Appendix 9.1 Annex B

Ornithological Survey Methodology

RWE

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Annex B Ornithological Survey Methodology

A range of ornithological surveys have been conducted at the proposed Creachan Wind Farm ('the Proposed Development'). The methodologies used in these surveys are summarised in the sections below; more detailed descriptions are provided in the NatureScot guidance (2025[i]) and upon which these surveys are based.

B.1 Flight Activity Surveys

The aims of the flight activity (vantage point) surveys are: (1) to record flight activity within the vicinity of a turbine array in order to identify areas of potential importance to birds; and (2) to quantify flight activity within 500 m of the proposed turbine locations in order to estimate the likelihood of collision using the NatureScot collision risk model (CRM).

Timing

- A survey period of 36 hours is recommended as the minimum level of sampling intensity at each VP for each season (breeding, non-breeding, migratory);
- Watches were spread as evenly throughout the year as possible to ensure that temporally representative data are collected (see **Annex C**). Specific consideration was given to the period around dawn and twilight for breeding waders and to changing raptor behaviour across seasons;
- Watches were suspended and resumed to take account of changes in visibility (e.g. fluctuations in cloud base). Watches were undertaken in conditions of good ground visibility when the cloud base was higher than the most elevated ground being observed; and
- Watches were conducted in a range of weather conditions and were spread throughout the day (see **Annex C** and **Annex D**).

Field Methods

- Viewshed analysis was conducted using Arc GIS to confirm suitable Vantage Point (VP) locations and their associated visible areas at 20m above ground level[1];
- Reconnaissance surveys were undertaken to refine VP locations;
- The VP locations and associated viewsheds are shown in **Figure 9.1**;
- Care was taken to maximize the area visible whilst minimising disturbance to birds;
- The final VP locations were selected with the aim of achieving coverage of all possible wind turbine locations within a preliminary Wind Turbine Zone (WTZ[2]), such that no turbine was more than 2 km from a VP;
- A maximum 180˚ view arc was scanned by surveyors;
- Each watch lasted a maximum of three hours but was suspended and then resumed to take account of changes in visibility (e.g. fluctuations in the cloud base).
- For each target and secondary species, the following data were recorded:

[1] The viewsheds are based on a 5 m DTM to provide a representation of visibility from the observer locations; this is confirmed and refined through field site visits.

[2] Which was slightly larger than the Main Development Area (MDA) shown in **Figure 9.1**. **Figure 3.2** shows both these areas.

- The flightlines by individuals or flocks of birds was plotted in the field onto 1:25,000 scale maps;
- The time the target bird was detected and the duration (seconds) spent flying over a defined survey area (the viewshed);
- The birds' flight heights, defined into five prescribed height bands (0-20 m, 21-40 m, 41-100 m, 101-150 m and >151 m) for surveys conducted between March 2022 and September 2022, and six prescribed height bands (0-20 m, 21-40 m, 41-100 m, 101-150 m, 151-200 m and >201 m) for subsequent surveys, were recorded at the point of detection and at 15 second intervals thereafter. From this the proportion of time spent flying below, within (referred to as Potential Collision Height (PCH)) and above approximate rotor height could be estimated.
- Observations of target species took priority over recording secondary species if both species were present simultaneously;
- The number of birds recorded were the minimum number of individuals that could account for the activity observed; and
- Observers only recorded perched birds and birds on waterbodies once only on arrival at the VP. Thereafter only flying birds and newly noticed perched/swimming birds were included in the activity summaries.

B.2 Scarce Breeding Bird Survey

The aim of the scarce breeding bird surveys in 2022 and 2023 was to determine the distribution of occupied nests/territories for target raptor, owl and diver species within 2 km of the preliminary WTZ[2] and where possible record breeding success (**Figure 9.3**).

Additional survey was also undertaken in 2025, with the survey area a 1 km corridor along the Existing Forestry Access Track (**Figure 9.3**).

Secondary species such as buzzard, sparrowhawk and kestrel were also noted but the locations of their nest sites were not the key focus of the surveys. Surveys were undertaken by experienced and licensed[3] field ornithologists. Extreme care was taken to avoid unnecessary disturbance to breeding birds.

Guidance from NatureScot (2025[i]), 'Bird Monitoring Methods' (Gilbert *et al*., 1998[ii]) and 'Raptors: a field guide to survey and monitoring' (Hardey *et al*., 2013[iii]) were all consulted to inform species-specific survey methodologies.

In 2022 and 2023 focal breeding loch watches were also undertaken for red-throated divers. Surveys comprised stationary watches from VPs overlooking occupied breeding lochans with the aim of recording incoming and outgoing flights during the incubation and chick-rearing periods (NatureScot, 2025[i]). Surveys were curtailed where breeding attempts were concluded to have failed.

B.3 Black Grouse and Capercaillie Survey

Surveys to record the presence of black grouse and capercaillie were undertaken within 1.5 km of the preliminary WTZ[2] (**Figure 9.4**).

The survey methodology used is detailed in NatureScot guidance (2025[i]) and based on specific-specific guidance set out in Gilbert *et al* (1998[ii]). A summary is provided below:

[3] NatureScot issued Schedule 1 Licence.

- Breeding black grouse and capercaillie were surveyed for by counting total numbers of males and females at lek locations, most lekking activity taking place at or soon after dawn in spring (April to May).
- Known lek sites and other areas of suitable habitat which can host leks were identified and visited during April and May within 2 hours of dawn on calm dry days with good visibility;
- Visits involved listening and scanning for lekking birds from strategic locations (avoiding disturbance of leks) and during walks between these locations ensuring that all potential habitat was covered;
- The maximum count of males in the 2 hours around dawn gives the standard count estimate but the maximum number of females seen was also presented; and
- Black grouse leks that were at least 200 m apart within the same year were treated as separate leks; and
- Searches for signs of black grouse capercaillie were also undertaken during lek surveys and were recorded where observed during all other ornithological survey visits. This included the recording of any droppings, feathers and potential dust baths.

B.4 Moorland Breeding Bird Survey

An upland breeding bird survey methodology was employed as detailed within NatureScot guidance (2025[i]). In summary, surveys involved the following:

- Open upland (including hedgerows, scrub, isolated trees and copses) was surveyed using an intensive version of the Brown and Shepherd (1993[iv]) method for upland bird survey and comprising four staggered visits between April and July;
- The objectives were to map the distribution of breeding bird territories within 500 m of the preliminary WTZ[2] and estimate the approximate size of breeding bird populations; and
- After each survey visit one overview map was then produced showing all target species. The maps from all four survey visits from that year were then compared, enabling the estimation of numbers of breeding territories. This was done by grouping the observations into territories using the methodology described by Bibby *et al*. (2000[v]). Due to the cryptic nature of many breeding birds and the necessary assumptions made when plotting territories, a minimum and maximum number of territories was identified for each target species.

In 2022 and 2023, the survey covered areas within 500 m of the preliminary WTZ[2] (**Figure 9.5**).

In 2025, the survey area covered a 500 m corridor of the Existing Forestry Access Track (**Figure 9.5**), with survey effort completed in July.

Timing

- As recommended in Calladine *et al*. (2009[vi]), four survey visits were undertaken between April and July (in 2022 and 2023);
- Fieldwork was undertaken between sunrise and 1800hrs; and
- Fieldwork was not undertaken in conditions considered likely to affect bird detection rates, for example in winds greater than Beaufort Scale Force 4, persistent precipitation, poor visibility (less than 300 m), or in unusually hot weather.

Field Methods

- Walk-routes which optimised ground visibility were used;
- Surveyors paused at appropriate vantage and listening points;
- Isolated trees, copses and patches of scrub were approached and examined;
- Streams, ditches and hedgerows were walked;
- All other areas were approached to within 100 m;
- Registrations were mapped at the first location that behaviour indicative of breeding was observed; and
- Standard British Trust for Ornithology (BTO) activity codes were used.

B.5 Winter Walkover

Winter walkovers were undertaken in the non-breeding seasons to map wintering populations of birds within and in proximity to the preliminary WTZ[2].

- The area was surveyed three times during each non-breeding season;
- These surveys involved following a route that optimised ground coverage, such that observers walked within 250 m of every point; and
- Observers periodically stopped at appropriate viewing and listening points along the route and longer vantage point watches were included within the walkover to allow potentially important areas to be monitored in greater detail.
- Survey areas are shown in **Figure 9.5**.

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[i] NatureScot (2025) Recommended Bird Survey Methods to inform impact assessment of Onshore Windfarms. Available at: https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms

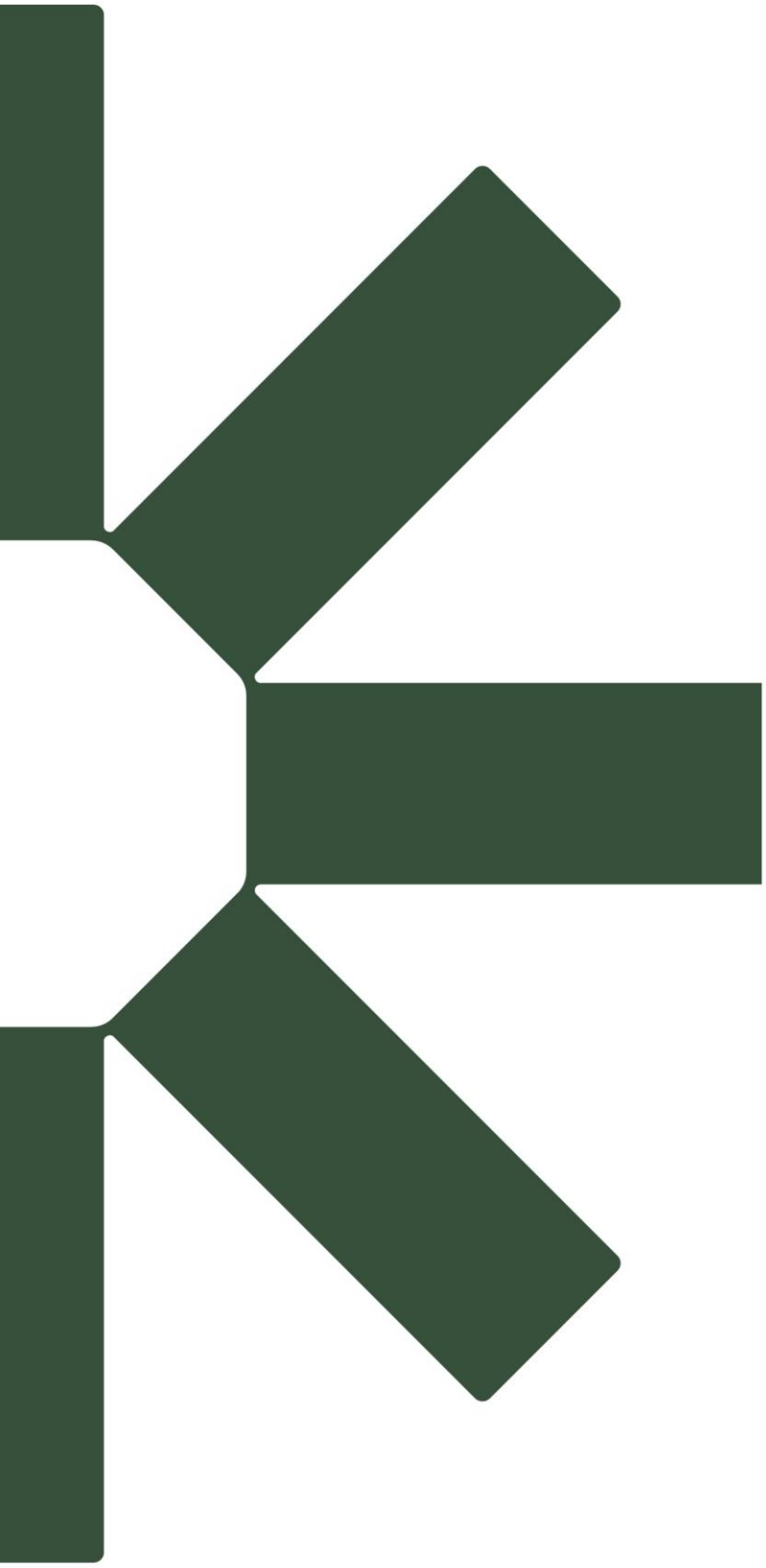
[ii] Gilbert, G., Gibbons, D. W. and Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy.

[iii] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013) Raptors: a field guide for surveys and monitoring (3rd edition). The Stationery Office, Edinburgh.

[iv] Brown, A. F. and Shepherd, K. B. (1993) A method for censusing upland breeding waders. Bird Study, 40: 189-195.

[v] Bibby, C. J., Neil D. Burgess, David A. Hill and Simon H. Mustoe (2000) Bird Census Techniques, 2nd Edition, London, Academic Press.

[vi] Calladine. J., Garner, G., Wernham, C., & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds. Bird Study, 56: 3, 381-388.



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