on areas of bare peat. The peatland enhancement measures have been informed by the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Mona Peatlands – Preliminary Study (Bord na Mona, Nov 2022 Version 19).

It is proposed to undertake peatland enhancement on deep peat and wetland cutaway habitats. Peatland enhancement will be undertaken through a combination of measures including drain blocking, outflow blocking, targeted fertiliser application and berms to rewet the cutaway.

Prescriptive measures are unique to the existing baseline habitats and comprise two no. broad categories, 1) measures associated with deep peat cutover bog and 2) those associated with wetland cutaway. The aim of enhancement is as much as possible to place existing peatlands on a trajectory towards a naturally functioning peatland system (Renou-Wilson, 2012).

- A widespread targeted drain-blocking programme will be implemented across the areas of cutaway identified for enhancement in order to influence the hydrological regime by counteracting previous drainage of this cutaway. This will be planned in association with the wind farm infrastructure. In general, bog drains will be blocked to re-wet areas of deep peat and wetland cutaway to the optimum water-level. The extent of drain blocking required will depend on the nature of the habitat present. Drain blocking methodology is illustrated in Plate 6 - 5 - 2, Plate 6 - 5 - 2 and Plate 6 - 5 - 2.

The measures proposed are outlined in more detail below.

Bare peat areas

- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields. Areas where vegetation has established do not need fertiliser application.
- Regular drain blocking at a minimum of (3/100) using peat dams along with the blocking of outfalls and management of water levels.
- Drain blocking undertaken by a bulldozer, raising water levels, re wetting and slowing water movements through the enhancement blocks.
- Assessment of inoculation of reeds and other target species including common reed, bulrush and saw sedge from other suitable areas within the Project Site, as needed.

Vegetated cutover bog

- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established or where tree growth limits access.
- Berms comprising embankments of peat are proposed. These will be constructed with the aim of trapping rainwater and creating shallow pools of water. Berms will be constructed perpendicular to the field orientation to create large compartments.
- There are areas of deeper peat within all four peatland enhancement areas. These will be targeted for more intensive drain-blocking at a minimum of 3/100 m, with field reprofiling also where suitable. Deep Peat measures will also include modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls.

Wetland Cutaway

- Measures proposed within areas of wetland cutaway include blocking outfalls, managing water levels with overflow pipes and targeted bunding.

An overview of the main measures proposed within each habitat type is provided in Table 6 - 5 - 1 below. The rehabilitation codes used come from the Environmental Protection Agency and refer to different habitat types present within a peatland landscape and the rehabilitation measures suitable for this habitat type.

*Table 6 - 5 - 2 Types of Enhancement Measures proposed within the Peatland Enhancement Blocks*

| Type | Peatland Enhancement Block | Enhanced Rehabilitation Measure Extent (Ha) | Area (Ha) |
|---|---|---|---|
| **Enhanced Deep Peat** | Block A, B, C and D | Regular drain blocking (3/100m), modifying outfalls and managing water levels with overflow pipes, inoculation of reeds, field reprofiling, fertiliser application | 189.48ha |
| **Enhanced Wetland cutaway** | Block A, B | Modifying outfalls and managing water levels with overflow pipes, targeted bunding | 42.12ha |
| **Total** | | | **231.6ha** |



*Plate 6-5-3. Example of peat dams to be used for on-site drain blocking.*

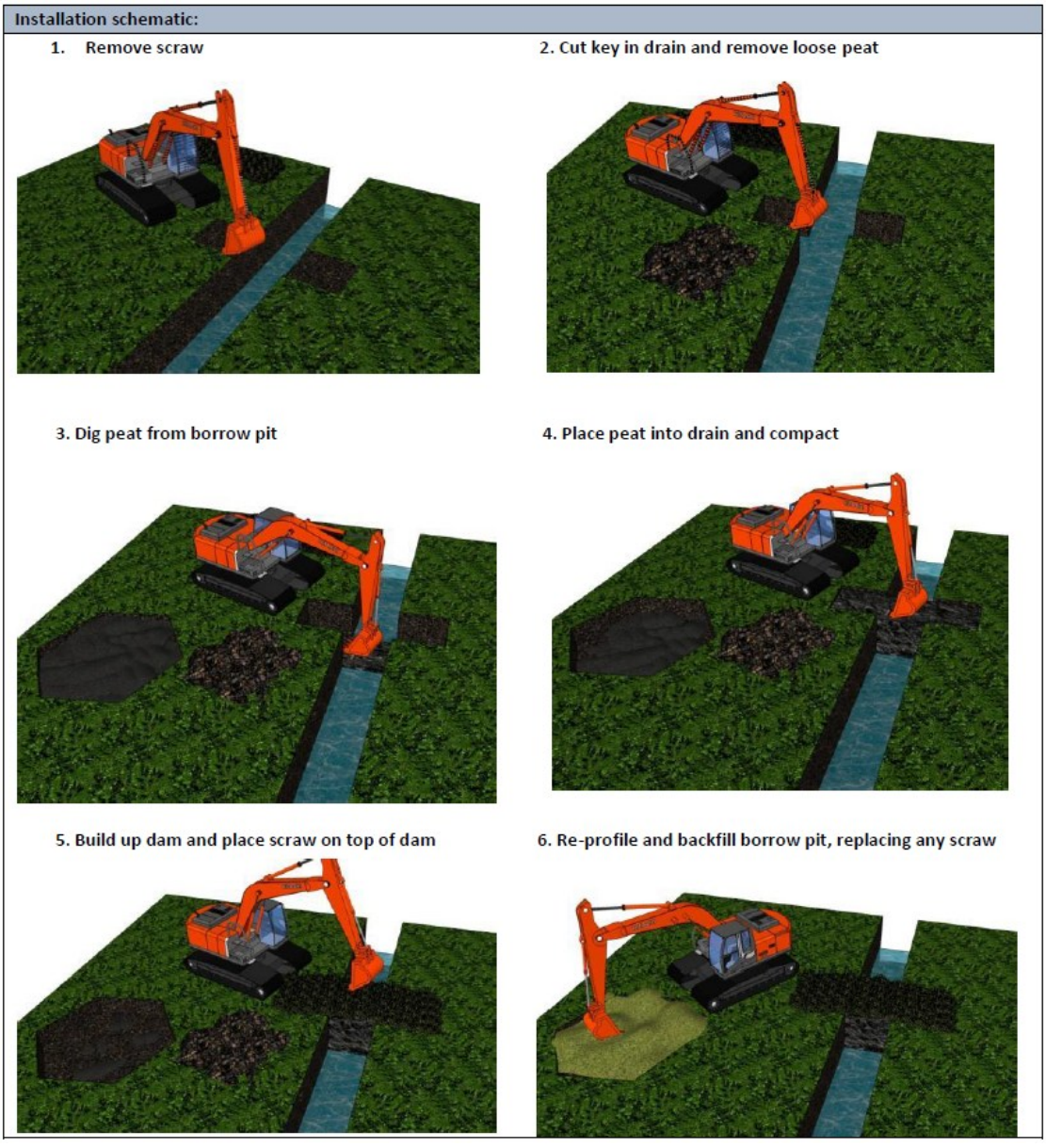



*Plate 6-5-4. Methodology for peat dam construction (Source: Mackin et al, (2017))*

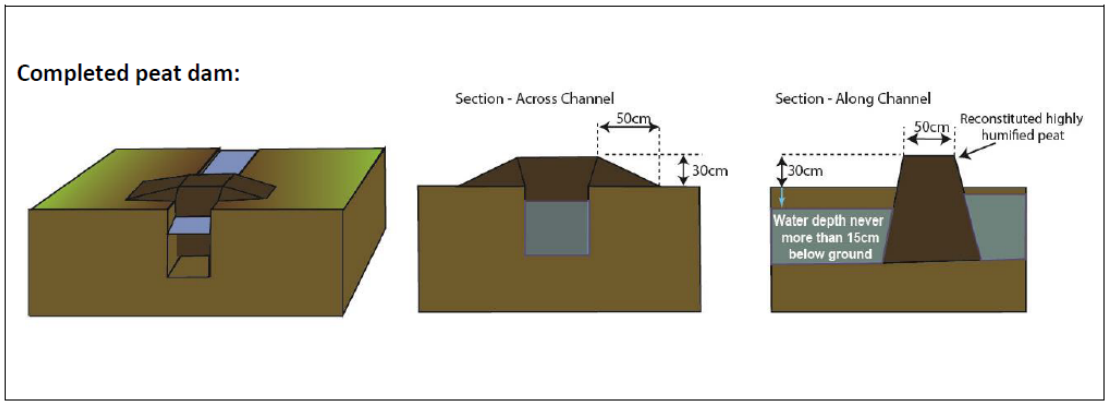



*Plate 6-5-5 Drain Blocking by machine (McDonagh, 1996)*

### 4.6.3 Management of Peatland Adjacent to Proposed Project Infrastructure

In addition to the enhancement measures proposed above, this BMP also sets out measures that will reinstate the embankments (cut and fill areas) alongside the newly constructed infrastructure i.e. site access roads and turbine hardstands, within areas of peatland. Such measures will further minimise peatland loss and the extent of the development footprint. During initial site preparation works, the top layer of vegetation on peat shall be placed/temporarily stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat and spoil. This will then be placed back on the reinstated berm along the adjacent section of turbine handstand. In addition to the above listed measures, the below will also be implemented:

- No vehicular access will be permitted within the reinstated peatland areas once all initial works are completed.
- The enhancement areas will be monitored to assess the success of the enhancement plan.
- Where vegetation has not established or ground conditions do not allow for easy recolonisation, any reseeding will be restricted to species occurring in the immediate
- surroundings. Such species will help to stabilise the reinstated peat, while not outcompeting
- any natural revegetation from local seed dispersal.

## 4.7 Objective 6: Native Tree (Woodland and Scrub) Planting

The objective is that 45.3ha of native tree planting will develop into mature native woodland over time. The Proposed Project will result in the loss of approx. 44.3ha of woodland to facilitate the construction of the Proposed Wind Farm, to facilitate bat buffers around turbines to make the habitat less attractive to bats and to allow for creation/enhancement of suitable areas for golden plover within Lodge Bog and Killina Bog to offset potentially significant effects on this species as identified in the EIAR.

It is proposed to plant 45.3ha of native trees at five different areas (Native Tree (Woodland and Scrub) Planting Block A – E, as shown in Figure 6 - 5 - 3) to offset any losses of woodland identified. This planting will occur within a planting season during or in advance of the commencement of construction works in order to minimise the interim time necessary for growth and establishment of new habitat. Over time this will establish into mature woodland habitat. Areas for woodland planting were chosen as

they were considered unsuitable for rewetting. Woodland Planting Block B includes for conifer removal prior to re-planting with native tree species.

### 4.7.1 Current Baseline Conditions

Native Tree (Woodland and Scrub) Planting Block A, C, D and E are located within recolonising cutover bog habitat where natural succession to scrub is already occurring on dry and wetland cutaway. Woodland Planting Block B is currently within Conifer Plantation.

As outlined in Section 6.3.4 of Chapter 6 in relation to the Likely Future Receiving Environment, and following the trends observed within the Proposed Wind Farm site following cessation of industrial peat extraction to date, at the commencement of construction it is likely that birch and willow scrub will have begun to develop on areas of dry cutaway, shallow peat, and some areas currently identified as scrub are anticipated to have developed into birch and willow-dominated woodland in this timeframe.

### 4.7.2 Methods to Achieve the Management Objectives

The enhancement measures are intended to diversify structure and species composition through targeted planting. For the establishment of woodland on highly modified peat and peaty podzols, the Native Woodland Intervention for Remediation of Industrial Cutaway Peatlands Pilot Scheme 2024-2027 (Department of Agriculture, Food and the Marine, December 2024) and the Management Guidelines for Ireland's Native Woodlands (Cross, J.R. & Collins, K.D. 2017) has informed the planting proposals for the enhancement areas. Planting proposed includes downy birch (*Betula pubescens*) (45%) and rowan (10%) in pure groups. Scots pine (*Pinus sylvestris*) (20%) and pedunculate oak (*Quercus robur*) (15%) also in pure groups, on free-draining areas. Minor species (10%) to comprise at least two of the following, positioned between the above groups and at edges: holly (*Ilex aquifolium*), hawthorn and hazel. Where wetter conditions occur within the replanting areas, these should be planted with: downy birch (50%) and grey willow (30%), planted in pure groups. Minor species (20%) should comprise of at least two of the following, positioned between the above groups and at edges: rowan, hazel and alder (*Alnus glutinosa*), and pedunculate oak. This native tree planting will provide areas of suitable habitat for species that utilise woodland habitat, including the suspected moth (*Parastichtis suspecta)* and will offset any losses of suitable habitat

Local variation in ground levels and hydrological conditions within the Native Tree (Woodland and Scrub) Planting Block will be taken into account during implementation. LiDAR topographic data and onsite observations will be used to inform species selection and planting layout, to ensure that planting is appropriate to local conditions. Where lower lying or wetter areas are identified, planting will be adapted accordingly, either through the use of appropriate wet woodland species or by allowing areas to remain as more open or transitional habitats. This approach will ensure that woodland enhancement is aligned with site conditions and allows for the gradual establishment of a structurally diverse woodland/wetland mosaic alongside ongoing peatland enhancement.

#### 4.7.2.1 Implementation and Management

The requirement for a Tree Felling Licence for the conifer removal within Woodland Planting Block B will be discussed with the Forest Service, and any measures specified by the Forest Service will be implemented.

- All trees within Woodland Planting Block B will be felled using conventional forestry harvesting approaches/machinery and with specific reference to Macklin *et al.* 2017.
- Timber and brash will be gathered and removed from the Proposed Wind Farm site post felling.
- The machine operators used will be experienced at working on deep peat and made aware of the specific risks on the Proposed Wind Farm site.
- The Proposed Wind Farm site will be walked prior to commencement of works.

- The use of off-road vehicles on the Proposed Wind Farm site will be restricted to the proposed new site access track unless where specifically required to access the areas to be felled
- These works will also be preceded by a toolbox talk to the felling team by the ECoW to ensure all measures are implemented in full.
- Burning and dumping will not be permitted.

The native woodland planting measures proposed for all five blocks will be implemented as follows:

- Planting areas will be clearly marked prior to works to define the extent of planting.
- Thin stakes or sticks will be used to mark the rows or areas of trees to be planted.
- Trees will generally be planted at approximately 2 m spacing. Shelterbelt planting may be applied by planting up two lines of trees as a staggered row.
- Newly planted trees will be protected as required using appropriate tree guards to prevent browsing by wild animals such as deer.
- New tree planting will be kept weed and litter free until the new plants are established, particularly from ruderal weeds. Healthy growth will be maintained by allowing the plant to occupy as much of the planting areas as possible to allow them to achieve as close their natural form as possible.
- During spring and autumn maintenance periods all trees and plants will be checked and adjusted as required, soil firmed, and any dead wood present removed back to healthy tissue. If there is significant failure, the need for replacement planting will be assessed. Where tree guards are no longer required these will be removed to avoid damage to the tree.
- During the first growing season, all standard trees/ semi-mature trees will be watered regularly during any prolonged dry periods during the growing season (i.e. in April, May, June, July and August). During the second growing season the trees will be kept well-watered as often as required, particularly during June, July and August.
- Trees will be inspected following the main growing season (i.e. in September) for the first five years of growth, where the requirement for replacement planting will be assessed. If any trees are dead or damaged these will be replaced using the same species within the next planting season. Recommendations for ongoing or remedial management required will be specified within a Monitoring Report (see Section 5).

## 4.8 Objective 7: Translocation of Basil Thyme and Round-leaved Wintergreen

The objective is that populations of basil thyme and round-leaved wintergreen will continue to grow within areas where they are translocated. During the surveys undertaken, basil thyme and round-leaved wintergreen were recorded at a number of locations throughout the Proposed Wind Farm site, both within and outside the Proposed Project construction footprint. While the Proposed Project has been designed to avoid the areas where these species were recorded insofar as possible, there will nonetheless be loss of these species where they occur at a small number of locations within the construction footprint to facilitate the construction of the Proposed Project infrastructure, proposed bat buffer zones around the Proposed Turbines, and within Killina Bog where felling is proposed as part of mitigation measures proposed to offset potential effects on golden plover as a result of the Proposed Project, as outlined within Section 4.4. It is proposed to translocate these species from areas where they occur within the construction footprint to areas of suitable habitat outside the construction footprint in order to ensure that there are no significant effects on populations of these species.

### 4.8.1 Current Baseline Conditions

Basil thyme was identified within the hardstand area of Proposed Turbine 21 and in several other locations throughout the Project Site within Ballydermot North, Ballydermot South, Blackriver, Codd 1,

Glashabaun North, Glashabaun South and Lodge Bogs. Basil thyme was recorded particularly along the limestone gravel trackways associated with the decommissioned BnM railways through the Project Site. Round-leaved wintergreen was recorded within wetter peatland habitats including pioneer fen. It was identified in a number of locations across Lullybeg, Glashabaun South, Glashabaun North and Killina Bogs. Large numbers of plants were identified approximately 50m to the south of the proposed access road to Proposed Turbine 37 as well as within Killina Bog. Smaller population were also recorded within the hardstands of Proposed Turbines 29, 37 and 44 as well as within and adjacent to the Proposed Turbine 40 hardstand.

Additionally, scattered small populations of round-leaved wintergreen were recorded approximately 4m and 18m to the south of the internal underground electrical cabling associated with Proposed Turbine 42, approximately 100m to the north of Proposed Turbine 37, and within and adjacent to the proposed roads and internal underground electrical cabling associated with Proposed Turbine 35.

As outlined in Section 6.3.4 of Chapter 6 in relation to the Likely Future Receiving Environment the extent of pioneer poor fen and *Calluna*-dominated communities are anticipated to have increased by the commencement of the construction phase of the Proposed Project. In addition, it is likely that birch and willow scrub will have begun to develop on areas of dry cutaway shallow peat. Additional areas of suitable habitat for basil thyme will likely develop, particularly in marginal areas where grasslands may revegetate, as well as along the former railway lines through the site which create calcareous ground conditions.

### 4.8.2 Methods to Achieve the Management Objectives

The following mitigations will be applied during the construction phase of the Proposed Project in order to ensure that there are no significant effects on populations of these species:

- Pre-commencement surveys for basil thyme and round-leaved wintergreen will be undertaken at the optimal time of year (i.e. July to August for basil thyme and June to July for round-leaved wintergreen) by a suitably qualified ecologist in advance of construction and any felling measures. The surveys will focus on the footprint of the Proposed Project (inclusive of the enhancement areas in Killina Bog) within the Proposed Wind Farm site where the species have previously been recorded. Due to the time that may elapse between surveys undertaken to inform this assessment and the commencement of construction works, as well as the annual life cycle of basil thyme, other areas of suitable habitat within the Proposed Project construction footprint, in proximity to previously-mapped populations, will also be surveyed for newly-colonised plants.
- If these species are found within the construction footprint, plants will be mapped.
- Where the species are identified within the Proposed Project infrastructure footprint, the ecologist will also identify suitable translocation areas for each species outside of the construction footprint and beyond the ZoI of the Proposed Project.

**Basil thyme**

- Existing plants identified within the Proposed Project infrastructure footprint will be carefully excavated by hand by the ECoW with a shovel ensuring that the root system and surrounding rooting substrate remain intact. These plants will be moved to a prepared area with suitable substrate and habitat conditions for the calcicole species, as identified by the ECoW during the pre-commencement survey.
- Following the removal of the plants, the gravel/subsoil from these areas within the Proposed Project infrastructure footprint shall also be stripped and reinstated at proposed new suitable locations. The locations of the reinstatement areas will be identified by a suitably qualified ecologist in advance of reinstatement works. During reinstatement a thin layer of the stripped gravel/subsoil, containing the residual floral

seed bank, shall then be spread evenly over gravel substrate. These works will be supervised by the ECoW.
- These areas shall then be temporarily fenced off and allowed to regenerate naturally.

**Round-leaved wintergreen**

- As round-leaved wintergreen is a perennial species, large turves containing the plants identified and mapped during the pre-commencement surveys which overlap the construction footprint will be translocated as follows:
- Translocation will be planned during a metabolically less active time of year for round-leaved wintergreen (winter months).
- These turves will be relocated to other suitable habitat nearby with appropriate levels of shading, an appropriate hydrological regime and appropriate substrate for the species.
- The receptor site will be appropriately prepared for receiving the turves by removing no more than 10cm of top soil from the receptor areas.

The reinstated areas of each species and the translocated individuals and turves shall be subject to a management and monitoring regime as follows:

- No fertiliser or herbicide shall be applied.
- Potential scrub encroachment will be monitored and appropriate measures adopted if required to manage any potential encroachment
- A monitoring programme shall be put in place and an annual assessment of each species populations shall be conducted by a suitably qualified ecologist to monitor the recovery and conservation status of this species.
- The annual assessment will be carried out for a period of three years. If the management measures are sub-optimal during this period, additional interventions may be necessary, and may be prescribed by a suitably qualified ecologist, extending the monitoring programme beyond three years if necessary.
- Following on from this the populations will be routinely assessed as part of the program of habitat surveys carried out by the BnM Ecology team.

## 4.9 Best Practice Enhancement Measures

A number of biodiversity enhancement measures are outlined in the sections below. These measures are not required to mitigate or offset identified significant effects.

### 4.9.1 Enhancement of Pollinator Foraging Habitat

No significant effects on supporting habitat for pollinating insects was identified within the EIAR. Nonetheless, there is an opportunity to create areas of high quality, flower rich grassland habitat along the verges of the proposed internal roads associated with the Proposed Project and to manage existing areas of cutover bog, wet grassland and dry meadows and grassy verge habitat along these proposed roads for increased floral diversity. This will benefit pollinators by providing flower rich foraging resources and improved habitat connectivity.

Two areas for habitat creation and enhancement have been identified. The first starts in Lullybeg just south of T37 continuing south along proposed internal roads past T34 into Barnaran, west along the old railway tracks entering Blackriver and then north along proposed internal site access roads past T07 (refer to Map 6-5-3). The second area starts in the north of the Proposed Wind Farm site in Ticknevin and continues along proposed roads joining T32 and T30, finally connecting to the Long Derries, Edenderry SAC.

Following construction of the internal roads at these locations, subsoil comprising calcareous mixed gravels and till will be used to reinstate ten meters either side of the infrastructure corridor. Where the calcareous substrate of the decommissioned railways will be removed to facilitate construction of new internal access roads, this material and its seed bank will be preserved and reinstated in the pollinator foraging habitat. Such material will facilitate the establishment of calcareous plant species which have been recorded elsewhere along old railway tracks and spoil heaps within the Proposed Wind Farm site. The establishment of such flower-rich vegetation will benefit pollinators by providing enhanced foraging opportunities and providing continuous habitat connectivity to other areas of flower rich grassland, e.g. The Long Derries. Birds-foot Trefoil readily naturally colonises this substrate and is a key foodplant for both Common Blue and Dingy Skipper. In addition, such material, in combination with the surrounding peat substrate can also create a suitable substrate for the natural colonisation of devil's-bit scabious in certain conditions and thus marsh fritillary breeding habitat. Targeted scrub removal will be undertaken by hand within the enhancement areas.

Any management approach will be flexible and be tailored to the specific on-site environment where there will be a variety of peat depths, hydrological conditions and nutrient status. Different actions in different places should enhance the natural diversity of habitats already developing on site.

### 4.9.2 Falcon Nest Boxes

As outlined in in Section 7.3.7.11 and 7.3.7.20 of the EIAR, peregrine and kestrel are resident at the Proposed Wind Farm site and breeding in the area. Although no significant impacts are anticipated for these species, both of these species can be limited by the lack of available suitable breeding locations in an Irish context. It is therefore proposed to bolster the population of these peregrine and kestrel by providing additional nesting sites in the form of nest boxes. For peregrine, it is proposed to install two nest boxes at suitable locations outside the buffer of disturbance for this species (750m, NatureScot 2022). For kestrel, it is proposed to provide nest boxes at a ratio of 5:1 relative to the potential collision risk mortality, or 25 nest boxes and these will be placed within the Core Ornithological Survey Area, but at sufficient distances from the Proposed Turbines to avoid impacts. Peregrine and kestrel are known to readily accept nest boxes (Valkama & Korpimäki, 1999; Drewitt, 2014; Fay *et al.*, 2019). Nest boxes will be placed in the winter before the first breeding season of the construction phase.

Providing additional nesting sites for these species is likely to increase the carrying capacity of the local bog complex. There is potential for these nest boxes to create additional nesting sites for other raptor species recorded locally such as long-eared owl or barn owl. To ensure availability of nesting sites does not become a factor limiting the local population growth for peregrine or kestrel, nest boxes will be monitored annually for signs of occupancy. As required, additional nest boxes will be provided annually such that there will always be a surplus of 20% to allow for population growth and to avoid inter-species competition for nest sites.

### 4.9.3 Log and Brash Piles

Log and brash habitat piles will be created within areas following birch woodland felling and scrub removal. These areas will be located outside of any areas proposed for permanent infrastructure. Where suitable, woody material arising from necessary vegetation removal associated with the Proposed Project will be retained and reused for this purpose.

The habitat piles will comprise untreated logs, branches and brash of varying sizes, with bark retained where possible, to provide a range of microhabitats for invertebrates, small mammals, small birds, other fauna and fungi (Browne, 2020). The piles will be located away from routinely trafficked areas and will remain in situ throughout the operational phase of the Proposed Project.

### 4.9.4 Bat Boxes

As a range of bat species are known to utilise the Proposed Wind Farm site for commuting and foraging, artificial roosting features will be incorporated within the Proposed Wind Farm site to enhance roost availability and strengthen the ecological functionality of the landscape for bats. The enhancement measures will comprise a minimum of 15 no. bat boxes.

The precise location of all artificial roosting features will be agreed with a suitably qualified ecologist prior to installation. In accordance with national guidance (NRA, 2006; Kelleher & Marnell, 2022), bat boxes will be installed in clusters on mature trees or dedicated poles within woodland, treelines and other sheltered linear features that form existing commuting corridors, and away from artificial lighting and other potential sources of disturbance. Boxes will be installed at a minimum height of 3m above ground level and on a range of aspects to provide a variety of microclimatic conditions. Boxes will include a mix of crevice-type and cavity-type designs (e.g., Schwegler 1FF and Schwegler 2FN/Wildcare Eco Cavity Bat Box).

Locations will be selected to maximise connectivity with existing foraging habitat while avoiding exposed, open areas. Bat boxes will not be placed within the Proposed Turbine risk area to avoid encouraging bats to roost or forage within rotor-swept zones. All placements will be at the edges of the Proposed Wind Farm, near existing linear features leading away from turbines or within Killina Bog Offsetting Area and Lodge Bog Enhancement area. Bat boxes should be positioned away from other species-specific enhancement features, including falcon nesting boxes and pine marten den boxes, to minimise the potential for disturbance, competition or predation risk and to maximise the likelihood of bat box uptake. Bat boxes will be installed in advance of, or during, the construction phase.

### 4.9.5 Amenity Development

The Proposed Project includes 55.2km of amenity track which is described in Chapter 4 of the EIAR. The potential for significant disturbance to wildlife as a result of the use of the proposed amenity track and boardwalk by the public during the operational phase of the Proposed Project was considered and assessed in Section 6.4.3.2 of Chapter 6. The amenity track and boardwalk proposed as part of the Proposed Project have been chosen to allow access through the Proposed Wind Farm site as well as to limiting potential disturbance to wildlife from walkers, dog-walkers, equestrian users, cyclists etc.

The following measures will ensure that disturbance to wildlife and encroachment on to sensitive habitats is avoided or kept to a minimum:

- Dog control management (dogs on leads) will be included on all signage, as required.
- The amenity tracks have been designed to avoid areas identified as suitable for marsh fritillary and construction activities will be supervised by the ECoW, ensuring minor micro-siting as required.
- The amenity pathways will include educational signage with information on the habitats, species and general biodiversity of Ballydermot Bogs and the habitat enhancement work being undertaken by Bord na Móna on the Project Site.
- Proposed Amenity Tracks that are located nearby waterbird breeding or roosting locations will be screened. Visual screening fences will be installed at selected locations along the amenity roads and tracks, to prevent disturbance to breeding and non-breeding birds using the site during the operation phase (occasional movement of people, dogs). The screening fence will be approximately 1m high. A dense hedgerow comprising native species may be planted to enhance privacy and visual appeal also. Indicative areas of where screens will be implemented are presented in Figure 6-5-9 below. The actual number and location of screening required will be assessed during the construction phase by the ECoW.

## 4.9.6 Pine Marten and Red Squirrel Boxes

Pine marten were recorded on trail camera footage in the woodland North of T28 in Glashabaun North Bog, south of T35 in Lullybeg Bog and north-west of T11 in Ballydermot South Bog. Red squirrel were observed in Ballydermot North Bog, Blackriver Bog, Killina Bog and in Lullymore Heritage Park. Other incidental records of these species occurring within and outside the Project Site were also noted in the Biodiversity chapter. No breeding sites for either species were recorded within the footprint of the Proposed Project by surveyors. While there will be loss of supporting habitat, i.e. woodland, scrub, revegetated cutover bog, conifer plantation, for these species, the total area of these habitats to be lost to the Proposed Project is small relative to their overall cover within the Project Site. Furthermore, it is anticipated that over time large areas of the cutover bog within the Proposed Wind Farm site, outside of the construction footprint, will develop into bog woodland and scrub through natural vegetation succession. Therefore, no significant effects as a result of habitat loss or fragmentation are anticipated.

However, the Proposed Project presents an opportunity to provide enhancement measures for these species in the form of artificial breeding sites. These den/nest boxes act to provide artificial breeding sites facilitating the raising of young during the spring and summer, in addition to providing shelter from environmental conditions and predators.

In relation to pine marten, these boxes have proved to be a very successful conservation tool in Scotland, with many boxes being occupied continuously over a number of years and were used by breeding females to raise their young (Croose *et al.*, 2016). A similar study carried out in Scotland in relation to red squirrel also showed that nest boxes can be a useful conservation tool to mitigate the impacts of forest operations (de Raad *et al.*, 2021).

### 4.9.6.1 Proposed Nest/Den Box Installation

It is proposed to erect five pine marten den boxes within Glashabaun North, Glashabaun South, Ballydermot South and Barnaran and five red squirrel nest boxes in Killina and within the proposed Native Tree (Woodland and Scrub) Planting Blocks. These will be erected immediately post construction (to avoid disturbance to these species during construction). They will be erected along existing mature trees within these area and in suitable locations where future tree felling (associated with forestry) will not occur. The following boxes will be used:

- Pine marten - https://www.nestbox.co.uk/products/pine-marten-den-box
- Red squirrel - https://www.nhbs.com/red-squirrel-nest-box

#### 4.9.6.1.1 *Tree Selection*

Boxes will not be installed until after the Proposed Project has been constructed, this will allow an optimal location to be identified. Selection of a suitable tree will require the installer to seek out a tree that they deem to be fit for the purpose. Although these guidelines were provided in relation to pine marten den boxes the same would apply in relation to the installation of red squirrel nest boxes. The following guidelines will aid the installer in selecting a tree that is suitable for installation:

- Ensure the boxes are installed on a tree a suitable distance from human roadways and paths, and away from areas targeted for woodland management or harvesting in the near future, to avoid disturbance of the box.
- Locating the box near pre-existing animal trails may increase the likelihood and speed with which the box is discovered
- The boxes are likely to produce the greatest benefits is they are installed in large, undisturbed, prey-rich woodlands where natural den sites such as tree cavities are scarce or absent.
- The tree itself must be a living tree with a straight trunk and a minimum DBH (diameter at breast height) of 20cm.

- Finally, when choosing a site for a box bear in mind the future requirement to view the boxes for signs of use or to check their condition.

### 4.9.7 Embankments for Solitary Bees and Pollinators

Safe places for bees to nest are crucial to the survival of each species. Adult solitary bees die in autumn, leaving the next generation behind as pupae in nests to emerge as adults the following spring. Mining solitary bees nest by making tiny burrows in bare earth. It is proposed to use excavated subsoil from the construction of the Proposed Project to construct short sections of embankments/berms at locations within the two pollinator foraging habitat areas that are proposed for enhancement. These berms will be allowed to become recolonised by vegetation naturally to ensure the local seedbank is preserved and provide additional foraging resources for pollinating insects. However, it is also proposed to maintain the south-facing embankment slopes free of vegetation to provide bare soil for nesting solitary bee species. An example of an embankment used by solitary bees is provided in Plate 6-5-6. Examples of pollinators present within the Project Site are shown within Plate 6-5-7 and Plate 6-5-8.

The following management measures will be applied:

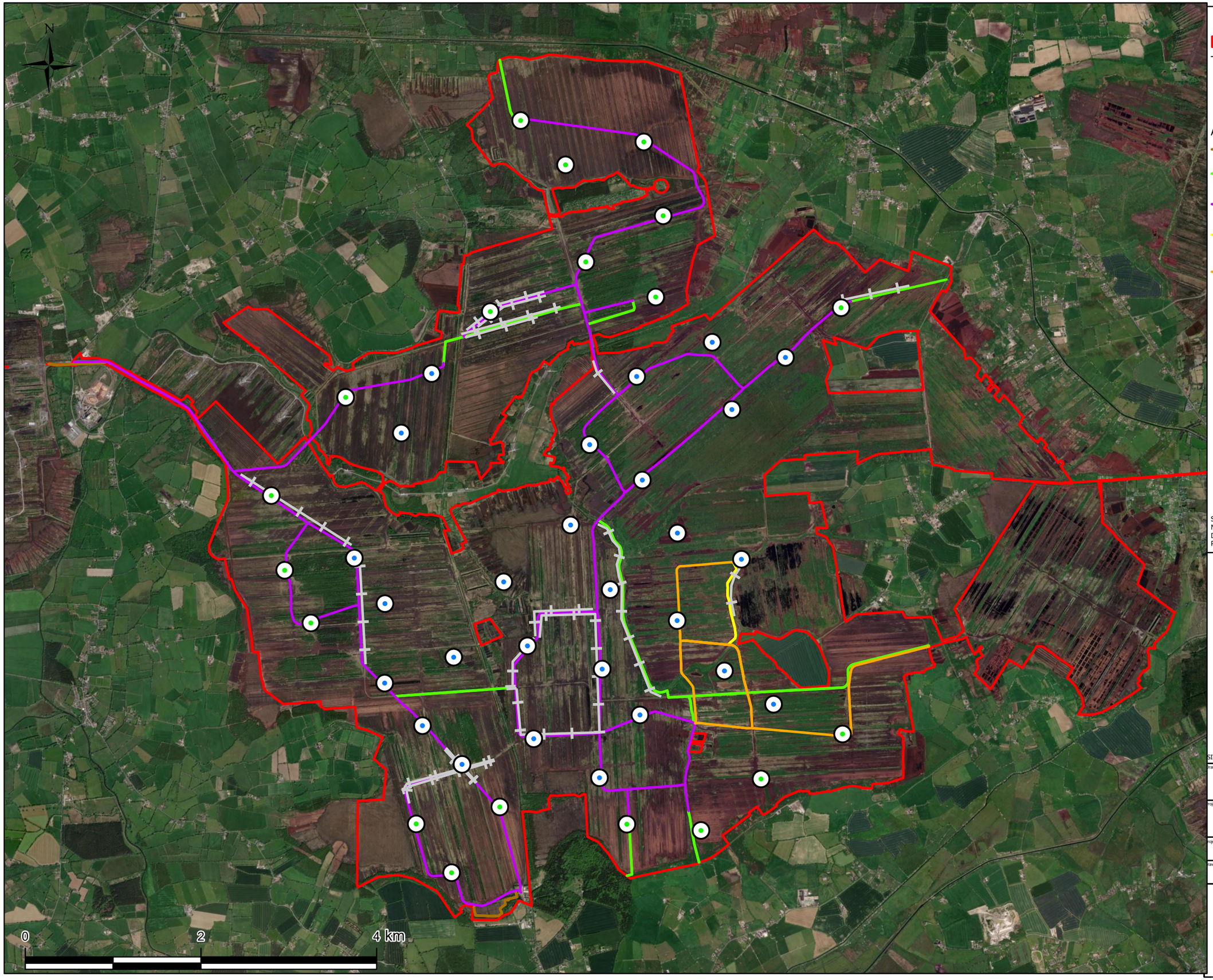
- Manually formed south facing slopes of embankments, kept free of vegetation.
- Do not use pesticides, herbicides or fertilisers on berms/embankments



*Plate 6-5-6 Embankment used by nesting mining bees. Source: National Biodiversity Data Centre.*



*Plates 6-5-7, 6-5-8: Pollinators recorded in the Project Site (Red-tailed bumblebee, common drone fly)*




Map Legend

- Project Site

Turbine Layout

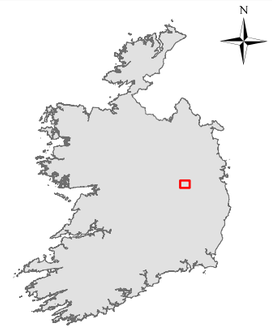
- 220
- 200
- Proposed Amenity Screens

Amenity Plan

- Proposed Amenity Boardwalk
- Proposed Dedicated Amenity Track
- Proposed Internal Roads Available for Amenity Access
- Proposed Dedicated Equestrian Amenity Track
- Proposed Internal Roads Available for Equestrian Amenity Access

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

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SITE LOCATION - NOT TO SCALE

Drawing Title
Proposed Amenity Screens

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

| Project No. | Drawing No. | Scale |
|---|---|---|
| 250708 | 6-5-9 | 1:40,000 |
| Drawn By | Checked By | Date |
| MNR | KS | 25/09/2026 |

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

## 4.10 Specific Measures and Timelines

Specific measures and timelines for the Proposed Enhancement Areas are outlined in Table 6-5-3 below.

*Table 6 - 5 - 3 Specific measures and timelines*

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| **Scrub Mosaic Creation** | | | | | |
| Preparation | Immediately post-consent | Open Peatland Habitat | Suitable for golden plover | Spreading of lime and slow-release fertiliser in areas where scrub patches are required.<br><br>Planting of patches scrub in large open areas where a natural seed bank of scrub species cannot be relied upon to germinate. | BnM (or a suitable contractor) will undertake the required work. |
| | Construction Phase | Revegetation of the open peatland. Mosaic habitat establishing | Becoming less suitable for golden plover over time | Passive action: revegetation in progress, the recolonising monitored each area to ensure unsuitability for golden plover.<br><br>Scrub to be planted in areas where germination of natural seed bank did not create the desired density of scrub. | The Applicant will commission an ecologist with relevant experience to undertake the habitat survey.<br><br>BnM (or a suitable contractor) will undertake the required planting work, if required. |
| Operation | For remainder of operational phase | Mosaic habitat established. | Unsuitable for golden plover | Passive action: revegetation in progress, the recolonising monitored each area to ensure unsuitability for golden plover.<br><br>Scrub to be planted in areas the desired mosaic of scrub has not been achieved. | The Applicant will commission an ecologist with relevant experience to annually undertake the habitat survey until the areas have achieved the desired mosaic habitat. |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| | | | | | BnM (or a suitable contractor) will undertake the planting work, if required. |
| After decommissioning | Ongoing | Mosaic habitat of scrub and open habitats | Unsuitable for golden plover | Passive action: mosaic habitat well established with mature scrub | n/a |
| **Lodge Bog Enhancement** | | | | | |
| Preparation | Construction Phase | Peatland mosaic with scrub and open water. | Moderate ecological value | Mechanical scrub removal through mulching and flailing to waste.<br><br>Annual flailing will likely be required during the construction phase in areas with dense scrub and where scrub, particularly willow, is likely to resprout quickly.<br><br>Erection of predator proof fencing around breeding wader areas.<br><br>Reprofiling of breeding wader areas.<br><br>Modification of whooper swan areas to facilitate 1.5m water depth.<br><br>Maintain existing reedbeds and encourage natural expansion, as well as creating a new area of reedbed. | BnM (or a suitable contractor) will undertake the required work.<br><br>Scrub management works will be undertaken outside the breeding season, but before scrub becomes dormant for the winter to minimise resprouting the next summer (i.e. works are to begin in August and to be completed before the end of September). |
| Operation | For remainder of operational phase | Open peatland mosaic | Good ecological value | The area is to be flailed as required to keep the habitat suitable for golden plover (e.g., every three to five years depending on regeneration | Scrub encroachment will be monitored annually by drone surveys and areas requiring further management to be |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| | | | | rates of scrub). The desired vegetation height after flailing is 7cm.<br><br>Breeding wader area to be flailed annually with the rear roller set to achieve a vegetation height of less than 5cm.<br><br>Predator-proof fencing to be inspected annually and repair as necessary. | mapped. Adaptive management will be implemented to ensure objectives are met throughout the lifetime of the Proposed Project.<br><br>BnM (or a suitable contractor) will undertake the required work. All works will be carried out outside of the bird nesting season.<br><br>Scrub management works will be undertaken outside the breeding season, but before scrub becomes dormant for the winter to minimise resprouting the next summer (i.e. works are to begin in August and to be completed before the end of September). |
| After decommissioning | Ongoing | Open peatland mosaic | Good ecological value | No action required. | No action required. |
| **Killina Bog Offsetting** | | | | | |
| Preparation | Immediately post-consent | Forestry and woodland | Low ecological value | Permanent felling of trees.<br><br>Timber, brash and stumps to be removed from the Proposed Wind Farm site or mulched to waste and left on-site, as appropriate.<br><br>Creation of wader scrapes.<br><br>Deployment of golden plover decoys each year from 1st September to the 31st March. | BnM (or a suitable contractor) will undertake the required work. |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| Operation | For remainder of operational phase | Open peatland habitat | Good ecological value | The area is to be flailed or grazed annually in August to ensure a sward height of 7-10cm during the winter season. Additional intervention may be required in October in seasons of good growth to ensure the sward remains at the desired height for the duration of the winter.<br><br>Deployment of golden plover decoys each year from 1st September to the 31st March. | BnM (or a suitable contractor) will undertake the required work. Adaptive management will be implemented to ensure objectives are met throughout the lifetime of the Proposed Project. |
| After decommissioning | Ongoing | Open peatland habitat | Good ecological value | No action required. | No action required. |
| **Marsh Fritillary Enhancement** | | | | | |
| Preparation | Construction Phase | Cutover bog and recolonising habitats | Sub-optimal habitat for marsh fritillary | Plug planting with devil's-bit scabious<br><br>Scrub removal | BnM (or a suitable contractor) will undertake the required work.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise the required work. |
| Operation | For remainder of operational phase | Cutover bog revegetating with grassland type communities | Optimal habitat for marsh fritillary | Scrub management | BnM (or a suitable contractor) will undertake the scrub management, if required.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise the required work. |
| After decommissioning | Ongoing | Cutover bog revegetated with | Optimal habitat for marsh fritillary | No action required. | No action required. |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| | | grassland type communities | | | |
| **Peatland Enhancement** | | | | | |
| Preparation | Construction Phase | Cutover bog, bare peat | Low ecological value | Drain blocking, outflow blocking, berms and field reprofiling | BnM (or a suitable contractor) will undertake the required work.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise the required work. |
| Operation | For remainder of operational phase | Cutover bog and recolonising habitats | Moderate ecological value | Monitoring of habitat regeneration | The Applicant will commission an ecologist with relevant experience to annually monitor the success of the enhancement and establishment of cutover bog communities |
| After decommissioning | Ongoing | Cutover bog and recolonising habitats | Good ecological value | No action required. | No action required. |
| **Enhancement of Pollinator Foraging Habitat** | | | | | |
| Preparation | Construction Phase | Cutover bog and recolonising habitats | Sub-optimal habitat for pollinators | Sub-peat material comprising calcareous mixed gravels and till. Such substrate will be used at targeted locations during site reinstatement and allowed to colonise naturally. | BnM (or a suitable contractor) will undertake the required work during site reinstatement.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise this work. |
| Operation | For remainder of operational phase | Cutover bog revegetating with | Optimal habitat for pollinators | Yearly monitoring of vegetation<br><br>Scrub management | The Applicant will commission an Ecologist with relevant experience to |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| | | grassland type communities | | | supervise this work and to undertake the annual monitoring. |
| After decommissioning | Ongoing | Cutover bog revegetating with grassland type communities | Optimal habitat for pollinators | No action required. | No action required. |
| **Woodland Planting** | | | | | |
| Preparation | Construction Phase | Cutover bog and recolonising habitats, conifer plantation | Moderate ecological value | Felling of Conifer plantation<br><br>Replanting with native tree species | BnM (or a suitable contractor) will undertake the required work. |
| Operation | For remainder of operational phase | Immature birch woodland | Good ecological value | Inspection of trees, replacement of trees and removal of deadwood, if required | BnM (or a suitable contractor) will undertake the planting work, if required.<br><br>The Applicant will commission an Ecologist with relevant experience to undertake vegetation monitoring and assess success. |
| After decommissioning | Ongoing | Established birch woodland | Good ecological value | No action required. | No action required. |
| **Basil Thyme and Round-leaved Wintergreen** | | | | | |
| Preparation | Construction Phase | Limestone substrate and wet peatland habitats including pioneer fen. | Good ecological value | Translocation of species and subsoil/ turves | BnM (or a suitable contractor) will undertake the required work during site reinstatement.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise this work. |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| Operation | For remainder of operational phase | Limestone substrate and wet peatland habitats including pioneer fen. | Good ecological value | Monitoring of vegetation and species | The Applicant will commission an Ecologist with relevant experience to undertake the surveys and monitoring. |
| After decommissioning | Ongoing | Limestone substrate and wet peatland habitats including pioneer fen. | Good ecological value | No action required. | No action required. |
| **Falcon Nest Boxes** | | | | | |
| Preparation | Immediately post-consent | Woodland and open peatland habitats | Low ecological value | Nest boxes will be erected within the Core Ornithological Survey Area. | BnM (or a suitable contractor) will undertake the required work. |
| Operation | For remainder of operational phase | Woodland and open peatland habitats | Good ecological value | Nest boxes will be inspected annually for occupancy and damage.<br><br>Nest boxes will be repaired and additional nest boxes erected as required. | The Applicant will commission an Ecologist with relevant experience to inspect the nest boxes.<br><br>BnM (or a suitable contractor) will undertake the required work. |
| After decommissioning | Ongoing | Woodland and open peatland habitats | Good ecological value | Nest boxes will be left in place after decommissioning. | No action required. |
| **Log and Brash Piles** | | | | | |
| Preparation | Construction Phase | Felled woodland and scrub | Low ecological value | Creation of log and brash piles | BnM (or a suitable contractor) will undertake the required work.<br><br>The Applicant will commission an Ecologist with relevant experience to |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| | | | | | supervise and advise on the required work. |
| Operation | For remainder of operational phase | Cutover bog and recolonising habitats | Good ecological value | Inspection of log and brash piles.<br><br>Replenishing piles if additional logs and brash become available. | BnM (or a suitable contractor) will undertake the work, if required.<br><br>The Applicant will commission an Ecologist with relevant experience to undertake monitoring and assess success. |
| After decommissioning | Ongoing | Cutover bog and recolonising habitats | Good ecological value | Log and brash piles will be left in place after decommissioning | No action required. |
| **Bat Boxes** | | | | | |
| Preparation | Immediately post-consent | Woodland and open peatland habitats | Low ecological value | Bat boxes will not be placed within the Proposed Turbine risk area to avoid encouraging bats to roost or forage within rotor-swept zones. All placements will be at the edges of the wind farm, near existing linear features leading away from turbines or within Killina Bog Offsetting Area and Lodge Bog Enhancement area. | BnM (or a suitable contractor) and ecologist to undertake the required work. |
| Operation | For remainder of operational phase | Woodland and open peatland habitats | Good ecological value | Monitoring and maintenance of the bat boxes will take place yearly for the first three years of the operational Wind Farm and will occur again at year five and every 3-5 years thereafter to ensure continued maintenance where required | The Applicant will commission an Ecologist with relevant experience to inspect the bat boxes. |
| After decommissioning | Ongoing | Woodland and open peatland habitats | Good ecological value | Bat boxes will be left in place after decommissioning. | No action required. |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| **Amenity Development** | | | | | |
| Preparation | Construction Phase | Buildings and artificial surfaces | Low ecological value | Erection of Signage.<br><br>Erection of screening along areas where there is the potential for disturbance to breeding or roosting birds. | BnM (or a suitable contractor) will undertake the required work.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise and advise on the required work. |
| Operation | For remainder of operational phase | Buildings and artificial surfaces | Low ecological value | Signage/screening will be inspected annually for damage.<br><br>Signage/screening will be repaired and additional signage/screening erected as required. | BnM (or a suitable contractor) will undertake the required work. |
| After decommissioning | Ongoing | Buildings and artificial surfaces | Low ecological value | Signage/screening will be left in place after decommissioning. | No action required. |
| **Pine Marten and Red Squirrel Boxes** | | | | | |
| Preparation | Immediately post-consent | Woodland habitats | Moderate ecological value | Boxes will be erected | BnM (or a suitable contractor) will undertake the required work. |
| Operation | For remainder of operational phase | Woodland habitats | Good ecological value | Boxes will be inspected annually for occupancy and damage.<br><br>Boxes will be repaired and additional boxes erected as required. | The Applicant will commission an Ecologist with relevant experience to inspect the boxes.<br><br>BnM (or a suitable contractor) will undertake the required work. |
| After decommissioning | Ongoing | Woodland habitats | Good ecological value | Boxes will be left in place after decommissioning. | No action required. |
| **Embankments for Solitary Bees and Pollinators** | | | | | |

| Phase | Timing | Habitat | Habitat Value | Actions | Responsibility |
|---|---|---|---|---|---|
| Preparation | Construction Phase | Cutover bog and recolonising habitats | Sub-optimal habitat for solitary bees and pollinators | Sub peat material comprising calcareous mixed gravels and till such substrate will be used at targeted locations during site reinstatement | BnM (or a suitable contractor) will undertake the required work during site reinstatement.<br><br>The Applicant will commission an Ecologist with relevant experience to supervise this work. |
| Operation | For remainder of operational phase | Cutover bog revegetating with grassland type communities | Optimal habitat for solitary bees and pollinators | Monitoring of vegetation<br><br>Scrub management | The Applicant will commission an Ecologist with relevant experience to supervise this work and to undertake annual monitoring. |
| After decommissioning | Ongoing | Cutover bog revegetating with grassland type communities | Optimal habitat for solitary bees and pollinators | No action required. | No action required. |

# 5. MONITORING

A site-specific monitoring and evaluation programme is necessary to ensure that the success of the proposed measures remains long-term. It will also assist in situations where the habitat establishment may not have been successful by providing evidence of shortcomings and allowing for a revised management plan to be formulated.

Monitoring results will be reported by the appointed ECoW within an Annual Environmental Report. Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any recommendations for amendments to the plan will be prepared. The BMP will be updated and amended where required to improve the efficacy of the enhancement measures.

A summary of the monitoring measures at the Proposed Enhancement Site is provided in the Table 6 - 5 – below. Full details of the monitoring measures are then outlined in the following sections.

*Table 6 - 5 – 4 Summary of monitoring measures*

| Feature | Frequency | Measure |
|---|---|---|
| Proposed Wind Farm | Annually | › Vantage point surveys<br>› Collision monitoring |
| Scrub Mosaic Areas | Annually for the first five years, or until it can be demonstrated that all areas are no longer suitable for golden plover. | › Vegetation monitoring |
| Lodge Bog Enhancement Area | Annually | › Breeding wader census surveys<br>› Wintering golden plover vantage point surveys<br>› Winter roost surveys<br>› Vegetation monitoring<br>› Predator-proof fence inspections |
| Killina Bog Offsetting Area | Annually | › Wintering golden plover vantage point surveys<br>› Vegetation monitoring |
| Marsh Fritillary Enhancement Areas | Years 1, 3, 5, 7, 10, 15 and 20 | › Habitat condition assessments<br>› Larval web surveys |
| Peatland Enhancement Areas | Annually for the first five years then every five years for the lifetime of the wind farm (35 years) | › Surveys of permanent vegetation monitoring plots |
| Pollinator Foraging Habitat Enhancement Areas | June, July and August in Years 1, 3, 5, 7, 10, 15 and 20 | › 1km transect surveys for pollinators |
| Native Tree (Woodland and Scrub) Planting Areas | Annually for the first five years | › Inspection of planted stock to assess survival rate and early structural development<br>› Quadrats to monitor vegetation succession |
| Basil Thyme and Round-leaved Wintergreen | Yearly for the first three years then every five years for the lifetime of the wind farm (35 years) | › Survey of translocation areas |
| Falcon Nest Boxes | Annually | › Nest box checks |

| Feature | Frequency | Measure |
|---|---|---|
| Bat Boxes | Years 1, 2 3, 5, then every three to five years for the lifetime of the wind farm (35 years) | › Bat box checks |
| Amenity Development | Annually for the first five years | › Inspection of signage and screening |
| Pine Marten and Red Squirrel Boxes | Annually | › Inspection of boxes |
| Embankments for Solitary Bees and Pollinators | Every five years for the lifetime of the wind farm (35 years) | › Vegetation monitoring<br>› Survey of embankments for presence of solitary bees |

The efficacy of the BMP measures employed will be reviewed annually following the commencement of the BMP. Analysis of the data collected will be the basis for a review of the measures and techniques employed. Should any adjustments to the BMP be deemed necessary or advisable, NPWS will be notified of any adjustments, prior to any alterations to the BMP.

The Annual Environmental Report, detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the BMP will be prepared and submitted to the planning authority annually following commencement of the BMP.

# 5.1 Monitoring Methodologies

## 5.1.1 Proposed Wind Farm

This section summarises the monitoring methodologies outlined within the Bird Monitoring Programme for the Proposed Project, please see Appendix 7-7 of the EIAR for further details. Additional monitoring of the ecological mitigation, offsetting and enhancement measures are also proposed.

### 5.1.1.1 Vantage Point Surveys

Vantage point surveys will be undertaken monthly during in years 1, 2, 3, 4, 5, 10 and 15 of the Proposed Project. Additionally, these surveys will be undertaken in winter (October to March) in all other operational years to monitor the usage of the site by golden plover to inform adaptive management and curtailment as set out in Appendix 6-5. The methodology for vantage point watches will follow guidelines issued by the SNH (2009) and NatureScot (2025). The proposed vantage point watches will adhere to a minimum of 36 hours per vantage point per season as per guidelines issued by NatureScot. Monthly visits will be undertaken for 12 consecutive months in years 1, 2, 3, 4, 5, 10 and 15, with surveys commencing at the start of the breeding season (April) or the start of the winter season (October), and monthly for six consecutive months in all other monitoring years, with surveys commencing at the start of the winter season (October). During each visit, six-hour vantage point watches will be undertaken from each fixed vantage point location that offers an un-interrupted view of the Proposed Turbines.

Vantage points will be undertaken from the same locations that pre-planning surveys which informed the EIAR application of the Proposed Project at vantage point locations which have Proposed Turbines within the viewshed (i.e. VP1, VP2, VP3, VP7, VP8, VP9, VP10, VP11, VP12, VP13, VP14, VP15, VP16). The adequacy of the vantage point viewsheds will be monitored throughout the lifetime of the Proposed Wind Farm, with vantage points locations being adjusted as required. A viewshed analysis will be carried out every two years to ensure adequate coverage of the Proposed Turbines is still being

achieved. Vantage point surveys will be timed to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Behavioural categories for the observation of bird interactions with operational wind farms will be in line with terminology outlined by Meredith *et al.* (2002).

#### 5.1.1.2 Collision Searches (Bird Casualties)

Carcass searches for bird casualties as a result of collision with turbines will follow survey methods broadly based on guidelines issued by the SNH (2009) and search methods adopted by Duffy and Steward (2008). The study area will be visited once per month during operational phase for the lifetime of the wind farm. During each visit, the base of each operating turbine will be searched for bird carcasses. The area to be searched will be based on the turbine size and surrounding landscape. A trained dog and handler should be used to locate carcasses. Edkins (2014) recommends the *"search width should be equal to the maximum rotor tip height*". Given a turbine rotor tip height 220 meters the search area surrounding the base of the turbine would be taken as a radius of 110 meters centred on the turbine base. This area will be the subject of target searches for bird casualties. Searches will incorporate the use of transects spaced at 10m intervals apart with the observer covering 5m on either side for each transect.

If a bird carcass is found, the following details will be recorded: GPS location of each bird carcass, photographic record, carcass condition (intact - carcass that is completely intact or not badly composed; scavenged - evidence that the carcass was fed upon by a scavenger/predator; or feather spot - ten or more feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty), distance from the turbine, date and time.

Carcass removal trials and searcher efficiency trials will be undertaken to account for the ability of the dog to find bird carcasses and the likelihood of scavenging of carcasses by animals. This is done to ensure a more accurate estimation of the total number of collision victims. During carcass removal trials, a carcass is placed in a study area periodically and is monitored for a set number of days or until scavengers remove the carcass. A determination on carcass removal is made when no body parts containing flesh or bone or >10 disarticulated feathers can be found. During searcher efficiency trials, a number of carcasses are placed in a study area by one worker, then searched for by the dog later. The result of these trials is a correction factor that can be applied to the results of the carcass searches.

##### 5.1.1.2.1 *Golden Plover Collision Analysis/Curtailment*

During each winter of the operational phase, the number of golden plover casualties from collision at the proposed wind farm will be closely monitored. Flight activity of these species will also be monitored through the vantage point surveys. If the number of golden plover collisions during the winter/passage period (September to April) is above the threshold of 10 golden plover (please see Chapter 7, Section 7.6.4.1 for further details), curtailment of the Proposed Turbines will be implemented immediately. The turbine, or turbines, which led to the high number of golden plover collisions will be curtailed for the remainder of the winter season, until the start of the following May when the majority of large flocks of golden plover will have left the Proposed Wind Farm site.

### 5.1.2 Scrub Mosaic Areas

The scrub mosaic creation areas proposed within 250m of the Proposed Turbines will be monitored for five years after these measures have been implemented (i.e. during the construction phase and the beginning of the operational phase), or until it can be demonstrated that the proposed measures have satisfied the requirements to make these areas unsuitable for golden plover.

Vegetation surveys will be undertaken to map the vegetation within 250m of the Proposed Turbines where scrub mosaic measures are proposed (i.e. T2, T3, T4, T5, T6, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T22, T23, T24, T25, T26, T27, T28, T29, T30, T31, T32, T36, T38 and T39). The

maps will be analysed to determine the extent of scrub coverage in these areas, if any open areas exceeding 10ha are identified within, or partially within, 250m of the Proposed Turbines, additional intervention will be required through planting of saplings or an additional application of fertilizer or agricultural lime as outlined in Section 0.

## 5.1.3 Lodge Bog Enhancement Area

The Lodge Bog Enhancement area will be the subject of ongoing monitoring during the operational phase of the Proposed Wind Farm to ensure it is offering supporting habitat for breeding waders, and wintering whooper swans and golden plover. The ongoing monitoring will take place during the breeding bird season (March to August) for breeding waders and winter (October to March) for whooper swan, hen harrier and golden plover. Each of the monitoring types are described in detail below.

### Breeding Wader Census Surveys

Breeding wader census surveys will seek to identify whether these species are utilising the areas under active management. These surveys will be undertaken once a month March to August, each year.

During the breeding season (March to August) three surveys will be undertaken for six hours per month starting at sunrise (as per Gilbert *et al.,* 1998), one overlooking each of the three proposed breeding wader areas. All activity of waders will be recorded and mapped. The peak number of birds for each species will be recorded as well as an estimate of the number of pairs of each species breeding within the breeding wader area. Breeding productivity and response to management will also be recorded. During each visit productivity data will be gather (e.g. how many pairs are displaying, how many pairs incubating, how many chicks within the area and how many birds fledged). Surveys will be undertaken from locations adjacent to the proposed breeding wader areas, at a sufficient distance as to not cause disturbance whilst surveying.

### Winter Vantage Point Surveys

During the winter season (October to March), monthly vantage point surveys will be conducted during for six hours per month, alternating between starting one hour before sunrise to finishing one hour after sunset each month, at the two existing vantage point survey locations that are within Lodge Bog (i.e. VP5 and VP6), to monitor the usage of the enhancement area by golden plover and whooper swan. All golden plover and whooper swan activity will be recorded, including details of the number of birds landing within the Lodge Bog, the duration they were landed and if they were roosting or foraging. Each usage area will also be georeferenced.

### Winter Roost Surveys

Roost surveys will be undertaken at each of the two permeant waterbodies created for the benefit of whooper swans and the reedbed created for the benefit of roosting hen harrier. Surveys will be conducted once per month for the duration of the winter period (October to March) for three hours, alternating between one hour before sunrise to two hours after sunrise and between two hours before sunset to one hour after sunset each month for the whooper swan roost surveys. The hen harrier roost surveys will be conducted once per month for the duration of the winter period (October to March) for three hours, from two hours before sunset to one hour after sunset each month. All activity relating to whooper swan and hen harrier will be recorded, including the total number of birds using the roost area and the direction of flight of birds arriving at, or departing from, the roost area.

### Vegetation Surveys

The Lodge Bog enhancement area will be monitored annually after the measures outlined within the BMP have been implemented (i.e. during the construction phase and throughout the lifetime of the Proposed Wind Farm). Sward height monitoring will be undertaken annually. Vegetation surveys will be undertaken using a drone, or other suitable remote sensing technology, to map the vegetation within Lodge Bog every five years. The maps will be analysed to determine the extent of scrub coverage and encroachment within the area, if scrub is identified within Lodge Bog, additional intervention will be required through mechanical flailing as outlined in Section 4.3.

The requirement for mowing in the breeding wader areas will be informed by the sward height monitoring. sward heights will be inspected within each of the breeding wader areas. Data will be recorded prior to the commencement of the BMP activities and annually in late winter thereafter. The character of each breeding wader area will be recorded, and photographs will be taken of each area from a fixed point. The results from the sward height inspections will be used to inform when mowing is required in the breeding wader areas. Thresholds are set in the methodology section above.

### Predator-proof fence inspections

The predator-proof fence will be inspected annually prior to the commencement of the breeding season. The fence will be inspected for any damage that would reduce its effectiveness, such as holes, loose posts etc. Any repairs required to the fence will be undertaken before the start of the breeding season (1st March). Continuity on each strand of electrical fence will also be inspected around the entirety of the fence. Any maintenance required on the electrical wire will be undertaken before the start of the breeding season, e.g. any cutting of vegetation to ensure continuity of the electrical wires.

Continuity of the electric fence will be inspected once per month during the breeding season (March to August). Any maintenance that is required to ensure the fence remains live is required, this will be completed as soon as possible after the required maintenance is identified.

If crows are observed utilising the predator proof fencing, humane predator removal practices will be implemented.

## 5.1.4 Killina Bog Offsetting Area

### Wintering Golden Plover Vantage Point Surveys

Vantage point surveys will seek to identify whether these species are utilising the areas under active management. These surveys will be undertaken once a month October to March inclusive, each year.

During the winter season (October to March), monthly vantage point surveys will be conducted during daylight hours for six hours per month from one vantage point survey location, within Killina Bog, to monitor the usage of the enhancement area by golden plover. All golden plover activity will be recorded, including details of the number of birds landing within the offsetting area, the duration they were landed and if they were roosting or foraging. Each usage area will also be georeferenced.

### Vegetation Surveys

The Killina Bog offsetting area will be monitored annually after the measures outlined within the BMP have been implemented (i.e. during the construction phase and throughout the lifetime of the Proposed Wind Farm). Sward height monitoring will be undertaken twice annually, in August and December each year. Vegetation surveys will be undertaken using a drone, or other suitable remote sensing technology, to map the vegetation within Lodge Bog every five years. The maps will be analysed to determine the extent of scrub coverage and encroachment within the area, if scrub is identified within

Lodge Bog, additional intervention will be required through mechanical flailing as outlined in Section 4.4.

The requirement for additional mowing in the offsetting areas will be informed by the sward height monitoring, i.e. if a second mowing is required during the winter season after the annual mowing in August. Vegetation mapping will be undertaken by drone within the offsetting area in early winter (October), every five years. Data will be recorded prior to the commencement of the BMP activities and every five years thereafter. The results from the drone survey will be used to inform if additional intervention is required in the offsetting area. Thresholds are set in the methodology section above. The vegetation survey data will then be re-examined every five years following the commencement of the BMP to establish the extent of habitat improvement resulting from management practices.

### 5.1.5 Marsh Fritillary Enhancement Areas

Following establishment of devil's-bit scabious in Marsh Fritillary Enhancment Blocks A and B, marsh fritillary habitat condition assessments will be carried out in these areas as part of the Monitoring Plan. Habitat condition assessments include surveying along a predetermined route for the presence and abundance of devil's-bit scabious as well as recording the vegetation height and any grazing evidence within the study site and is based on methodology and recording sheets designed by the NBDC[5]. Monitoring will be carried out between August and September when devil's-bit scabious is in flower. The habitat condition assessments should be carried out in Years 1, 3, 5, 7, 10, 15 and 20 of the Plan. The results of the marsh fritillary habitat condition assessments will inform whether adaptive management measures need to be introduced to improve the condition of the habitats for marsh fritillary.

Monitoring surveys will also include presence/absence surveys for marsh fritillary larvae initially in Blocks A and B throughout the Monitoring Plan. These will be carried out in accordance with best practice guidance (TII 2009) and the NBDC Marsh Fritillary survey methodologies for larval web surveys[6]. The optimum survey period for larval surveys is during August and September, in sunny conditions. Any occupied larval webs will be recorded.

Monitoring results will be reported by the appointed ecologist within a Monitoring Report. Any criteria failures will be identified, and corrective actions will be implemented. Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the Plan will be prepared.

The results of all monitoring will be made available to the NPWS.

### 5.1.6 Peatland Enhancement Areas

Prior to the commencement of the habitat enhancement measures described in this BMP, permanent vegetation monitoring plots will be established within the management areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the management areas. Biotic and abiotic parameters that form baseline indicators of ecological and hydrological condition of the bog will be recorded. Monitoring plots will be marked out permanently using fencing posts and their location recorded using GPS. The number of monitoring plots will be determined by the level of plant community heterogeneity identified following drain blocking, outflow blocking, berms and field reprofiling. However, it is proposed that a minimum of ten

[5] https://biodiversityireland.ie/app/uploads/2021/11/Marsh-Fritillary-Habitat-Condition-Form.pdf
[6] https://biodiversityireland.ie/app/uploads/2021/11/Marsh-Fritillary-Larval-Survey-Form.pdf

4m x 4m monitoring plots will be established across each Block. The number of monitoring plots may change depending on the results of the initial surveys.

Monitoring plots will be surveyed at 5 year intervals for the lifespan of the Proposed Wind Farm (35 years) by a suitably qualified ecologist.

Habitat data gathered during the monitoring surveys will be classified and analysed according to the methodology provided within the following documents:

- Vegetation Description and Data Analysis: A Practical Approach, 2nd Edition (Kent, 2011)
- The Habitats of Cutover Raised Bog, Irish Wildlife Manuals No. 128 (Smith and Crowley, 2020)
- Raised Bog Monitoring and Assessment Survey 2013, Irish Wildlife Manuals No. 81 (Fernandez *et al.*, 2014)

Hydrological monitoring will also be undertaken by a competent hydrologist to assess the effectiveness of enhancement works. Water levels within areas where drains are blocked will be recorded bi-annually during the first five years of the Proposed Wind Farm and at 5-year intervals for the lifespan of the Proposed Wind Farm (35 years). A number of dipwells or piezometers will be inserted on the peatland to monitor the height of the water table. These will be constructed from 52mm internal diameter PVC. To stop peat filling the tube from the base, the pipe will be covered with gauze affixed with tape. This will be done prior to enhancement to allow monitoring of water levels within the enhancement areas. In this way, any positive impacts on the local hydrology can be verified and quantified.

### 5.1.7 Native Tree (Woodland and Scrub) Planting

Monitoring of newly planted native woodland will be undertaken to assess establishment success, structural development and species composition.

- Two 10mx10m long-term woodland monitoring plots will be established in each woodland block.

Monitoring will include:

- Survival rates of planted stock
- Identification of failed planting requiring replacement
- Assessment of early structural development
- Confirmation that management measures are being implemented as intended
- Any replacement planting or remedial management identified through monitoring will be implemented during the appropriate planting season and documented within the Monitoring Report.
- Woodland planting will be inspected annually as outlined in Section 4.8.2. Monitoring frequency may be reduced where planting has successfully established, subject to the recommendations of the Project Ecologist.

### 5.1.8 Basil Thyme and Round-leaved Wintergreen

In order to monitor the success of the translocation of basil thyme and round-leaved wintergreen it is proposed that a minimum of two vegetation monitoring plots will be established across each translocation site in order to monitor the populations of both red listed species. These monitoring plots will be surveyed in Yearly for the first three years then every five years for the lifetime of the wind farm (35 years) within the flowering season for each species.

### 5.1.9 Enhancement of Pollinator Foraging Habitat Areas

In order to monitor the success of the establishment of suitable foraging habitat for pollinators and to determine usage of these areas by pollinating insects three separate 1km transects will be walked. These will be undertaken on three occasions – once in June, July and August in Years 1, 3, 5, 7, 10, 15 and 20 in order to capture seasonal variability in pollinator communities. The transect routes will be designed to cover representative areas of habitats suitable for pollinator species – i.e. areas of species/flower rich grassland, open vegetated peatland and woodland edge habitat. During these transect walks all bees, butterflies/moths and hoverflies observed will be recorded. These taxa rely on pollen and nectar for their diets and are the most important and most effective pollinators of wild plants. Insects will be identified to species where possible. As it is preferred not to undertake lethal collection of specimens for later identification under a microscope, any species that cannot be identified reliably in the field will be assigned to either genus (if possible) or alternatively to its broad functional group, i.e. bee, butterfly or hoverfly. In addition to the transects, it is proposed that a minimum of ten 2m x 2m vegetation monitoring plots will be established across each Block in order to monitor the establishment of suitable habitat within the pollinator foraging habitat areas.

### 5.1.10 Falcon Nest Boxes

There will be annual nest box monitoring at each of the 27 proposed nest boxes (2 peregrine and 25 kestrel) throughout the hinterlands of the Project Site during the lifetime of the Proposed Project. Each nest box will be monitored for signs of occupancy. Should nest box be occupied (by any bird species, not limited to peregrine or kestrel), then replacement nest boxes will be installed such that there will always be a surplus of 20% to allow for population growth and to avoid inter-specific competition for nest sites.

### 5.1.11 Bat Boxes

Monitoring and maintenance of the bat boxes will take place yearly for the first three years of the operational phase and will occur again at year five and every 3-5 years thereafter to ensure continued maintenance where required. The results of the first three years of monitoring will inform the need for and frequency of further monitoring and maintenance of the bat boxes, to be reviewed by the appointed ecologist and agreed with the wind farm operator. All bat box monitoring should be undertaken by a suitably licenced ecologist.

### 5.1.12 Amenity Development

Signage and screening along the amenity tracks will be inspected annually for damage. Signage and screening will be repaired and additional signage or screening erected as required.

### 5.1.13 Pine Marten and Red Squirrel Boxes

There will be annual nest box monitoring at each of the 10 proposed boxes (5 pine marten and 5red squirrel) within the Project Site during the lifetime of the Proposed Project. Each box will be monitored for signs of occupancy. Should boxes be occupied (by any species, not limited to pine marten or red squirrel), then replacement boxes will be installed such that there will always be a surplus of 20% to allow for population growth and to avoid inter-specific competition for sites.

## 5.2 Auditing

The Applicant will ultimately be responsible for the implementation of the management measures and audits. Audits will be required to ensure the effectiveness of the BMP. They are essential to ensure

adequate plan quality, compliance, and control. Audits will be based on a field inspection and the assessment of the success of the implemented measures.

The BMP will be audited each year. The audit will assess:

- Objectives of the plan;
- Implementation of the plan; and
- Adherence to the requirements of the plan.

The BMP will be reviewed annually and as previously outlined, any requirement for amendments will be submitted to the planning authority.

# 6. IMPLEMENTATION

As previously discussed, this BMP will be implemented prior to the commissioning of the Proposed Project. The BMP measures will be implemented as follows.

## 6.1 Scrub Mosaic Areas

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for the creation of scrub mosaics within 250m of the Proposed Turbines.

Site-specific felling methods will be devised between the Applicant and their forestry consultant.

## 6.2 Lodge Bog Enhancement Area

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for this area.

Site-specific felling methods will be devised between the Applicant and the personnel undertaking the work for the initial removal of the scrub within the area, through flailing and/or mulching.

BnM (or a suitably qualified contractor(s)) will undertake flailing annually as required within this area.

## 6.3 Killina Bog Offsetting Area

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for the creation suitable golden plover habitat within this area.

Site-specific felling methods will be devised between the Applicant and their forestry consultant.

BnM (or a suitably qualified contractor(s)) will undertake flailing annually as required within this area.

## 6.4 Marsh Fritillary Enhancement Areas

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4. An Ecologist will be engaged for plug planting and to identify areas for targeted scrub removal.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP and the methods to be followed for enhancing marsh fritillary habitat within the Proposed Wind Farm site.

BnM (or a suitably qualified contractor(s)) will undertake scrub removal annually as required within these areas and the Ecologist will undertake plug planting annually.

## 6.5 Peatland Enhancement Areas

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4. An ECoW will be engaged to supervise the works.

A meeting will be held with the personnel undertaking the work and Ecologist to outline the general aims, objectives and requirements of the BMP and the methodologies for the enhancement of areas of cutover bog.

BnM (or a suitably qualified contractor(s)) will undertake the required works within these areas under the supervision of an ECoW.

## 6.6 Native Tree (Woodland and Scrub) Planting

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP, to identify the areas proposed for replanting and the methodologies to be followed Different sections of the woodland planting blocks may require different species mixes.

Site-specific felling methods will be devised between the Applicant and their forestry consultant.

## 6.7 Basil Thyme and Round-leaved Wintergreen

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the contractor to outline the general aims, objectives and requirements of the BMP for this area.

BnM (or a suitably qualified contractor(s)) will undertake the required works within these areas under the supervision of an ECoW.

## 6.8 Pollinator Foraging Habitat Enhancement Areas

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for the creation of flower rich pollinator foraging habitat at the identified areas.

BnM (or a suitably qualified contractor(s)) will undertake scrub removal as required, within these areas.

## 6.9 Falcon Nest Boxes

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for this area.

BnM (or a suitably qualified contractor(s)) will erect additional nest boxes annually, as required.

## 6.10 Log and Brash Piles

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4 of the BMP.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for the creation of the log and brash piles.

BnM (or a suitably qualified contractor(s)) will establish the log and brash piles, as required.

## 6.11 Bat Boxes

BnM (or a suitably qualified contractor(s)) and a suitably qualified ecologist will carry out the measures as detailed in Section 4. The installation of the bat boxes will be supervised by the ecologist.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for the installation of bat boxes within the Proposed Wind Farm site.

BnM (or a suitably qualified contractor(s)) and ecologist will carry out inspections and repairs as required. Note: a roost disturbance licence will be required to carry out bat box inspections.

## 6.12 Amenity Development

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP in relation to amenity development.

BnM (or a suitably qualified contractor(s)) will undertake signage inspections and repairs as required.

## 6.13 Pine Marten and Red Squirrel Boxes

BnM (or a suitably qualified contractor(s)) will carry out the measures as detailed in Section 4.

A meeting will be held with the personnel undertaking the work to outline the general aims, objectives and requirements of the BMP for this area.

BnM (or a suitably qualified contractor(s)) will erect additional boxes annually, as required.

## 6.14 Responsibility for Implementing the Measures

The Applicant is the legal landowner of all areas within the Proposed Wind Farm site that are proposed for mitigation, offsetting and other biodiversity enhancement measures within the BMP, which allows the implementation of the land management measures to benefit the habitats and species outlined within the BMP.

The Applicant will be responsible for overseeing the preparation of the specific management plans for contractors which will be in strict accordance with measures outlined in Section 4. The Applicant will be responsible for employing consultants and ecologists as required.

The Applicant will also be responsible for auditing the Proposed Enhancement Areas, determining if the measures are achieving the desired results and, where necessary, amending the plan to achieve the

required results. The management plan and auditing programme will be in place for the lifetime of the Proposed Project.

The Applicant or their agents will also be responsible for ensuring compliance with planning conditions and engaging with statutory bodies and advisory agencies as required.

## 6.15 Next Steps

Assuming that the Proposed Project receives a grant of planning permission the next steps from the perspective of implementation of the BMP are as follows:

1. *Prepare the tender documents and issue tender notice for the required contractors and ecological specialists to administrate and implement the BMP.*
2. *Appoint the successful tenderer and agree final terms including scope of work.*
3. *Apply for felling licence for forestry in the Killina Bog offsetting area.*
4. *Appoint forestry company to carry out deforestation upon receipt of licence.*
5. *Toolbox talk with forestry operators prior to any works to ensure all personnel are fully informed of the methodologies required for operation within the Proposed Enhancement Site.*
6. *Meeting with the appointed tenant / contractor of the other enhancement areas to detail required measures under the BMP.*

# 7. CONCLUSION

This BMP has been prepared to set out the project-specific measures to be implemented within the Proposed Wind Farm site to mitigate and/or offset potentially significant effects on Key Ecological Receptors (KERs) and Key Ornithological Receptors (KORs), as identified in the EIAR for the Proposed Wind Farm. In addition, a number of further biodiversity/habitat enhancement measures to be implemented within the Project Site are also set out in this document. These are not required to offset significant effects on biodiversity but are proposed to further enhance biodiversity within the Project Site. The BMP describes the existing ecological baseline, sets out the objectives of the proposed mitigation, offsetting and enhancement measures, and details the methods for their implementation, monitoring and review.

The BMP details project-specific measures that will cover approximately 943.3 ha of the Project Site. These measures are for the benefit of a number of KERs and KORs identified within the EIAR for the Proposed Project including golden plover, whooper swan, breeding waders, marsh fritillary, pollinators, peatland habitats and bog woodland. These measures are intended to increase habitat diversity, improve habitat structure and enhance ecological connectivity within the Project Site.

This BMP also sets out the implementation, management and monitoring requirements associated with the proposed enhancement measures. The success of the measures will be evaluated through a programme of monitoring and reporting by a suitably qualified ecologist, with provision for adaptive management where required to ensure that the objectives of the BMP are achieved over the operational lifetime of the Proposed Project.

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