Appendix 7.9 – Post-Construction Monitoring Programme

Derrinlough Wind Farm

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Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

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1. INTRODUCTION

This Bird Monitoring Programme has been prepared by MKO for the proposed Derrinlough Wind Farm, Co. Offaly.

This document provides a timeframe and monitoring schedule for the bird population of the study area during the construction and post-construction phase of the project. Breeding and wintering bird surveys were undertaken during the period October 2017 to September 2019 encompassing two full breeding seasons and two full winter seasons, as well as autumn and spring migration periods. These surveys were in line with SNH guidance entitled *"Recommended bird survey methods to inform impact assessment of onshore wind farms"* (SNH, 2017). The surveys undertaken to date have informed the various proposed bird monitoring measures outlined in this document.

1.1 Key Ornithological Receptors and Birds of Conservation Concern

Table 1.1 lists the Key Ornithological Receptors recorded within the study area during field surveys.

Table 1.1 Key Ornithological Receptors identified during field surveys undertaken at the Derrinlough Community Wind Farm

Common Name	Latin Name	Conservation Status
Whooper Swan	*Cygnus cygnus*	Annex I; EU Birds Directive
Golden Plover	*Pluvialis apricaria*	Annex I; EU Birds Directive, BoCCI Red List & Irish Wildlife Act
Red-necked Phalarope	*Phalaropus lobatus*	Annex I; EU Birds Directive
Hen Harrier	*Circus cyaneus*	Annex I; EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.
Little Egret	*Egretta garzetta*	Annex I; EU Birds Directive
Merlin	*Falco columbarius*	Annex I; EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.
Peregrine	*Falco peregrinus*	Annex I; EU Birds Directive
Lapwing	*Vanellus vanellus*	BoCCI Red List & Irish Wildlife Act
Black-headed Gull	*Chroicocephalus ridibundus*	BoCCI Red List & Irish Wildlife Act
Woodcock	*Scolopax rusticola*	BOCCI Red Listed with regard to Breeding Populations
Redshank	*Tringa totanus*	BoCCI Red List & Irish Wildlife Act
Buzzard	*Buteo buteo*	Raptor Species; Schedule 4 of the Wildlife Act 1976

Common Name	Latin Name	Conservation Status
Sparrowhawk	*Accipiter nisus*	Raptor Species; Schedule 4 of the Wildlife Act 1976
Kestrel	*Falco tinnunculus*	Raptor Species; Schedule 4 of the Wildlife Act 1976
Snipe	*Gallinago gallinago*	BoCCI Amber Listed, Bio-indicator Species for Hen Harrier

1.2 Objectives

This document has been prepared having regard to the following objectives:

- To ensure any required pre-commencement/ pre-construction phase monitoring is scheduled to ensure any impacts on breeding lapwing in particular, are avoided.
- To record usage of the site by birds and interaction with operating turbines during the post-construction phase of the development.
- To monitor short-term and long-term effects on bird populations with a particular emphasis on wintering and breeding birds deemed to be of high conservation concern (Annex I; EU Birds Directive and BoCCI red list species).
- To undertake collision monitoring and corpse searches for potential bird fatalities as a result of collision with turbine blades.
- To record usage of the enhancement area by key ornithological receptors and in particular breeding lapwing.
- Report on findings of post construction monitoring at the end of each monitoring year (Year 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm).

2. METHODOLOGY

2.1 Pre-construction Bird Monitoring

It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs, and in particular to avoid any impacts on breeding lapwing.

Any requirement for construction works to run into subsequent breeding seasons following commencement of works will be subject to pre-construction bird surveys in the form of breeding bird surveys: adapted Brown & Shephard.

This construction phase monitoring, if required, will involve surveying onsite and to a 500m radius of the proposed development boundary. Monitoring will be undertaken by a suitably qualified ornithologist. The survey period will include four visits between April and July. If breeding activity is identified, the nest sites will be located, and no works shall be undertaken within a 500m buffer. No works within the buffer zone shall be permitted until it can be demonstrated that the species is no longer reliant on the nesting areas.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.

2.2 Post-construction Bird Monitoring

Survey methods employed for post-construction monitoring will be in line with guidelines issued by the Scottish Natural Heritage (SNH, 2009). Post-construction monitoring will be undertaken in Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm.

Post-construction monitoring will include vantage point surveys, breeding bird surveys, winter surveys and a programme of regular corpse searching of birds that may potentially collide with operating turbines during the operational phase of the wind farm project.

Bird monitoring will include the following survey methods:

- Flight activity surveys: vantage point surveys
- Breeding bird surveys: adapted Brown and Shephard (with an emphasis on breeding lapwing and black-headed gull).
- Winter distribution and abundance surveys: winter transects/waterfowl surveys (with an emphasis on wintering waterfowl).
- Targeted bird collision surveys (corpse searches) will be undertaken. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.

Vantage Point Surveys

Vantage point surveys will be undertaken monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. The methodology for vantage point watches will follow guidelines issued by the SNH (2009) and SNH (2017). The proposed vantage point watches will adhere to a minimum of 36 hours/VP per season as per guidelines issued by SNH. Monthly visits will be undertaken between January and December inclusive. 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 study area. Vantage points will be undertaken from the same locations that pre-planning surveys which informed the EIAR

application of the proposed development (i.e. VPs 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10). 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).

Distribution and Abundance Surveys

During monitoring years, post-construction distribution and abundance surveys will include adapted Brown and Shepherd surveys. This survey approach *'is suitable for many moorland and open country species including, waders, skuas, gulls, red grouse and some wildfowl species.'*, as per SNH (2017). Survey methodology will be similar to methods employed for baseline EIAR surveys which will allow a comparison of data to be made for each monitoring year.

During adapted Brown and Shepherd surveys, particular attention will be paid to breeding lapwing, although all bird species and breeding activity will be recorded. The standard approach for surveying breeding waders is outlined in Brown and Shepherd (1993) and Gilbert et al. (1998). It is recommended that surveys for breeding waders should be undertaken between 08:30-18:00 with at least four visits undertaken during the core breeding period: April and July. On site surveys will consist of the surveyors walking a route within quadrats which will have been selected to survey all suitable habitat types on site and to a 500m radius from the development/planning boundary (where access allows). Quadrat coverage should be such that every point of suitable habitat (on site and to a 500m radius) should be surveyed to within 100m. Surveyors should spend 20-25 minutes in each 500 x 500m quadrat (or field). These surveys will follow the same routes that were followed during pre-planning surveys.

A total of four site visits will be undertaken during the bird breeding season for each monitoring year and timed to coincide with the core breeding period April - July. Notes will be recorded on nesting and territorial behaviour and breeding signs using standard BTO codes. Non-breeding behaviour such as birds flying over the site will also be recorded.

Winter Distribution and Abundance Surveys

During monitoring years, walked transects will also be undertaken monthly during the winter season (October – March inclusive). Transects will following identifiable tracks through the site including railway lines. Methodology for these surveys will involve a combination of adapted Brown and Shepherd and I-WeBS methods[1] at encountered ephemeral waterbodies. These surveys will follow the same routes that were followed during baseline EIAR surveys which informed the EIAR application of the proposed development. Transect routes were devised to ensure coverage of different habitat complexes within the development site and 500m of the site boundary during winter months. While the primary concern during these surveys will be wintering waterfowl, other target species (e.g. raptors, gulls, etc.) as well as passerines will also be recorded.

Collision Searches (Bird Casualties)

Surveys for bird casualties will follow survey methods broadly based on guidelines issued by the Scottish Natural Heritage (2009) and search methods adopted by Duffy & Steward, *'Turbine Search Methods and Carcass Removal Trials at the Braes of Doune Windfarm'* (Natural Research Information Note 4. Natural Research Ltd, Banchory, UK, 2008).

It is proposed to undertake a minimum of one visit per month during each survey year. During each visit, searches will be undertaken at each operating turbine location by a team of two surveyors. A square plot measuring 130m x 130m with the turbine at the middle at each turbine location will be the subject of target searches for bird casualties. Searches will incorporate the use of transects spaced at

[1] *I-WeBS Counter Manual – Guidelines for Irish Wetland Bird Survey Counters' co-ordinated by BirdWatch Ireland*

10m intervals apart with the observer covering 5m on either side for each transect. Locations and coordinates of transect routes will be confirmed using a portable GPS recording device. Recording sheets will be used to document bird carcasses encountered in the field.

Alternatively, a trained dog and handler may be used where possible to locate any carcasses.

The following details will be considered during field surveys: 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 location, date, time, etc.

Corpse searching work will be calibrated to account for the ability to find bird corpses and likelihood of scavenging of corpses by animals. This will ensure a more accurate estimation of the total number of collision victims. To allow for this, sample bird corpses of various bird sizes will be placed within the various habitats found within proximity of the turbine locations. Carcasses will be left out in the trial areas by one worker and searched for by another two days later. A 36-hour period between laying carcasses and searching to ensure not visual cues will remain from the carcass layer. The locations of all carcasses will be logged using GPS by the layer and the finder. Any signs of predation will be recorded. Birds will be left in place for a further four weeks before a further examination will occur in order to determine further predation levels. The level of predation which occurs will then be used to help calibrate the detection rate and estimate a likely percentage of collisions that may be removed by scavengers between searches.

Results of bird casualties will be incorporated into a report which will be submitted to the planning authority at the end of each monitoring year.

2.3 Enhancement Area Monitoring

As proposed in the Habitat Enhancement Plan (EIAR Appendix 7-8), fixed point vantage points will be used to monitor the use of the enhancement areas by breeding lapwing in particular. The plan will be the subject of ongoing monitoring to assess the effectiveness of the measures proposed to contribute to advances in habitat management methods, which can be applied to future similar projects.

It is considered that a single vantage point will be required to provide adequate views of the proposed enhancement area to ground level. A ground truthing exercise will be undertaken prior to the commencement of surveys to confirm coverage of the required view shed. Monitoring will be undertaken between March and August inclusive during monitoring years (i.e. 1, 2, 3, 5, 10 and 15 as per SNH (2009)). The core breeding season for lapwing runs from April to July. The surveys will run from March to August to ensure early and late breeding attempts are identified. A total of 36 hours of vantage point watches will be undertaken per vantage point during the period, as per SNH guidance (2017).

The rationale for monitoring the enhancement area by means of a vantage point rather than a breeding bird walkover survey is to minimise disturbance and identify if there is connectivity between the enhancement area and the adjacent Drinagh wetlands. It is likely that breeding waders including lapwing will forage in the wetlands. If this is the case regular flight paths between the enhancement area and wetlands will be recorded during the vantage point surveys.

Analysis of the data collected will be the basis for a review of the measures and techniques employed. Should any adjustments to the plan be deemed necessary or advisable, these will be the subject of consultation with the NPWS prior to any alterations to the plan.

3. TIMEFRAME OF PROPOSED MONITORING WORKS

It is proposed to undertake bird monitoring surveys during years 1, 2, 3, 5, 10 and 15 of the wind farm operation.

Table 3.1 below describes the proposed bird monitoring work schedule for each monitoring year for the proposed wind farm development

Table 3.1 Proposed bird monitoring work schedule for each monitoring year at the Derrinlough Wind Farm

Survey Type	Phase	Period	No. of Visits	Survey Method
Vantage Point Surveys	Year 1, 2, 3, 5, 10 and 15	January - December	1 visits/ VP / month for each monitoring year	Ten fixed, 6-hour, Vantage Point Surveys
Distribution and Abundance Survey (Breeding Season)	Year 1, 2, 3, 5, 10 and 15	April - July	4 visits / monitoring year	Adapted Brown and Shepherd Survey
Winter Distribution and Abundance Surveys	Year 1, 2, 3, 5, 10 and 15	October - March	6 visits / monitoring year	Adapted Brown and Shepherd Survey and I-WeBS at water bodies
Corpse Searches (Bird Casualties)	Year 1, 2, 3, 5, 10 and 15	January - December	1 visit/month for each monitoring year	Targeted corpse searches at turbine bases
Enhancement Area: Vantage Point Surveys	Year 1, 2, 3, 5, 10 and 15	March - August	1 visits/ VP / month for each monitoring year	One fixed, 6-hour, Vantage Point Survey

4. REPORTING

A report summarising the findings of the bird monitoring surveys will be submitted to the Planning Authority, where required, within three months of each monitoring year. The report will be submitted by no later than the 31st of March. This will provide details of the various methods employed, the results of field surveys (vantage point watches, corpse searches, distribution and abundance surveys), potential effects/impacts on birds and any recommendations that may inform additional mitigation measures during the operational phase of the wind farm project.

Maps outlining flight lines of key target species will be produced using GIS software applications to accompany the final report at the end of each monitoring year.

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