



APPENDIX 7-7

BIRD MONITORING AND MITIGATION PLAN

Bird Monitoring and Mitigation Plan

Slievegrine Renewable
Energy Development, Co.
Waterford



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1. INTRODUCTION

1.1 Background

This Bird Monitoring and Mitigation Plan has been prepared by MKO for the Proposed Slievegrine Renewable Energy Development, Co. Waterford. It provides a monitoring schedule for the bird population at the Proposed Wind Farm during the operational phase of the project and a specific mitigation plan for white-tailed eagle.

The impact assessment in the EIAR identified potentially significant effects of collision risk for white-tailed eagle (Section 7.5.2.7 of the EIAR). To address this, a species-specific mitigation plan has been prepared for white-tailed eagle. This mitigation plan is integrated with the monitoring plan, enabling monitoring results to inform the implementation and evaluation of mitigation measures.

The objectives of the monitoring and mitigation plan are:

- Ensure any required construction phase monitoring is scheduled to avoid impacts on birds of conservation concern during the construction phase.
- Record birds using the Proposed Wind Farm site and their interaction with operating turbines, to understand short-term and long-term effects on bird populations in the area, with a particular emphasis on birds of high conservation concern (birds listed on Annex I of the EU Birds Directive or on the Red List of Birds of Conservation Concern in Ireland).
- Undertake collision monitoring for potential bird fatalities as a result of a collision with turbine blades, with a specific emphasis on white-tailed eagle.
- Monitor white-tailed eagle activity and collision risk at the Proposed Wind Farm and implement adaptive mitigation where required.
- Report on the findings of monitoring.
- Ensure any required decommissioning phase monitoring is scheduled to avoid impacts on birds of conservation concern during the decommissioning phase.

1.2 Key Ornithological Receptors

Table 7 - 7 - 1 lists the key ornithological receptors (KORs) recorded within the Proposed Wind Farm site and hinterland during surveys conducted from October 2023 to March 2025 inclusive. Conservation status is listed based on the findings of the baseline ornithological conditions and receptor evaluation for each species (see Section 7.3.1 and Section 7.4 of Chapter 7 of the EIAR for full details). These species form the basis of the monitoring plan.

Table 7 - 7 - 1 Key ornithological receptors identified during surveys

Species	Scientific Name	Conservation Status
Golden Plover	<i>Pluvialis apricaria</i>	SCI of Dungarvan Harbour SPA and Blackwater Estuary SPA & Annex I & Red List (breeding and wintering population)
Black-tailed Godwit	<i>Limosa limosa</i>	SCI of Dungarvan Harbour SPA & Red List (wintering)
Common Gull	<i>Larus canus</i>	SCI of Ballymacoda Bay SPA

Species	Scientific Name	Conservation Status
Cormorant	<i>Phalacrocorax carbo</i>	SCI of Helvick Head to Ballyquin SPA
Herring Gull	<i>Larus argentatus</i>	SCI of Helvick Head to Ballyquin SPA
Lesser Black-backed Gull	<i>Larus fuscus</i>	SCI of Ballymacoda Bay SPA
White-tailed Eagle	<i>Haliaeetus albicilla</i>	Annex I & Red List (breeding)
Hen Harrier	<i>Circus cyaneus</i>	Annex I
Peregrine Falcon	<i>Falco peregrinus</i>	Annex I
Red Kite	<i>Milvus milvus</i>	Annex I & Red List (wintering)
Curlew	<i>Numenius arquata</i>	Red List (breeding and wintering)
Kestrel	<i>Falco tinnunculus</i>	Red List (breeding)
Snipe	<i>Gallinago gallinago</i>	Red List (breeding and wintering)
Woodcock	<i>Scolopax rusticola</i>	Red List (breeding)
Buzzard	<i>Buteo buteo</i>	Green List
Long-eared Owl	<i>Asio otus</i>	Green List
Sparrowhawk	<i>Accipiter nisus</i>	Green List

2. MITIGATION MEASURES

2.1 White-tailed Eagle Activity

White-tailed eagle has been the subject of significant reintroduction efforts between 2007-2011 and 2020-2025 in attempts to reintroduce and bolster the Irish population. As a result, the most recent estimated national (Republic of Ireland 2013–2018) population is 12 pairs (Crowe *et al.*, 2021), although the population is likely to have increased since this count due to the ongoing reintroduction programme.

White-tailed eagle was seen ten times during the survey period in the breeding and winter season: four times at the Proposed Wind Farm site and six times in the hinterland. The species was seen soaring over the Proposed Wind Farm site and a juvenile was once seen perched and preening within the Proposed Wind Farm site. Some of the records were of tagged birds, and at least two different tagged birds were observed within the Proposed Wind Farm site (including the juvenile described above) and two other tagged birds were observed in the wider surroundings of the Proposed Wind Farm site, as well as unmarked birds. This shows a minimum of five distinct birds observed during surveys.

In a meeting with the National Parks and Wildlife Service (NPWS), the presence of a breeding territory near the confluence of the Blackwater River and the Licky River was shared, which is ~5km from the

Proposed Wind Farm site. No breeding behaviour was recorded during surveys at the Proposed Wind Farm site.

Due to the infrequent use of habitat within the Proposed Wind Farm site, no significant effects of direct habitat loss, disturbance, displacement or barrier effects are anticipated. However, collision risk was calculated at 0.196 collisions per year, or one white-tailed eagle every five years over the proposed 35-year operational period of the Proposed Wind Farm. Although these are theoretical values and the predicted number of collisions is relatively low in absolute terms, the loss of even a small number of individuals could represent a meaningful impact given the species' small national breeding population and slow reproductive rate. The overall effect significance was classed as **very high** (as per Percival [2003] criteria) or **very significant** (as per EPA [2022] criteria). As such, an adaptive mitigation plan is proposed to ameliorate potential adverse effects of collision risk to low (Percival, 2003) or slight (EPA, 2022).

2.2 Mitigation Plan

In accordance with the mitigation hierarchy (IUCN, 2021), fallen-animal removal will be implemented as the first part of this mitigation plan to minimise the attraction of eagles into the turbine area; this is an established approach to reducing raptor collision risk (USFWS, 2013; Allison *et al.*, 2017). Its effectiveness will be assessed through flight-activity and collision monitoring. If either a pre-defined collision or flight-activity threshold is reached, additional measures will be implemented and evaluated in consultation with NPWS. While the required outcome and thresholds are fixed, the measures used to achieve them may be adapted in response to monitoring findings, emerging evidence and technological developments, consistent with best practice in adaptive management.

2.2.1 Step 1: Fallen Animal Removal and Monitoring

The first step of the mitigation plan is fallen animal removal and flight activity and collision monitoring. Threshold values for the number of collisions to occur or time spent in flight at potential collision height (PCH) will be set. If these threshold values are exceeded, the mitigation plan will proceed to step 2. Fallen animal removal, surveys and the threshold values are described individually in the sections below.

2.2.1.1 Fallen Animal Removal

White-tailed eagle readily scavenges on dead animal carcasses (e.g. sheep or deer), which may be the attractant to the area within and surrounding the Proposed Wind Farm site, particularly given the commercial forestry of the Proposed Wind Farm site is of low ecological value to this species. To reduce the amount of white-tailed eagle flight activity at the Proposed Wind Farm site and hence reduce the collision risk, a carcass removal programme for fallen animals will be implemented. The proposed protocol which will be undertaken by the site manager to ensure that the Proposed Wind Farm is kept free from carcasses is described below:

- Surveys of the wind farm site for carcasses will be undertaken weekly throughout the lifetime of the wind farm.
- The site manager will inspect open areas within 100m of turbines. It is proposed that the search area will extend 100m from the turbine base, which exceeds the maximum rotor radius included within the turbine range (75-81m).
- Site managers will be trained in the survey methodology, which will include not only the search for fallen animals by sight but also the identification of signs that a carcass may be present but obscured from view. Such signs may include trails of wool/fur or congregations of scavenging species such as hooded crows or ravens.
- In addition, the survey can be supplemented by a drone flight to assist in surveying concealed areas of the site.
- The fallen animal carcass will be removed from the site on the same day it was located. The removal will be undertaken in compliance with the Department of Agriculture, Food and Marine (DAFM) guidelines.

- A log will be kept of the number of carcasses recorded and removed annually. This information will be included in the annual Bird Monitoring report submitted to the planning authority.
- Furthermore, the bird surveyors, dog and handler team that will be present onsite undertaking operational monitoring and local farmers will be instructed to report all observations of carcasses to the site manager to arrange for removal. The phone number of the site manager will be provided to all such surveyors visiting the wind farm site.

2.2.1.2 Flight Activity and Collision Monitoring

An adaptive mitigation plan is proposed for white-tailed eagle. Adaptive mitigation is a structured approach in which monitoring results are used to determine whether mitigation measures need to be adjusted. This plan uses pre-defined indicators, threshold values and corresponding actions, rather than relying on an unspecified future response. The effectiveness of any measures implemented is then evaluated through continued monitoring, allowing further intervention where necessary.

Monthly flight-activity surveys will be undertaken at the Proposed Wind Farm site to monitor activity within 500m of the turbine locations. The time birds spend flying at PCH will be recorded. Full details of the survey methodology are provided in Section 3.2.1.

Monthly collision monitoring will be undertaken concurrently with the flight-activity surveys, with carcass searches conducted at each turbine base. These surveys will use a trained detection-dog team, with all bird species included as search targets. Searcher-efficiency and carcass-persistence trials will also be undertaken, and the resulting correction factors will be applied when estimating collision rates. These trials will include large-bodied bird carcasses as proxies to ensure that the estimates are representative of white-tailed eagle, along with small and medium-size birds.

To further bolster the collision monitoring surveys, an additional human-led search will be conducted between successive monthly dog-led searches, resulting in an overall search interval of approximately two weeks. The species' large and conspicuous body size is expected to facilitate detection by human observers.

The frequency and spatial coverage of both flight activity surveys and collision monitoring will be reviewed in light of emerging findings and adapted where necessary. Any proposed change to carcass search intensity would be undertaken in consultation with NPWS.

2.2.1.3 Threshold for Adaptive Mitigation

Two trigger thresholds will be established: one based on flight activity and the other on observed collisions. If either threshold is reached or exceeded, a review will be initiated and additional adaptive mitigation measures implemented.

The collision threshold will be the detection of a single white-tailed eagle carcass attributable to turbine collision. The flight-activity threshold will be expressed in 'bird seconds' recorded at PCH. For each flight, bird seconds will be calculated by multiplying the number of birds observed by the duration, in seconds, for which they remain at PCH; values will then be summed across all flights.

The collision-risk assessment predicted one white-tailed eagle collision every five years based on the 2,120 bird-seconds recorded during baseline surveys. This equates to seven predicted collisions over the proposed 35-year operational lifetime of the wind farm. The level of activity corresponding to one predicted collision over the operational lifetime is therefore calculated to be 303 bird seconds. Accordingly, the threshold will be set at 303 bird seconds at PCH within 162m of the turbine locations (i.e., double the length of the longest rotor blade) per year, standardised to the same survey effort and seasonal coverage as the baseline dataset.

2.2.2

Step 2: Adaptive Mitigation

The selection and design of the additional mitigation measures will be informed by the monitoring results and will take account of the technologies, guidance and white-tailed eagle population trends prevailing at the time of implementation. These may differ substantially from those available when this plan was prepared. Two potential measures outlined below reflect the current evidence base but may be refined or replaced where more effective approaches become available:

- **Offsetting collision mortality:** Any mortality of white-tailed eagle attributable to the Proposed Wind Farm will be offset through measures intended to increase recruitment into the population associated with the Blackwater River nest. This method is standard practice by the U.S. Fish and Wildlife Service, in which wind energy developers create compensatory mitigation plans as a condition of obtaining a ‘programmatic take’ permit for projects that may occasionally result in eagle collision fatalities.

Electricity-transmission and communications infrastructure is identified as a threat to white-tailed eagle in Ireland’s Article 12 Reporting 2013-2018 (EU, 2022). Bird-flight diverters will therefore be installed on overhead power lines up to 5km from the nest to reduce collision risk to the breeding pair and recently fledged juveniles. The nest is the focal point of activity when breeding, and thus where bird flight diverters are most likely to be effective. To ensure the most appropriate locations are chosen, the NPWS will be consulted on the (micro) siting of the proposed bird flight diverters.

- **Enhanced turbine visibility:** Turbine blades will be painted black to increase their contrast against the surrounding environment, thereby enhancing their visibility to white-tailed eagles and reducing collision risk. At Smøla Wind Farm, Norway, where white-tailed eagle collisions were recorded, one blade on each of four turbines was painted black as part of a before-after control-impact experiment, an average 72% reduction in bird fatalities was recorded, with the strongest effect on raptors. No white-tailed eagle carcasses were found after treatment (Kuzovnikova *et al.*, 2026).

Step 2 Adaptive mitigation measures will be planned and implemented in consultation with NPWS.

2.2.3

Funding of Research

The developer will provide funding for the purchase of telemetry tags for white-tailed eagle chicks at the Blackwater River nest. Telemetry tags provide valuable information on eagle movements, dispersal, habitat use and survival in Ireland and are routinely deployed on chicks prior to fledging. This information can be used to inform conservation of the species in Ireland. They can also show whether tagged birds enter wind farms and, where altitude data are available, whether they fly at potential collision height. Tags can also indicate the approximate timing and location of a mortality event.

Provision will be made for up to two tags over the proposed 35-year operational period of the Proposed Wind Farm, reflecting the expected number of chicks produced by a successful nesting pair. If tagging at the Blackwater River nest is not possible or appropriate, the tags may be used for chicks at another white-tailed eagle nest within the region. The funding commitment relates solely to the purchase of telemetry tags and does not include the costs associated with fitting the tags, monitoring the birds or managing and analysing the resulting data.

Funding will be provided to an appropriate white-tailed eagle research group in consultation with NPWS and subject to the appropriate licencing. The raw telemetry data will be made available for assessment of interactions with wind farms including the Proposed Wind Farm.

3. **MONITORING MEASURES**

3.1 **Pre-construction Monitoring**

Pre-commencement and construction monitoring are proposed to identify sensitive nests or roosts in proximity to the works. It is proposed that major 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.

A pre-commencement survey will be undertaken prior to the initiation of works at the Proposed Wind Farm site. This survey will be conducted a maximum of three weeks before the commencement of works. Following commencement, construction phase surveys will be conducted during works. These surveys will be conducted once per month during the breeding season (April to July) and once at the start of the winter season (October). These surveys will continue to be conducted each season for the duration of the construction period. The aim of the pre-commencement and construction phase surveys is to identify sensitive sites (e.g., nests or roosts) in proximity to works.

The surveys will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase no works shall be undertaken and any on-going works will cease within a species-specific buffer of this location in line with best practice guidance (e.g., Forestry Commission Scotland, 2006; NatureScot, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied. 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 to alert all personnel on site to the suspension of works within that area.

3.2 **Operational Monitoring**

Operational monitoring will be undertaken at the Proposed Wind Farm site to monitor flight activity and turbines collisions, providing thresholds for adaptive monitoring. Following SNH (2009), monitoring will be conducted in years 1, 2, 3, 5, 10 and 15 of operation. Because monitoring informs the mitigation plan, the intensity of survey and the survey programme will be reviewed after three years and any changes that are deemed necessary will be made in consultation with NPWS. The surveys that will be undertaken are:

- Vantage Point Surveys
- Collision Monitoring Surveys
- Breeding Woodcock Survey

3.2.1 **Vantage Point Surveys**

Vantage point surveys will be undertaken to monitor flight activity within a 500m radius of the turbines. The objective of the surveys is to provide information on bird use of the area and interactions with turbines after construction of the wind farm that can be compared to pre-planning data.

Vantage point surveys will be conducted from fixed locations used during pre-planning surveys to provide full coverage of the turbines to a 500m radius. Should vantage point locations need to be moved, a viewshed analysis will be conducted to ensure there is still comprehensive coverage of the 500m radius of turbines at the new locations. Surveys will be conducted monthly.

Survey methodology should follow NatureScot (2025) and any revisions to the same. The surveyor should collect data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e.,

6 hours total) per month. Surveys should be spread over the full daylight period between sunrise and sunset.

Flight activity of target species will be mapped and recorded as per three defined flight bands chosen in relation to the dimensions of the turbines as built: below rotor swept height, at the rotor swept height and above rotor swept height. When a target species is detected, the location of the bird will be recorded on a map and the surveyor will provide the following details: time, species, number of birds, activity/behaviour, the primary habitat used (and secondary and tertiary habitat if applicable) and any other notes of interest.

3.2.2 Collision Monitoring

Carcass searches for all 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; or any revisions to the same). A monthly programme of carcass searches is proposed to ensure the mitigation strategy is informed by robust, contemporary data. Monthly carcass searches will be conducted at each turbine base, and should use a trained detection-dog team, with all bird species included as search targets. To increase the likelihood of detecting any white-tailed eagle collision, an additional human-led search will be conducted between successive monthly dog-led searches, resulting in an overall search interval of approximately two weeks. The species' large and conspicuous body size is expected to facilitate detection by human observers. The area around each turbine base to be searched will be based on the turbine size and surrounding landscape.

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 searcher to find bird carcass and the likelihood of scavenging of carcass 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 Proposed Wind Farm 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 within the wind farm by one worker, then searched for by the carcass searcher later. The result of these trials is a correction factor that can be applied to the results of the carcass searches. These trials will include large-bodied bird carcasses as proxies to ensure that the estimates are representative of white-tailed eagle.

3.2.3 Breeding Woodcock Survey

A breeding woodcock survey will be conducted at the Proposed Wind Farm site including the 3.6ha of native woodland proposed to be planted in proximity to a tributary of the River Licky as part of the Biodiversity Management and Enhancement Plan (BMEP) for the Proposed Wind Farm. Breeding woodcock surveys will be undertaken for Years 3 and 5 of operation (allowing time for trees to establish) to provide comparable data to the pre-planning period as well as information on woodcock use of the native woodland. Surveys should identify breeding woodcock territories by locating roding (breeding display) males. Survey methodology will follow Gilbert *et al.* (1998) and any revisions to the same: the surveyor will walk transects for 2 hours from dusk until last visible light during which all woodcock observations were mapped, with particular reference to roding observations. Each transect will be surveyed three times during the core breeding season of May and June.

3.2.4 Summary

Table 7 - 7 - 2 summarises the proposed bird monitoring schedule for each monitoring year.

Table 7 - 7 - 2 Proposed bird monitoring schedule

Survey	Year	Period	Visits	Survey Method
Fallen Animal Removal	Annually	Every week	1 visit to open areas within 100m of turbine hardstands per month	search for fallen animals by sight
Vantage Point	Years 1, 2, 3, 5, 10 & 15 of operation (subject to review after first 3 years of operation)	Every month	1 visit to each vantage point location per month	NatureScot (2025)
Collision Monitoring	Years 1, 2, 3, 5, 10 & 15 of operation (subject to review after first 3 years of operation)	Every month	1 search of each turbine base by detection dog and 1 search of each turbine base by human per month, spread evenly across the month	Carcass searches following SNH (2009) and search methods adopted by Duffy and Steward (2008)
Breeding Woodcock	Years 3 & 5 of operation (trees establishing in Years 1 & 2)	May and June	3 visits to each transect over May and June	Gilbert <i>et al.</i> (1998)

3.3 Decommissioning Monitoring

An appropriate Decommissioning Plan will be prepared in advance of the decommissioning of the proposed turbines. This plan will include the measures proposed for the construction monitoring (Section 3.1) and will be developed in consultation with the Planning Authority and the NPWS. The aim of the plan will be to identify and protect sensitive nests, roosts or other key areas in proximity to decommissioning works. The requirements of the plan will be informed by the findings of the operational monitoring, along with the findings of other relevant ornithological surveys conducted in the interim where available. Methodologies should follow the current best practice guidance at the time the plan is prepared.

3.4 Reporting

A report summarising the findings of bird monitoring surveys will be submitted to the Planning Authority at the end of each monitoring year. The report will provide the results of the surveys and discuss potential impacts on birds (particularly KORs) and any recommendations that may inform additional mitigation measures during the operational phase of the Proposed Wind Farm. The results of any telemetry tracking of white-tailed eagle, particularly interactions with wind farms, will also be discussed in these reports. Sensitive information relating to white-tailed eagle will not be publicly disseminated.

Reports should clearly outline if the threshold for adaptive mitigation measures has been met and describe these measures and the plan for implementation. If adaptive mitigation measures are implemented, reporting should evaluate the effectiveness of these measures.

Sharing Ecological Data

As a measure to support conservation research and policy, it is proposed to submit the monitoring survey data and information to the National Biodiversity Data Centre (NBDC) and to BirdWatch Ireland to contribute to the upcoming bird atlas (2027-2031) on relevant ecological records, for example, information on the location of breeding territories and nest sites of bird species of conservation concern (e.g., Red-List Species as per the most recent BoCCI). The submission of the data will follow relevant standards and will be provided in the preferred NBDC excel template. This commitment ensures the project is contributing to the aims of Objective Four, Outcome 4B of the Ireland's 4th National Biodiversity Action Plan²: Data relevant to biodiversity and ecosystems, including conservation needs, is widely accessible and standardised.

4.

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