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Hill of Fare Wind Farm Ornithology Technical Appendix 9.1

Date: 27 September 2023
Tel: 0141 342 5404
Web: www.macarthurgreen.com
Address: 93 South Woodside Road | Glasgow | G20 6NT

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1 Introduction

MacArthur Green was commissioned by RES to complete ornithological surveys at the proposed Hill of Fare Wind Farm, approx. 6 km north of Banchory in Aberdeenshire (hereafter referred to as ‘the Proposed Development’). The surveys were conducted between October 2020 and August 2022 to inform an assessment of the potential ornithological effects of the Proposed Development on the species assemblage present.

This technical report summarises the methods employed and the results of the field surveys and is supported by the following Annexes.

Annex A	Ornithological Legal Protection
Annex B	Ornithological Survey Methodologies
Annex C	Ornithological Survey Effort & General Information
Annex D	Ornithological Survey Results
Annex E	Collision Risk Assessments

Confidential information relating to species listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is detailed in **Confidential Appendix 9.2**.

A range of surveys were employed to accurately record baseline conditions within the Proposed Development and appropriate survey areas (detailed in **Annex B**). In this Technical Appendix, associated **Annexes A – E**, **Confidential Technical Appendix 9.2** and **Chapter 9 (Ornithology)** of the Environmental Impact Assessment Report. Terms referred to are as follows:

- ‘the Site’ refers to the area within the red line boundary, e.g. **Figure 9.1**;
- ‘survey area’ is defined as the area covered by each survey type for the Proposed Development; and
- ‘study area’ is defined as the area of consideration of effects on each species at the time of assessment (**Figure 9.1**).

2 Legal Protection

With limited exceptions, all wild birds and their eggs are protected by law. Specific levels of protection are determined by a species’ inclusion on certain lists. **Annex A** to this report details the various levels of legal protection afforded to UK bird species.

3 Field Survey Methods

The following surveys were undertaken at the Proposed Development between October 2020 and August 2022:

- Flight activity surveys (two breeding seasons and two non-breeding seasons), from two vantage points (VPs) (**Figure 9.2**);
- Breeding bird surveys (two breeding seasons), 500 m survey buffer;
- Winter walkover surveys (two non-breeding seasons), 500 m survey buffer;
- Scarce breeding bird surveys (two breeding seasons), 2 km survey buffer; and

- Black grouse surveys (two breeding seasons), 1.5 km survey buffer.

Survey methods followed the recommended NatureScot guidance (SNH 2017¹) available at the time and methods are described in detail within **Annex B**. Where possible, each survey was carried out beyond the Proposed Development within a buffer distance specific to that method (e.g., 2 km buffer for the scarce breeding bird surveys) and these are detailed within **Annex B**.

The relative importance of the data collected was determined by the specific level of protection assigned to those species recorded, coupled with their perceived susceptibility to potential effects resulting from the Proposed Development. The resulting ‘target species’ and ‘secondary species’ lists are a standard assessment tool for wind farm ornithology studies (see **Annex B**).

4 Field Survey Results

All valid surveys were undertaken during suitable weather conditions (as described within **Annex B**). Where weather conditions deteriorated below acceptable conditions (see definitions in **Annex B**), surveys were either suspended or additional surveys were undertaken. In the case of flight activity surveys, any time where the visibility was <1 km was excluded from total survey effort and subsequent analysis (further detail in **section 4.1**). Schedule 1/Annex 1 surveys were carried out by appropriately licensed surveyors. All survey data were reviewed, inputted, and analysed by MacArthur Green.

A total 54 bird species were recorded within, or adjacent to, the Proposed Development during the various ornithological surveys conducted. Survey effort and results of the field surveys are detailed within **Annex C** and **Annex D**. The following sections summarise the results from each survey undertaken.

4.1 Flight Activity

The flight activity surveys recorded all target species’ flight activity within the Proposed Development and beyond. These data have been used in the collision risk modelling. The flights used included those within the ‘Collision Risk Analysis Area’ (CRAA) (i.e. the area to be occupied by operational turbines, together with a 500 m buffer).

Flight activity surveys across the 2021 and 2022 breeding seasons and 2020/2021 and 2021/2022 non-breeding seasons were undertaken from two VPs. Valid survey effort¹ is detailed in **Table 9-1** and full details of flight activity surveys are contained in **Annex C** with methodology in **Annex B**.

Table 9-1 Summary of total hours of valid survey per VP in each season

Period	VP3	VP4
2020/2021 non-breeding season	26	26
2021 breeding season	36	36
2021/2022 non-breeding season	38	38
2022 breeding season	36	36

A total of eight target species were recorded during the flight activity surveys (further details are provided in **Annex D**). For each species across the whole flight activity survey period, **Table 9-2** shows the total number of flights recorded and the total number of birds recorded². The bird seconds are calculated for each observation

¹ Hours where visibility was >1km are not considered valid for use in collision risk modelling as less than half the 2km viewshed can be seen.

² This includes flights that would not technically be ‘at-risk’ of collision (e.g. recorded outwith the CRAA and/or not at rotor height).

as the product of flight duration and number of individuals. This is then summed per species to give the total bird seconds recorded across the entire surveyed period.

Table 9-2 Target species recorded and total number of flights recorded during flight activity surveys, 2020-2022

Species	Total number of flightlines recorded	Total number of birds recorded	Total bird seconds recorded
Goshawk	16	16	3,853
Greylag goose	1	20	1,000
Hen harrier	3	3	267
Herring gull	3	7	897
Osprey	2	4	1,517
Peregrine falcon	5	5	767
Pink-footed goose	12	950	167,016
Red kite	39	41	12,078

4.1.1 Flightlines Used in Collision Risk Modelling

Only flightlines identified to be within the CRAA and recorded within the 2 km viewshed of the associated VP were considered in the collision risk modelling and **Annex E** provides details of the bird seconds from flights identified to be ‘at-risk’.

- ‘At-risk’ is defined as – a flight having at least part of its duration (i) at Potential Collision Height (PCH)³; (ii) within the CRAA; and (iii) recorded within the 2 km viewshed of the associated VP.
- PCH is defined as – the altitude between the minimum and maximum blade height⁴ (taken to be from 25 m to 180 m and 45 m to 200 m for the Proposed Development).

Full survey results detailing the findings from each survey visit (including target species’ flightlines considered not ‘at-risk’ and secondary species information) can be found within **Annex D**. Only bird seconds for observations identified as within the CRAA and associated viewshed are considered in the following discussions. Full target species results are detailed within **Annex D** and the collision risk calculations are detailed in **Annex E**.

4.1.2 Collision Risk Model Outputs

The bird seconds for target species flights within the CRAA at PCH were then input into a Collision Risk Model (CRM) to calculate the predicted collision rates per season. The CRM calculations for each species can be found in **Annex E**. **Table 9-3** to **Table 9-6** provide the estimated collision rates and number of seasons per collision for each species.

Table 9-3 Estimated collision rates (180 m tip)

Species	2020/2021 non-breeding season	2021 breeding season	2021/2022 non-breeding season	2022 breeding season	Mean breeding season	Mean non-breeding season	Mean annual
Goshawk	0.0025	0.0907	0.0115	0.0195	0.0551	0.0070	0.0621
Greylag goose	0.0176	0	0	0	0	0.0088	0.0088
Hen harrier	0	0	0	0.0032	0.0016	0	0.0016

³ In some cases, only part of a total flight duration was recorded at PCH, and it is assumed that this proportion is applicable for that part of the flight within the CRAA and 2km viewshed area.

Species	2020/2021 non-breeding season	2021 breeding season	2021/2022 non-breeding season	2022 breeding season	Mean breeding season	Mean non-breeding season	Mean annual
Herring gull	0	0.0198	0	0	0.0198	0	0.0198
Osprey	0	0	0	0.0510	0.0255	0	0.0255
Peregrine falcon	0	0.0030	0.0412	0	0.0030	0.0206	0.0236
Pink-footed goose	0.1008	0	0.1172	0	0	0.1090	0.1090
Red kite	0	0.2951	0.0763	0.6172	0.6037	0.0381	0.6418

Table 9-4 Estimated collision rates (200 m tip)

Species	2020/2021 non-breeding season	2021 breeding season	2021/2022 non-breeding season	2022 breeding season	Mean breeding season	Mean non-breeding season	Mean annual
Goshawk	0	0.1050	0.0144	0.0219	0.0635	0.0072	0.0707
Herring gull	0	0.0198	0	0	0.0099	0	0.0099
Osprey	0	0	0	0.0431	0.0216	0	0.0216
Peregrine falcon	0	0.0027	0.0285	0.0000	0.0014	0.0143	0.0156
Pink-footed goose	0.1627	0	0.1856	0	0	0.1741	0.1741
Red kite	0	0.2332	0.0301	0.3509	0.2920	0.0150	0.3071

Table 9-5 Estimated number of seasons per collision (180 m tip)

Species	2020/2021 non-breeding season	2021 breeding season	2021/2022 non-breeding season	2022 breeding season	Mean breeding season	Mean non-breeding season	Mean annual
Goshawk	402	11	87	51	18.2	143	16
Greylag goose	57	-	-	-	-	114	114
Hen harrier	-	-	-	315	630	-	630
Herring gull	-	51	-	-	51	-	51
Osprey	-	-	-	19.6	39	-	39
Peregrine falcon	-	336	24.3	-	336	49	42
Pink-footed goose	10	-	8.5	-	-	9.2	9.2
Red kite	-	3.4	13.1	1.6	1.7	26	1.6

Table 9-6 Estimated number of seasons per collision (200 m tip)

Species	2020/2021 non-breeding season	2021 breeding season	2021/2022 non-breeding season	2022 breeding season	Mean breeding season	Mean non-breeding season	Mean annual
Goshawk	-	9.5	70	46	15.8	139	14.2
Herring gull	-	51	-	-	101	-	101
Osprey	-	-	-	23.2	46	-	46
Peregrine falcon	-	-	35	-	733	70	64
Pink-footed goose	6.2	-	5.4	-	-	5.7	5.7

⁴ Where the actual rotor blade altitude differs from the pre-defined survey height bands, the collision risk model accounts for this difference on the assumption of an even flight distribution within each particular survey height band, and an adjustment can be made to estimate total flight duration at actual rotor blade altitude.

Species	2020/2021 non-breeding season	2021 breeding season	2021/2022 non-breeding season	2022 breeding season	Mean breeding season	Mean non-breeding season	Mean annual
Red kite	-	4.3	33	2.9	3.4	66	3.3

4.2 Breeding Birds

Two complete breeding bird seasons (comprising of four visits each) were surveyed in 2021 and 2022 (April to July). Surveys recorded five wader species, of which two were considered to be breeding (**Table 9-7**). Golden plover were also recorded both years but were not considered to be breeding. Full details of the breeding bird surveys are provided within **Annexes C and D** and survey methodology is provided within **Annex B**.

Table 9-7 Breeding wader territories, 2021 and 2022 – (number of territories within 500 m study area)

Species	Number of territories 2021	Number of territories 2022
Curlew	0-1	0-1
Snipe	-	1-2

4.3 Winter Walkover

Winter walkover surveys were conducted during the 2020/2021 and 2021/2022 non-breeding seasons. Surveys recorded 29 species of which eleven are considered to be target species (**Table 9-8**). Full details of the winter walkover surveys are provided within **Annexes C and D** and survey methodology is provided within **Annex B**.

Table 9-8 Winter walkover: target species records (number of birds recorded per visit)

Species	2020/2021 non-breeding season		2021/2022 non-breeding season	
	Number of records	Total number of birds	Number of records	Total number of birds
Golden eagle	-	-	1	1
Golden plover	2	36	1	1
Goshawk	5	5	2	2
Greylag goose	5	319	-	-
Hen harrier	1	1	-	-

ⁱ Scottish Natural Heritage (2014; updated 2017) Recommended Bird Survey Methods to inform impact assessment of Onshore Windfarms.

Species	2020/2021 non-breeding season		2021/2022 non-breeding season	
	Number of records	Total number of birds	Number of records	Total number of birds
Peregrine falcon	-	-	2	2
Pink-footed goose	10	682	2	546
Red kite	1	1	3	6
Snipe	-	-	1	1
Whooper swan	-	-	2	19
Woodcock	3	3	-	-

4.4 Scarce Breeding Birds

Scarce breeding bird surveys were conducted during the 2021 (March to August) and 2022 (March to August) breeding seasons. Goshawk and peregrine falcon were confirmed to be breeding within the survey area and breeding activity is summarised in **Table 9-9**. **Confidential Technical Appendix 9.2** contains the full details of all breeding activity. Full details of the scarce breeding bird surveys are provided within **Annex C** and **Annex D** and survey methodology is provided within **Annex B**.

Table 9-9 Scarce breeding bird summary

Species	2021	2022
Goshawk	Two territories; breeding confirmed at both locations, success unknown.	One confirmed territory with a minimum of one young fledged and one potential territory with breeding unconfirmed.
Peregrine falcon	One territory; success unknown.	One territory; one young fledged.

Golden eagle, osprey and red kite were also recorded during surveys but were not considered to be breeding/no breeding attempts were located.

4.5 Black Grouse

Surveys to identify areas of black grouse activity, locate lek locations and establish lek size were conducted in the 2021 and 2022 breeding seasons during April and May. No black grouse or signs of black grouse were recorded across all surveys.

ANNEX A. Ornithological Legal Protection

In Scotland, all wild birds are protected under the Wildlife and Countryside Act 1981 (the 'Act'), as amended by the Nature Conservation (Scotland) Act 2004. This protection also extends to their eggs and nests, with it being an offence to intentionally or recklessly¹:

- Kill, injure or take any wild bird²;
- Take, damage, destroy or otherwise interfere with the nest of any wild bird while it is being built or is in use³;
- At any other time take, damage, destroy or otherwise interfere with any nest habitually used by any wild bird included in Schedule A1 (Protected Nests and Nest Sites for Birds: white-tailed eagle and golden eagle)⁴;
- Obstruct or prevent any wild bird from using its nest⁵; or
- Take or destroy an egg of any wild bird⁶.

It is also an offence to have in possession or control any live or dead wild bird or any part thereof; or any egg or part of an egg of any wild bird⁷.

Further special protection under this legislation is afforded to those species listed on Schedule 1 of the Act. For these species, it is an offence to:

- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or is in, on or near a nest containing eggs or young, or disturb the dependent young of such a bird⁸;
- Intentionally or recklessly disturb any wild birds included on Schedule 1 which leks, while it is doing so⁹ (capercaillie is the only bird this offence applies to in Scotland);
- Intentionally or recklessly harass any wild bird included in Schedule 1A¹⁰. Section 1, subsection 5B states, 'Subject to the provisions of this Part, any person who intentionally or recklessly harasses any wild bird included in Schedule 1A shall be guilty of an offence'. At this time, Schedule 1A includes golden eagle, hen harrier, red kite and white-tailed eagle. This updated legislation was introduced on 16 March 2013; or
- Intentionally or recklessly take, damage, destroy or otherwise interfere with any nest and/or nest site habitually used by any bird on Schedule A1 at any time. At this time, Schedule 1A includes golden eagle and white-tailed eagle¹¹;

It is also an offence to knowingly cause or permit to be done an act which is made unlawful by any of the above provisions.

¹ Exceptions to these offences exist under various circumstances (e.g. controlling pest species; taking birds during specific season; and killing sick or injured birds etc.).

² Wildlife and Countryside Act 1981, Section 1(1)(a)

³ Wildlife and Countryside Act 1981, Section 1(1)(b)

⁴ Wildlife and Countryside Act 1981, Section 1(1)(ba)

⁵ Wildlife and Countryside Act 1981, Section 1(1)(bb)

⁶ Wildlife and Countryside Act 1981, Section 1(1)(c)

⁷ Wildlife and Countryside Act 1981, Section 1(2)

Further protection is described under the EU Birds Directive which requires member states to maintain wild bird species in favourable conservation status¹² and promote the conservation of bird species listed within Annex 1 of the Birds Directive through the protection of their habitat. This is achieved via the designation of Special Protection Areas (SPAs).

Red List bird species are those deemed to be globally threatened and to be suffering population declines within the UK. Although not legally enforceable, the conservation of Red List bird species represents a material consideration, in planning terms.

⁸ Wildlife and Countryside Act 1981, Section 1(5)

⁹ Wildlife and Countryside Act 1981, Section 1(5A)

¹⁰ Wildlife and Countryside Act 1981, Section 1(5B)

¹¹ This reflects the changes introduced by the Wildlife and Countryside Act 1981 (as amended by: Variation of Schedules A1 and 1A (Scotland) Order 2013).

¹² While the term 'favourable conservation status' is not used in the Birds Directive, EU court cases over recent years have progressively interpreted the concept as meaningful in a Birds Directive context (SNH, 2006).

ANNEX B. Ornithological Survey Methodology

A range of ornithological surveys have been conducted at the proposed Hill of Fare 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 (SNH 2017ⁱ) on 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 the Proposed Development in order to identify areas of importance to birds; and (2) to quantify flight activity within 500 m of proposed turbine locations in order to estimate the likelihood of collision (SNH, 2017ⁱ P.14-19).

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) (SNH, 2017ⁱ P.17);
- 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 (SNH, 2017ⁱ P.17);
- 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 20 m above ground level¹;
- Reconnaissance surveys were undertaken to refine VP locations;
- The VP locations and associated viewsheds are shown in **Figure 9.2**;
- 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 the proposed turbine locations such that no turbine was more than 2 km from a VP. This objective was achieved for the majority of the turbines, although two turbines (T5 and T10) were not covered by any of the viewsheds (**Annex E** details how this is taken into account in the collision modelling);
- A maximum 180° view arc was scanned by surveyors. This rule did not however apply when tracking migratory waterfowl and raptors across the Proposed Development;
- 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 (SNH, 2017ⁱ P.17-18):

- The flightlines by individuals or flocks of birds;
- 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 m⁴) 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. The actual planned rotor height is 25 – 180 m or 45 – 200 m above ground level. This difference is accounted for within the collision risk models on the assumption of even flight distribution within each height band;
- The route followed was plotted in the field onto 1:25,000 scale maps;
- 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 Moorland Breeding Bird Survey

Upland breeding bird survey methodology was employed as detailed within NatureScot guidance (SNH, 2017ⁱ P.11). 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 (1993ⁱⁱ) method for upland bird survey;
- The objectives were to map the distribution of breeding bird territories within 500m of the Proposed Development and estimate the approximate size of breeding bird populations;
- 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.* (2000ⁱⁱⁱ). 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;
- The survey covered all areas within 500 m of the Proposed Development; and
- All upland wader species were recorded during the breeding bird survey.

Timing

- As recommended in Calladine *et al.* (2009^{iv}), four survey visits were undertaken between April and July;
- Fieldwork was undertaken between sunrise and 1800hrs; and

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.

- 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; and
- 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.3 Winter Walkover

Winter walkovers were performed in the non-breeding seasons to map wintering populations of birds within 500m of the Proposed Development.

- 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.

B.4 Scarce Breeding Bird Survey

The aim of the scarce breeding bird surveys was to determine the distribution of occupied nests/territories for target raptor and owl species within 2km of the Proposed Development and record breeding success. Secondary species such as buzzard, sparrowhawk and kestrel were also noted but location of their nests was not the key focus of the surveys.

Surveys were undertaken by experienced and licensed² field ornithologists. Extreme care was taken to avoid unnecessary disturbance to breeding birds.

Guidance from NatureScot (SNH, 2017ⁱ P.11-14), 'Bird Monitoring Methods' (Gilbert *et al.* 1998^v) and 'Raptors: a field guide to survey and monitoring' (Hardey *et al.* 2013^{vi}) were all consulted to inform survey methodology and are referenced where appropriate in the species methodologies below.

Barn Owl

- The surveys followed methodology outlined in Gilbert *et al.* (1998^v), as mentioned in NatureScot guidance (SNH, 2017ⁱ P12-13);

- Surveys were undertaken within 1 km of the Proposed Development; and
- Surveyors checked for signs of occupation (moulted feathers, pellets) in all suitable buildings within this 1 km buffer.

Golden Eagle

Methodology outlined in Hardey *et al.* (2013^{vi}) was used as guidance. Extreme care was taken not to disturb potential nests, especially where nesting was confirmed or during periods of extremely wet, hot or cold conditions (Hardey *et al.* 2013^{vi}).

- All habitats within 2 km of the Proposed Development with the potential to accommodate golden eagle were searched including; Caledonian pine woodland, montane areas, heather moorland, open and unimproved habitat;
- Searches carried out between January and March focussed on watching for territorial displays and nest building activities. Occupancy of the home range was confirmed by seeing two adult birds together, or by seeing one bird incubating in the later months (Hardey *et al.* 2013^{vi});
- When searches of a nesting site were carried out, they were done so from a distance, so as to not cause disturbance to any displaying, nesting or incubating birds; and
- Where breeding was confirmed, scans of the nests were carried out in June, to check for the presence of young. Further scans were carried out in late July to search for fledged young.

Goshawk

Methodology outlined in Hardey *et al.* (2013^{vi}) was used as guidance for the surveying of areas for potential goshawk breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or incubating.

- Areas of suitable woodland were observed for the presence of nests. Searches for goshawk nests were focused on mature forestry blocks, although their presence was not ruled out of other wooded areas;
- Searches carried out between March and April focussed on observing territorial and nest building behaviours;
- Where nests were known to be present, scans were carried out between mid-March and May to confirm breeding. Scans were kept brief – carried out for between 5-10 minutes and from a distance; and
- When breeding was confirmed, searches for further nests were deferred until such a time as the young had hatched. Searches were then undertaken between late May and late June for evidence of provisioning young and then between late July and early August to watch for fledgling activity, this included listening for the begging calls of newly fledged young.

Hen Harrier

Methodology outlined in Hardey *et al.* (2013^{vi}) was used as guidance for the surveying of areas for potential hen harrier breeding. Extreme care was taken not to disturb potential nests especially around the time of year when

² All surveyors hold SNH Schedule 1 Licences.

females were likely to be laying or in cold/wet weather when females were likely to be incubating or brooding. Areas of suitable habitat³ were visited during four time periods across the breeding season to:

- Check for territory occupancy (between March and mid-April) – this consisted of watching over suitable habitat from a good vantage point for displaying males (and females) and checking all areas of suitable habitat to within 250 m (watching out for signs of kills);
- Locate incubating females (between mid-April and late May) by listening for female begging calls and watching for food passes between the male and female – surveyors watched for at least four hours as Hardey *et al.* (2013^{vi}) notes that when the female is incubating it can be up to six hours between feeding visits from the male, but on average it is less than every four hours. Surveys were undertaken between 06:00 to 12:00 or 16:00 to 20:00;
- Check for young or breeding evidence (between late May and late June) again by listening for female begging calls and watching for food passes between male and female when the female is brooding and watching for the male and female provisioning the nest with food once brooding has ended– surveyors should watch for at least two hours as Hardey *et al.* (2013^{vi}) notes that an adult bird will visit the nest every 1-2 hours. Surveyors should also watch for display behaviour which could indicate a failed breeding attempt; and
- Check for fledged young (between late June and late August).

Merlin

Methodology outlined in Hardey *et al.* (2013^{vi}) was used as guidance for the surveying of areas for potential merlin breeding.

- Areas of suitable nesting habitat (including forest edge where trees are >5 m high) were closely observed between 20th March and 30th April;
- Boulders, fence lines, isolated posts, stone dykes, grouse butts, hummocks, stream banks, crags, trees and recently burnt areas of heather were checked for signs of occupation (e.g. plucked prey, moulted feathers, pellets and faeces);
- If merlin were observed, or signs found, areas were visited at least twice to verify occupation of the territory; and
- Potential nest areas were watched for 4-6 hours if necessary.

Osprey

Methodology outlined in Hardey *et al.* (2013^{vi}) and Gilbert *et al.* (1998^v) was used as guidance for the surveying of areas for potential osprey breeding. Care was taken when carrying out the searches so as not to disturb any displaying or nesting birds, with nests checked from a distance.

- All wooded areas within the study area were searched for the possible presence of nests, especially those located close to freshwater lochs and rivers that could provide feeding sites. Artificial platforms were also checked;

- If breeding was suspected within the study area, the location was visited between April and May until nesting was confirmed;
- In line with the methods suggested by Gilbert *et al.* (1998^v) and Hardey *et al.* (2013^{vi}), proof of occupancy was determined by:
 - Two ospreys seen on the same eyrie on more than one occasion (with a week separating observations);
 - Incubation; or
 - Feeding of chicks.
- Further scans were undertaken between late May and early July to try and observe any young in the nests.

Peregrine Falcon

- Potential nest sites were visited and checked for evidence of occupation between March and April;
- Sites checked included crags and steep banks identified from OS maps and searches of the survey area;
- Surveyors checked for signs of occupation (e.g. faecal splash, fresh plucked prey);
- If occupied sites were found they were re-visited to verify incubation; and
- Searches were made for eyries. Where this was not possible sites were watched from a suitable vantage point for 3-4 hours or until a nest was located.

Red Kite

Care was taken not to disturb any birds, especially between mid-March and mid-April when disturbance to displaying red kites can cause them to move to another area (Hardey *et al.* 2013^{vi}).

- Wooded areas were scanned from outside for the presence of nests, with signs occupation searched for between February and March;
- Potential territories were watched for 1-2 hours between March and April to observe any breeding or nest-building behaviour; and
- Where breeding was confirmed, nests were scanned to determine the breeding success between late April and late June/early July.

Short-Eared Owl

- At least two visits between early April and the end of May were carried out;
- Suitable habitat was visited and checked for evidence of hunting males, territorial activity and other signs of presence; and
- If breeding was confirmed, a further visit was made in June to watch birds, locate nest-sites and confirm breeding behaviour wherever possible.

³ Unsuitable habitat areas include: land above 600m; improved pasture and arable land; extensive areas of degraded land with no heather cover and low vegetation; the vicinity of cliffs, rocky outcrops, boulder fields and scree; areas within 100m of hill farms and occupied dwellings.

B.5 Black Grouse Survey

The survey methodology used is detailed in NatureScot guidance (SNH, 2017ⁱ P.12). A summary is provided below.

- Breeding black grouse were surveyed within 1.5 km of the Proposed Development by counting total numbers of males and females at leks, most lekking activity taking place at or soon after dawn in spring.
- 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 black grouse 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
- Leks that were at least 200 m apart within the same year were treated as separate leks.

ⁱ Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms.

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

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

^{iv} 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.

^v Gilbert, G., Gibbons, D. W. and Evans, J. (1998) *Bird Monitoring Methods*. RSPB, Sandy.

^{vi} 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.

ANNEX C. Ornithological Survey Effort & General Information

Table C-1 shows the system used for recording weather conditions on all the surveys (sections C.1 to C.5). Reference source not found. below).

Table C-1 Key to meteorological conditions recorded during all surveys

Wind speed		Rain		Cloud cover		Cloud height			
Calm	0	Moderate gale	7	None	0	In eighths	<150 m		
Light air	1	Fresh gale	8	Drizzle/Mist	1	e.g.	3/8		
Light breeze	2	Strong gale	9	Light showers	2		>500 m		
Gentle breeze	3	Whole gale	10	Heavy showers	3				
Moderate breeze	4	Storm	11	Heavy rain	4				
Fresh breeze	5	Hurricane	12	Snow		Frost		Visibility	
Strong breeze	6			None	0	None	0	Poor (<1 km)	0
				On site	1	Ground	1	Moderate (1-2 km)	1
				High ground	2	All day	2	Good (>2 km)	2

C.1 Flight Activity Surveys

Flight activity surveys were undertaken during the 2021 and 2022 breeding seasons and 2020/2021 and 2021/2022 non-breeding seasons. Details of the flight activity surveys undertaken across each Vantage Point (VP) location are supplied in **Table C-2** (survey hours per VP per season are summarised in **Technical Appendix 9.1 Table 9-1**) and the associated weather data recorded is detailed in **Table C-3**. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-2 Summary of flight activity surveys undertaken at Hill of Fare Wind Farm (sorted chronologically)

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours ¹ surveyed
27/10/2020	2020/2021 NBR	AB	4	1355	1555	2
28/10/2020	2020/2021 NBR	AB	4	0720	0920	2
28/10/2020	2020/2021 NBR	AB	4	0950	1150	2
29/10/2020	2020/2021 NBR	AB	3	0730	1030	3
29/10/2020	2020/2021 NBR	AB	3	1100	1400	3
20/11/2020	2020/2021 NBR	AB	3	0800	0830	0.5
20/11/2020	2020/2021 NBR	AB	3	1000	1230	2.5
23/11/2020	2020/2021 NBR	AB	3	0830	1130	3
23/11/2020	2020/2021 NBR	AB	3	1200	1500	3
24/11/2020	2020/2021 NBR	PS	4	0800	1100	3
24/11/2020	2020/2021 NBR	PS	4	1145	1445	3
26/11/2020	2020/2021 NBR	PS	4	1200	1500	3
15/12/2020	2020/2021 NBR	AB	3	0830	1100	2.5
15/12/2020	2020/2021 NBR	AB	3	1130	1400	2.5
17/12/2020	2020/2021 NBR	AB	4	0830	1100	2.5
17/12/2020	2020/2021 NBR	AB	4	1130	1400	2.5
23/12/2020	2020/2021 NBR	AB	3	1015	1315	3
24/12/2020	2020/2021 NBR	AB	4	1000	1300	3
10/03/2021	2020/2021 NBR	AB	4	0700	1000	3
11/03/2021	2020/2021 NBR	AB	3	0715	1015	3
16/03/2021	2021 BR	AB	3	1130	1430	3

¹ Note: only valid hours (i.e. where visibility was at least 1 km) are presented in this column.

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours ¹ surveyed
16/03/2021	2021 BR	AB	3	1500	1800	3
22/03/2021	2021 BR	AB	4	1015	1315	3
22/03/2021	2021 BR	AB	4	1345	1645	3
07/04/2021	2021 BR	FL	3	1220	1520	3
07/04/2021	2021 BR	FL	4	1600	1800	2
22/04/2021	2021 BR	FL	3	0900	1200	3
22/04/2021	2021 BR	IG	4	0930	1130	2
22/04/2021	2021 BR	FL	4	1500	1700	2
10/05/2021	2021 BR	FL	4	0745	1045	3
28/05/2021	2021 BR	IG	4	0810	1110	3
28/05/2021	2021 BR	FL	3	0840	1055	2.25
28/05/2021	2021 BR	FL	3	1410	1455	0.75
28/05/2021	2021 BR	FL	3	1510	1810	3
08/06/2021	2021 BR	FL	3	1105	1405	3
09/06/2021	2021 BR	FL	4	1730	2030	3
10/06/2021	2021 BR	IG	4	0845	1145	3
16/06/2021	2021 BR	FL	3	1415	1715	3
21/07/2021	2021 BR	IG	4	0815	1115	3
28/07/2021	2021 BR	FL	3	1250	1615	3
29/07/2021	2021 BR	FL	4	0655	0955	3
30/07/2021	2021 BR	FL	3	0615	0915	3
18/08/2021	2021 BR	FL	3	1650	1950	3
18/08/2021	2021 BR	IG	4	1700	2000	3
23/08/2021	2021 BR	IG	3	1030	1330	3
23/08/2021	2021 BR	FL	4	1240	1540	3
13/09/2021	2021/2022 NBR	FL	3	0700	1000	3
13/09/2021	2021/2022 NBR	IG	4	1400	1700	3
14/09/2021	2021/2022 NBR	IG	3	1400	1700	3
15/09/2021	2021/2022 NBR	FL	4	0650	1015	3
08/10/2021	2021/2022 NBR	FL	3	1535	1835	3
15/10/2021	2021/2022 NBR	IG	3	1230	1530	3
20/10/2021	2021/2022 NBR	IG	4	1215	1515	3
25/10/2021	2021/2022 NBR	FL	4	0810	1110	3
10/11/2021	2021/2022 NBR	IG	3	1030	1300	2.5
10/11/2021	2021/2022 NBR	FL	4	1345	1615	2.5
17/11/2021	2021/2022 NBR	FL	4	1115	1345	2.5
17/11/2021	2021/2022 NBR	FL	3	1410	1625	2.25
07/12/2021	2021/2022 NBR	IG	3	0845	1115	2.5
07/12/2021	2021/2022 NBR	FL	4	1045	1315	2.5
13/12/2021	2021/2022 NBR	FL	4	0825	1055	2.5
16/12/2021	2021/2022 NBR	IG	3	1115	1400	2.75
12/01/2022	2021/2022 NBR	IG	4	1100	1330	2.5
12/01/2022	2021/2022 NBR	FL	3	1130	1400	2.5
26/01/2022	2021/2022 NBR	IG	3	1130	1400	2.5
26/01/2022	2021/2022 NBR	FL	4	1220	1450	2.5
09/02/2022	2021/2022 NBR	FL	4	0800	1030	2.5
09/02/2022	2021/2022 NBR	IG	3	1145	1415	2.5
22/02/2022	2021/2022 NBR	FL	3	0850	1120	2.5
24/02/2022	2021/2022 NBR	FL	4	0855	1125	2.5
07/03/2022	2021/2022 NBR	FL	4	0900	1200	3

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours ¹ surveyed
07/03/2022	2021/2022 NBR	IG	3	1230	1530	3
08/03/2022	2021/2022 NBR	IG	3	1020	1320	3
08/03/2022	2021/2022 NBR	FL	4	1410	1710	3
17/03/2022	2022 BR	IG	4	0850	1150	3
17/03/2022	2022 BR	FL	3	1245	1545	3
18/03/2022	2022 BR	FL	4	1140	1440	3
18/03/2022	2022 BR	FL	3	1510	1810	3
08/04/2022	2022 BR	IG	4	0900	1200	3
08/04/2022	2022 BR	FL	3	1220	1520	3
14/04/2022	2022 BR	FL	4	0700	1000	3
25/04/2022	2022 BR	FL	3	1600	1900	3
12/05/2022	2022 BR	IG	4	0815	1115	3
17/05/2022	2022 BR	FL	4	1030	1330	3
17/05/2022	2022 BR	IG	3	1230	1530	3
31/05/2022	2022 BR	FL	3	0810	0850	0.67
31/05/2022	2022 BR	FL	3	1150	1410	2.33
03/06/2022	2022 BR	FL	4	1330	1630	3
09/06/2022	2022 BR	FL	3	1040	1340	3
14/06/2022	2022 BR	FL	4	1815	2115	3
20/06/2022	2022 BR	FL	3	0515	0815	3
05/07/2022	2022 BR	FL	4	1800	2100	3
06/07/2022	2022 BR	FL	3	1700	2000	3
07/07/2022	2022 BR	FL	4	0600	0900	3
10/07/2022	2022 BR	FL	3	1110	1410	3
05/08/2022	2022 BR	FL	4	1345	1645	3
12/08/2022	2022 BR	FL	3	0530	0830	3
25/08/2022	2022 BR	IG	4	1000	1300	3
25/08/2022	2022 BR	FL	3	1350	1650	3

Table C-3 Meteorological conditions during flight activity surveys at Hill of Fare Wind Farm (sorted chronologically)

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
27/10/2020	AB	4	1355	1555	1	1	SE	0	8	2	2	0	0
27/10/2020	AB	4	1355	1555	2	1	SE	0	8	2	2	0	0
28/10/2020	AB	4	0720	0920	1	3	SW	0	6	2	2	0	0
28/10/2020	AB	4	0720	0920	2	3	SW	0	5	2	2	0	0
28/10/2020	AB	4	0950	1150	1	3	SW	0	6	2	2	0	0
28/10/2020	AB	4	0950	1150	2	3	SW	0	7	2	2	0	0
29/10/2020	AB	3	0730	1030	1	1	SW	0	1	2	2	0	0
29/10/2020	AB	3	0730	1030	2	1	SW	0	2	2	2	0	0
29/10/2020	AB	3	0730	1030	3	2	SW	0	4	2	2	0	0
29/10/2020	AB	3	1100	1400	1	1	SW	0	8	2	2	0	0
29/10/2020	AB	3	1100	1400	2	2	SW	0	8	2	2	0	0
29/10/2020	AB	3	1100	1400	3	2	SW	2	8	2	2	0	0
20/11/2020	AB	3	0800	0830	1	3	S	0	8	0	2	1	1
20/11/2020	AB	3	1000	1230	1	3	S	0	8	0	1	1	1
20/11/2020	AB	3	1000	1230	2	3	S	0	8	0	1	1	1
20/11/2020	AB	3	1000	1230	3	3	S	1	8	0	1	1	1
23/11/2020	AB	3	0830	1130	1	4	SW	0	7	2	2	0	0
23/11/2020	AB	3	0830	1130	2	4	SW	0	7	2	2	0	0
23/11/2020	AB	3	0830	1130	3	4	SW	0	6	2	2	0	0
23/11/2020	AB	3	1200	1500	1	4	SW	0	7	2	2	0	0
23/11/2020	AB	3	1200	1500	2	4	SW	0	7	2	2	0	0
23/11/2020	AB	3	1200	1500	3	4	SW	0	8	2	2	0	0
24/11/2020	PS	4	0800	1100	1	4	SSE	0	8	2	2	0	0
24/11/2020	PS	4	0800	1100	2	4	SSE	0	8	2	2	0	0
24/11/2020	PS	4	0800	1100	3	4	SSE	2	8	1	2	0	0
24/11/2020	PS	4	1145	1445	1	4	SE	2	8	2	2	0	0
24/11/2020	PS	4	1145	1445	2	4	SE	1	8	1	2	0	0
24/11/2020	PS	4	1145	1445	3	4	SE	1	8	1	2	0	0
26/11/2020	PS	4	1200	1500	1	3	NW	0	7	2	2	0	0
26/11/2020	PS	4	1200	1500	2	1	NW	0	1	2	2	0	0
26/11/2020	PS	4	1200	1500	3	0	-	0	1	2	2	0	0
15/12/2020	AB	3	0830	1100	1	2	SW	0	7	2	2	0	0
15/12/2020	AB	3	0830	1100	2	2	SW	0	7	2	2	0	0
15/12/2020	AB	3	0830	1100	3	2	SW	0	7	2	2	0	0
15/12/2020	AB	3	1130	1400	1	3	SW	0	8	2	2	0	0
15/12/2020	AB	3	1130	1400	2	2	SW	0	8	2	2	0	0
15/12/2020	AB	3	1130	1400	3	2	SW	0	8	2	2	0	0
17/12/2020	AB	4	0830	1100	1	2	SW	1	2	2	2	0	0
17/12/2020	AB	4	0830	1100	2	2	SW	2	2	2	2	0	0
17/12/2020	AB	4	0830	1100	3	2	SW	1	2	2	2	0	0
17/12/2020	AB	4	1130	1400	1	2	SW	1	2	2	2	0	0
17/12/2020	AB	4	1130	1400	2	2	SW	1	2	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
17/12/2020	AB	4	1130	1400	3	2	SW	1	2	2	2	0	0
23/12/2020	AB	3	1015	1315	1	3	N	0	8	1	1	1	0
23/12/2020	AB	3	1015	1315	2	3	N	0	7	1	2	0	0
23/12/2020	AB	3	1015	1315	3	3	N	0	8	2	2	0	0
24/12/2020	AB	4	1000	1300	1	4	N	2	8	1	1	2	1
24/12/2020	AB	4	1000	1300	2	3	N	0	7	2	2	2	1
24/12/2020	AB	4	1000	1300	3	4	N	0	7	2	2	2	1
10/03/2021	AB	4	0700	1000	1	2	SW	0	3	2	2	1	1
10/03/2021	AB	4	0700	1000	2	2	SW	0	5	2	2	1	1
10/03/2021	AB	4	0700	1000	3	2	SW	0	7	2	2	1	1
11/03/2021	AB	3	0715	1015	1	3	W	0	7	2	2	0	2
11/03/2021	AB	3	0715	1015	2	3	W	0	7	2	2	0	2
11/03/2021	AB	3	0715	1015	3	3	W	0	7	2	2	0	2
16/03/2021	AB	3	1130	1430	1	4	N	0	1	2	2	0	2
16/03/2021	AB	3	1130	1430	2	4	N	0	2	2	2	0	2
16/03/2021	AB	3	1130	1430	3	4	N	0	1	2	2	0	2
16/03/2021	AB	3	1500	1800	1	3	N	0	2	2	2	0	2
16/03/2021	AB	3	1500	1800	2	4	N	0	2	2	2	0	2
16/03/2021	AB	3	1500	1800	3	4	N	0	2	2	2	0	2
22/03/2021	AB	4	1015	1315	1	0	-	0	4	2	2	0	2
22/03/2021	AB	4	1015	1315	2	1	S	0	7	2	2	0	2
22/03/2021	AB	4	1015	1315	3	1	S	0	8	2	2	0	2
22/03/2021	AB	4	1345	1645	1	1	S	0	5	2	2	0	2
22/03/2021	AB	4	1345	1645	2	1	S	0	4	2	2	0	2
22/03/2021	AB	4	1345	1645	3	0	-	0	5	2	2	0	2
07/04/2021	FL	3	1220	1520	1	5	N	0	7	2	2	2	1
07/04/2021	FL	3	1220	1520	2	5	N	2	7	2	2	2	1
07/04/2021	FL	3	1220	1520	3	5	NNW	0	7	2	2	2	1
07/04/2021	FL	4	1600	1800	1	4	NNW	0	7	2	2	2	1
07/04/2021	FL	4	1600	1800	2	3	NW	0	6	2	2	2	1
22/04/2021	FL	3	0900	1200	1	3	N	0	1	2	2	0	0
22/04/2021	FL	3	0900	1200	2	2	N	0	1	2	2	0	0
22/04/2021	FL	3	0900	1200	3	2	N	0	1	2	2	0	0
22/04/2021	IG	4	0930	1130	1	3	W	0	1	2	2	0	0
22/04/2021	IG	4	0930	1130	2	2	W	0	1	2	2	0	0
22/04/2021	FL	4	1500	1700	1	3	E	0	2	2	2	0	0
22/04/2021	FL	4	1500	1700	2	3	E	0	2	2	2	0	0
10/05/2021	FL	4	0745	1045	1	1	E	0	5	2	2	0	0
10/05/2021	FL	4	0745	1045	2	1	E	0	6	2	2	0	0
10/05/2021	FL	4	0745	1045	3	1	E	0	7	2	2	0	0
28/05/2021	IG	4	0810	1110	1	1	NE	0	2	2	2	0	0
28/05/2021	IG	4	0810	1110	2	2	NE	0	2	2	2	0	0
28/05/2021	IG	4	0810	1110	3	2	NE	0	2	1	1	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
28/05/2021	FL	3	0840	1055	1	1	NE	0	3	2	2	0	0
28/05/2021	FL	3	0840	1055	2	1	NE	0	3	2	2	0	0
28/05/2021	FL	3	1410	1455	1	2	E	0	1	2	2	0	0
28/05/2021	FL	3	1510	1810	1	2	SE	0	1	2	2	0	0
28/05/2021	FL	3	1510	1810	2	2	SE	0	1	2	2	0	0
28/05/2021	FL	3	1510	1810	3	2	SE	0	2	2	2	0	0
08/06/2021	FL	3	1105	1405	1	3	SW	0	4	2	2	0	0
08/06/2021	FL	3	1105	1405	2	4	SW	0	6	2	2	0	0
08/06/2021	FL	3	1105	1405	3	3	SW	0	3	2	2	0	0
09/06/2021	FL	4	1730	2030	1	3	S	0	8	2	2	0	0
09/06/2021	FL	4	1730	2030	2	4	S	0	8	2	2	0	0
09/06/2021	FL	4	1730	2030	3	3	S	0	7	2	2	0	0
10/06/2021	IG	4	0845	1145	1	4	SW	0	4	2	2	0	0
10/06/2021	IG	4	0845	1145	2	4	SW	0	5	2	2	0	0
10/06/2021	IG	4	0845	1145	3	5	SW	0	7	2	2	0	0
16/06/2021	FL	3	1415	1715	1	3	SW	0	7	2	2	0	0
16/06/2021	FL	3	1415	1715	2	2	SW	0	7	2	2	0	0
16/06/2021	FL	3	1415	1715	3	2	SW	0	6	2	2	0	0
21/07/2021	IG	4	0815	1115	1	1	E	0	2	1	2	0	0
21/07/2021	IG	4	0815	1115	2	2	E	0	3	1	2	0	0
21/07/2021	IG	4	0815	1115	3	2	E	0	3	1	2	0	0
28/07/2021	FL	3	1250	1615	1	1	ENE	0	8	2	2	0	0
28/07/2021	FL	3	1250	1615	2	1	E	2	8	2	2	0	0
28/07/2021	FL	3	1250	1615	3	1	SE	2	8	2	2	0	0
29/07/2021	FL	4	0655	0955	1	3	N	1	8	1	1	0	0
29/07/2021	FL	4	0655	0955	2	3	N	0	8	1	1	0	0
29/07/2021	FL	4	0655	0955	3	4	N	0	7	1	2	0	0
30/07/2021	FL	3	0615	0915	1	1	N	0	7	2	2	0	0
30/07/2021	FL	3	0615	0915	2	2	N	0	7	2	2	0	0
30/07/2021	FL	3	0615	0915	3	2	N	0	8	2	2	0	0
18/08/2021	FL	3	1650	1950	1	5	NNW	0	6	2	2	0	0
18/08/2021	FL	3	1650	1950	2	3	NNW	0	8	2	2	0	0
18/08/2021	FL	3	1650	1950	3	2	NNW	1	8	2	2	0	0
18/08/2021	IG	4	1700	2000	1	5	NW	0	6	2	2	0	0
18/08/2021	IG	4	1700	2000	2	4	NW	0	7	2	2	0	0
18/08/2021	IG	4	1700	2000	3	4	NW	0	7	1	2	0	0
23/08/2021	IG	3	1030	1330	1	0	-	0	8	1	1	0	0
23/08/2021	IG	3	1030	1330	2	1	NE	0	7	2	2	0	0
23/08/2021	IG	3	1030	1330	3	1	NE	0	7	2	2	0	0
23/08/2021	FL	4	1240	1540	1	0	-	0	7	2	2	0	0
23/08/2021	FL	4	1240	1540	2	0	-	0	7	2	2	0	0
23/08/2021	FL	4	1240	1540	3	1	E	0	7	2	2	0	0
13/09/2021	FL	3	0700	1000	1	0	-	0	7	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
13/09/2021	FL	3	0700	1000	2	1	SW	0	7	2	2	0	0
13/09/2021	FL	3	0700	1000	3	1	SW	0	6	2	2	0	0
13/09/2021	IG	4	1400	1700	1	3	SSE	0	4	2	2	0	0
13/09/2021	IG	4	1400	1700	2	4	SSE	0	3	2	2	0	0
13/09/2021	IG	4	1400	1700	3	4	SSE	0	6	2	2	0	0
14/09/2021	IG	3	1400	1700	1	3	SE	0	8	2	2	0	0
14/09/2021	IG	3	1400	1700	2	4	SE	0	8	2	2	0	0
14/09/2021	IG	3	1400	1700	3	4	SSE	0	8	2	2	0	0
15/09/2021	FL	4	0650	1015	1	0	-	0	7	2	2	0	0
15/09/2021	FL	4	0650	1015	2	0	-	0	7	2	2	0	0
15/09/2021	FL	4	0650	1015	3	0	-	0	8	2	2	0	0
08/10/2021	FL	3	1535	1835	1	2	SSW	0	8	1	2	0	0
08/10/2021	FL	3	1535	1835	2	2	SSW	2	8	2	2	0	0
08/10/2021	FL	3	1535	1835	3	2	SSW	2	8	1	2	0	0
15/10/2021	IG	3	1230	1530	1	4	WNW	0	2	2	2	0	0
15/10/2021	IG	3	1230	1530	2	5	WNW	0	2	2	2	0	0
15/10/2021	IG	3	1230	1530	3	5	WNW	0	3	2	2	0	0
20/10/2021	IG	4	1215	1515	1	5	WSW	0	4	2	2	0	0
20/10/2021	IG	4	1215	1515	2	4	WSW	0	4	2	2	0	0
20/10/2021	IG	4	1215	1515	3	4	W	0	5	2	2	0	0
25/10/2021	FL	4	0810	1110	1	3	SW	0	1	2	2	0	0
25/10/2021	FL	4	0810	1110	2	4	SW	1	1	2	2	0	0
25/10/2021	FL	4	0810	1110	3	4	SW	2	2	2	2	0	0
10/11/2021	IG	3	1030	1300	1	2	SSW	0	5	2	2	0	0
10/11/2021	IG	3	1030	1300	2	3	SW	0	4	2	2	0	0
10/11/2021	IG	3	1030	1300	3	4	WSW	0	5	2	2	0	0
10/11/2021	FL	4	1345	1615	1	2	SSW	0	5	2	2	0	0
10/11/2021	FL	4	1345	1615	2	3	SSW	0	6	2	2	0	0
10/11/2021	FL	4	1345	1615	3	3	SSW	0	4	2	2	0	0
17/11/2021	FL	4	1115	1345	1	3	SW	0	3	2	2	0	0
17/11/2021	FL	4	1115	1345	2	3	SW	0	7	2	2	0	0
17/11/2021	FL	4	1115	1345	3	4	SW	0	7	2	2	0	0
17/11/2021	FL	3	1410	1625	1	2	W	0	3	2	2	0	0
17/11/2021	FL	3	1410	1625	2	2	W	0	7	2	2	0	0
17/11/2021	FL	3	1410	1625	3	2	W	0	7	2	2	0	0
07/12/2021	IG	3	0845	1115	1	0	-	0	8	2	2	0	0
07/12/2021	IG	3	0845	1115	2	1	SE	0	6	2	2	0	0
07/12/2021	IG	3	0845	1115	3	2	SE	0	6	2	2	0	0
07/12/2021	FL	4	1045	1315	1	1	E	0	8	2	2	2	2
07/12/2021	FL	4	1045	1315	2	2	SE	0	8	2	2	2	2
07/12/2021	FL	4	1045	1315	3	3	SE	0	8	2	2	2	2
13/12/2021	FL	4	0825	1055	1	1	S	0	7	2	2	0	2
13/12/2021	FL	4	0825	1055	2	1	S	0	6	2	2	0	2

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
13/12/2021	FL	4	0825	1055	3	0	-	0	4	2	2	0	2
16/12/2021	IG	3	1115	1400	1	1	SSW	0	7	2	2	0	0
16/12/2021	IG	3	1115	1400	2	2	SW	0	6	2	2	0	0
16/12/2021	IG	3	1115	1400	3	3	SW	0	5	2	2	0	0
12/01/2022	IG	4	1100	1330	1	4	W	0	8	2	2	0	0
12/01/2022	IG	4	1100	1330	2	4	W	0	7	2	2	0	0
12/01/2022	IG	4	1100	1330	3	4	W	0	8	2	2	0	0
12/01/2022	FL	3	1130	1400	1	5	W	0	7	2	2	0	0
12/01/2022	FL	3	1130	1400	2	5	W	0	7	2	2	0	0
12/01/2022	FL	3	1130	1400	3	5	NW	0	7	2	2	0	0
26/01/2022	IG	3	1130	1400	1	4	SW	0	6	2	2	0	0
26/01/2022	IG	3	1130	1400	2	5	SW	0	7	2	2	0	0
26/01/2022	IG	3	1130	1400	3	4	SW	0	7	2	2	0	0
26/01/2022	FL	4	1220	1450	1	3	S	0	8	2	2	0	0
26/01/2022	FL	4	1220	1450	2	3	S	0	7	2	2	0	0
26/01/2022	FL	4	1220	1450	3	4	SW	0	7	2	2	0	0
09/02/2022	FL	4	0800	1030	1	5	SW	0	0	2	2	0	0
09/02/2022	FL	4	0800	1030	2	5	SW	0	0	2	2	0	0
09/02/2022	FL	4	0800	1030	3	5	SW	0	0	2	2	0	0
09/02/2022	IG	3	1145	1415	1	4	W	0	2	2	2	0	0
09/02/2022	IG	3	1145	1415	2	5	W	0	2	2	2	0	0
09/02/2022	IG	3	1145	1415	3	4	W	0	1	2	2	0	0
22/02/2022	FL	3	0850	1120	1	4	NW	0	2	2	2	1	1
22/02/2022	FL	3	0850	1120	2	5	NW	0	2	2	2	1	1
22/02/2022	FL	3	0850	1120	3	5	NW	0	8	2	2	0	1
24/02/2022	FL	4	0855	1125	1	3	SW	0	3	2	2	1	1
24/02/2022	FL	4	0855	1125	2	4	SW	0	2	2	2	1	1
24/02/2022	FL	4	0855	1125	3	5	SW	0	4	2	2	1	1
07/03/2022	FL	4	0900	1200	1	2	S	0	0	2	2	1	0
07/03/2022	FL	4	0900	1200	2	2	S	0	1	2	2	1	0
07/03/2022	FL	4	0900	1200	3	2	S	0	2	2	2	0	0
07/03/2022	IG	3	1230	1530	1	3	S	0	3	2	2	0	0
07/03/2022	IG	3	1230	1530	2	3	S	0	2	2	2	0	0
07/03/2022	IG	3	1230	1530	3	4	SSE	0	3	2	2	0	0
08/03/2022	IG	3	1020	1320	1	5	S	0	8	1	2	0	0
08/03/2022	IG	3	1020	1320	2	6	SSE	0	6	2	2	0	0
08/03/2022	IG	3	1020	1320	3	6	SSE	0	6	2	2	0	0
08/03/2022	FL	4	1410	1710	1	5	SE	0	6	2	2	0	0
08/03/2022	FL	4	1410	1710	2	5	SE	0	7	2	1	0	0
08/03/2022	FL	4	1410	1710	3	6	SE	0	4	2	1	0	0
17/03/2022	IG	4	0850	1150	1	3	SSW	0	3	2	2	0	0
17/03/2022	IG	4	0850	1150	2	5	S	0	4	2	2	0	0
17/03/2022	IG	4	0850	1150	3	5	S	0	4	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
17/03/2022	FL	3	1245	1545	1	4	SSW	0	3	2	2	0	0
17/03/2022	FL	3	1245	1545	2	5	SW	0	3	2	2	0	0
17/03/2022	FL	3	1245	1545	3	5	SW	0	3	2	2	0	0
18/03/2022	FL	4	1140	1440	1	4	S	0	6	2	2	0	0
18/03/2022	FL	4	1140	1440	2	4	S	0	6	2	2	0	0
18/03/2022	FL	4	1140	1440	3	5	S	0	6	2	2	0	0
18/03/2022	FL	3	1510	1810	1	4	S	0	7	2	2	0	0
18/03/2022	FL	3	1510	1810	2	3	SE	0	7	2	1	0	0
18/03/2022	FL	3	1510	1810	3	5	SE	0	6	2	1	0	0
08/04/2022	IG	4	0900	1200	1	4	NW	0	6	2	2	0	1
08/04/2022	IG	4	0900	1200	2	5	NW	0	7	1	1	0	1
08/04/2022	IG	4	0900	1200	3	5	NW	0	7	2	2	0	1
08/04/2022	FL	3	1220	1520	1	4	NNW	0	2	2	2	0	0
08/04/2022	FL	3	1220	1520	2	5	NNW	0	3	2	2	0	0
08/04/2022	FL	3	1220	1520	3	6	NNW	0	3	2	2	0	0
14/04/2022	FL	4	0700	1000	1	0	-	0	8	2	2	0	0
14/04/2022	FL	4	0700	1000	2	0	-	0	8	2	2	0	0
14/04/2022	FL	4	0700	1000	3	0	-	0	8	2	2	0	0
25/04/2022	FL	3	1600	1900	1	0	-	0	8	2	2	0	0
25/04/2022	FL	3	1600	1900	2	0	-	0	8	2	2	0	0
25/04/2022	FL	3	1600	1900	3	1	NE	0	8	2	2	0	0
12/05/2022	IG	4	0815	1115	1	3	W	0	6	2	2	0	0
12/05/2022	IG	4	0815	1115	2	4	W	0	7	2	2	0	0
12/05/2022	IG	4	0815	1115	3	4	W	0	6	2	2	0	0
17/05/2022	FL	4	1030	1330	1	2	S	0	5	2	2	0	0
17/05/2022	FL	4	1030	1330	2	3	S	0	4	2	2	0	0
17/05/2022	FL	4	1030	1330	3	2	S	0	6	2	2	0	0
17/05/2022	IG	3	1230	1530	1	3	S	0	3	2	2	0	0
17/05/2022	IG	3	1230	1530	2	4	S	0	7	2	2	0	0
17/05/2022	IG	3	1230	1530	3	4	S	0	6	2	2	0	0
31/05/2022	FL	3	0810	0850	1	1	N	0	8	1	1	0	0
31/05/2022	FL	3	1150	1410	1	1	N	2	8	2	2	0	0
31/05/2022	FL	3	1150	1410	2	2	N	2	7	2	2	0	0
31/05/2022	FL	3	1150	1410	3	1	E	2	6	2	2	0	0
03/06/2022	FL	4	1330	1630	1	2	ENE	0	4	2	2	0	0
03/06/2022	FL	4	1330	1630	2	2	ENE	0	3	2	2	0	0
03/06/2022	FL	4	1330	1630	3	3	ENE	0	2	2	2	0	0
09/06/2022	FL	3	1040	1340	1	3	SE	0	7	2	2	0	0
09/06/2022	FL	3	1040	1340	2	2	SE	0	7	2	2	0	0
09/06/2022	FL	3	1040	1340	3	3	SE	0	7	2	2	0	0
14/06/2022	FL	4	1815	2115	1	2	SW	0	7	2	2	0	0
14/06/2022	FL	4	1815	2115	2	2	SW	0	8	2	2	0	0
14/06/2022	FL	4	1815	2115	3	2	SW	0	8	2	2	0	0

Date	Observer	VP	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
20/06/2022	FL	3	0515	0815	1	1	NW	0	0	2	2	0	0
20/06/2022	FL	3	0515	0815	2	1	NW	0	1	2	2	0	0
20/06/2022	FL	3	0515	0815	3	0	NW	0	1	2	2	0	0
05/07/2022	FL	4	1800	2100	1	2	S	0	7	2	2	0	0
05/07/2022	FL	4	1800	2100	2	1	S	2	6	2	2	0	0
05/07/2022	FL	4	1800	2100	3	1	S	0	7	2	2	0	0
06/07/2022	FL	3	1700	2000	1	4	NW	2	8	2	2	0	0
06/07/2022	FL	3	1700	2000	2	5	NW	0	7	2	2	0	0
06/07/2022	FL	3	1700	2000	3	4	NW	0	7	2	2	0	0
07/07/2022	FL	4	0600	0900	1	3	NW	0	6	1	2	0	0
07/07/2022	FL	4	0600	0900	2	3	NW	0	5	2	2	0	0
07/07/2022	FL	4	0600	0900	3	2	W	0	4	2	2	0	0
10/07/2022	FL	3	1110	1410	1	1	E	0	0	2	2	0	0
10/07/2022	FL	3	1110	1410	2	1	NE	0	0	2	2	0	0
10/07/2022	FL	3	1110	1410	3	2	E	0	1	2	2	0	0
05/08/2022	FL	4	1345	1645	1	3	NW	0	4	2	2	0	0
05/08/2022	FL	4	1345	1645	2	3	NW	2	5	2	2	0	0
05/08/2022	FL	4	1345	1645	3	3	NW	2	4	2	2	0	0
12/08/2022	FL	3	0530	0830	1	1	E	0	4	2	2	0	0
12/08/2022	FL	3	0530	0830	2	1	E	0	3	2	2	0	0
12/08/2022	FL	3	0530	0830	3	2	E	0	3	2	2	0	0
25/08/2022	IG	4	1000	1300	1	3	SW	0	3	2	2	0	0
25/08/2022	IG	4	1000	1300	2	3	SW	0	4	2	2	0	0
25/08/2022	IG	4	1000	1300	3	3	SW	0	6	2	2	0	0
25/08/2022	FL	3	1350	1650	1	1	W	0	7	2	2	0	0
25/08/2022	FL	3	1350	1650	2	2	W	0	7	2	2	0	0
25/08/2022	FL	3	1350	1650	3	2	W	0	7	2	2	0	0

C.2 Moorland Breeding Bird Surveys

Moorland breeding bird surveys were undertaken during the 2021 and 2022 breeding seasons. **Table C-4** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-4 Meteorological conditions during breeding bird surveys at Hill of Fare Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
21/04/2021	1	FL	1000	1600	1	3	NE	0	2	2	2	0	0
21/04/2021	1	IG	1000	1600	1	2	W	0	1	2	2	0	0
21/04/2021	1	FL	1000	1600	2	2	NE	0	2	2	2	0	0
21/04/2021	1	IG	1000	1600	2	2	W	0	1	2	2	0	0
21/04/2021	1	FL	1000	1600	3	2	NE	0	2	2	2	0	0
21/04/2021	1	IG	1000	1600	3	3	SW	0	1	2	2	0	0
21/04/2021	1	FL	1000	1600	4	2	NE	0	2	2	2	0	0
21/04/2021	1	IG	1000	1600	4	3	SW	0	1	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
21/04/2021	1	FL	1000	1600	5	2	E	0	2	2	2	0	0
21/04/2021	1	IG	1000	1600	5	3	SW	0	2	2	2	0	0
21/04/2021	1	FL	1000	1600	6	2	E	0	1	2	2	0	0
21/04/2021	1	IG	1000	1600	6	3	SE	0	2	2	2	0	0
22/04/2021	1	FL	1230	1430	1	2	N	0	1	2	2	0	0
22/04/2021	1	FL	1230	1430	2	2	N	0	1	2	2	0	0
25/05/2021	2	IG	1400	1700	1	3	NE	0	8	2	2	0	0
25/05/2021	2	IG	1400	1700	2	3	NE	0	8	2	2	0	0
25/05/2021	2	IG	1400	1700	3	3	NE	0	8	2	2	0	0
25/05/2021	2	FL	1435	1735	1	2	N	0	7	2	2	0	0
25/05/2021	2	FL	1435	1735	2	2	N	0	8	2	2	0	0
25/05/2021	2	FL	1435	1735	3	2	N	0	7	2	2	0	0
26/05/2021	2	FL	1415	1715	1	3	N	0	8	2	2	0	0
26/05/2021	2	FL	1415	1715	2	3	N	0	7	2	2	0	0
26/05/2021	2	FL	1415	1715	3	3	N	0	7	2	2	0	0
28/05/2021	2	FL	1100	1400	1	1	E	0	4	1	2	0	0
28/05/2021	2	FL	1100	1400	2	1	SE	0	1	2	2	0	0
28/05/2021	2	FL	1100	1400	3	1	SE	0	1	2	2	0	0
28/05/2021	2	IG	1130	1300	1	2	N	0	2	2	2	0	0
28/05/2021	2	IG	1130	1300	2	3	N	0	1	2	2	0	0
08/06/2021	3	IG	1345	1645	1	3	SW	0	5	2	2	0	0
08/06/2021	3	IG	1345	1645	2	3	SW	0	5	2	2	0	0
08/06/2021	3	IG	1345	1645	3	4	SW	0	6	2	2	0	0
08/06/2021	3	FL	1440	1740	1	3	SW	0	5	2	2	0	0
08/06/2021	3	FL	1440	1740	2	2	SW	0	6	2	2	0	0
08/06/2021	3	FL	1440	1740	3	2	SW	0	7	2	2	0	0
10/06/2021	3	IG	1230	1530	1	4	SW	0	6	2	2	0	0
10/06/2021	3	IG	1230	1530	2	5	WSW	0	4	2	2	0	0
10/06/2021	3	IG	1230	1530	3	5	WSW	0	4	2	2	0	0
10/06/2021	3	FL	1235	1535	1	3	S	0	7	2	2	0	0
10/06/2021	3	FL	1235	1535	2	3	S	0	7	2	2	0	0
10/06/2021	3	FL	1235	1535	3	4	S	0	7	2	2	0	0
16/06/2021	3	FL	1050	1350	1	2	SW	0	7	2	2	0	0
16/06/2021	3	FL	1050	1350	2	2	SW	0	7	2	2	0	0
16/06/2021	3	FL	1050	1350	3	2	SW	0	6	2	2	0	0
16/06/2021	3	IG	1530	1630	1	3	SW	0	7	2	2	0	0
08/07/2021	4	FL	1000	1600	1	2	SE	0	7	2	2	0	0
08/07/2021	4	IG	1000	1600	1	2	SE	0	7	2	2	0	0
08/07/2021	4	FL	1000	1600	2	2	SE	0	6	2	2	0	0
08/07/2021	4	IG	1000	1600	2	2	SE	0	7	2	2	0	0
08/07/2021	4	FL	1000	1600	3	2	SE	0	7	2	2	0	0
08/07/2021	4	IG	1000	1600	3	2	SE	0	7	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
08/07/2021	4	FL	1000	1600	4	2	SE	0	7	2	2	0	0
08/07/2021	4	IG	1000	1600	4	2	SE	0	8	2	2	0	0
08/07/2021	4	FL	1000	1600	5	2	SE	0	7	2	2	0	0
08/07/2021	4	IG	1000	1600	5	2	SE	0	8	2	2	0	0
08/07/2021	4	FL	1000	1600	6	2	SE	0	8	2	2	0	0
08/07/2021	4	IG	1000	1600	6	2	SE	0	8	2	2	0	0
25/04/2022	5	IG	1000	1600	1	2	ENE	0	8	2	2	0	0
25/04/2022	5	IG	1000	1600	2	1	ENE	0	8	2	2	0	0
25/04/2022	5	IG	1000	1600	3	2	E	0	7	2	2	0	0
25/04/2022	5	IG	1000	1600	4	2	E	0	7	2	2	0	0
25/04/2022	5	IG	1000	1600	5	2	E	0	6	2	2	0	0
25/04/2022	5	IG	1000	1600	6	2	E	0	6	2	2	0	0
25/04/2022	5	FL	1045	1530	1	1	NE	0	7	2	2	0	0
25/04/2022	5	FL	1045	1530	2	1	NE	0	7	2	2	0	0
25/04/2022	5	FL	1045	1530	3	0	-	0	7	2	2	0	0
25/04/2022	5	FL	1045	1530	4	0	-	0	8	2	2	0	0
25/04/2022	5	FL	1045	1530	5	0	-	0	8	2	2	0	0
27/04/2022	5	FL	0830	1200	1	0	-	0	3	2	2	0	0
27/04/2022	5	FL	0830	1200	2	0	-	0	7	2	2	0	0
27/04/2022	5	FL	0830	1200	3	1	SW	0	3	2	2	0	0
27/04/2022	5	FL	0830	1200	4	1	SW	0	3	2	2	0	0
11/05/2022	6	FL	1500	1800	1	4	NW	0	6	2	2	0	0
11/05/2022	6	FL	1500	1800	2	3	NW	0	4	2	2	0	0
11/05/2022	6	FL	1500	1800	3	2	W	0	2	2	2	0	0
12/05/2022	6	FL	0900	1300	1	2	SW	0	7	2	2	0	0
12/05/2022	6	FL	0900	1300	2	3	SW	0	6	2	2	0	0
12/05/2022	6	FL	0900	1300	3	2	SW	0	4	2	2	0	0
12/05/2022	6	FL	0900	1300	4	3	SW	0	6	2	2	0	0
17/05/2022	6	FL	0950	1030	1	1	S	0	5	2	2	0	0
17/05/2022	6	FL	1330	1540	1	2	S	0	6	2	2	0	0
17/05/2022	6	FL	1330	1540	2	2	S	0	6	2	2	0	0
31/05/2022	6	FL	1430	1615	1	2	E	0	6	2	2	0	0
31/05/2022	6	FL	1430	1615	2	2	E	0	6	2	2	0	0
03/06/2022	7	IG	1030	1330	1	2	NE	0	3	2	2	0	0
03/06/2022	7	FL	1030	1315	1	2	NE	0	4	2	2	0	0
03/06/2022	7	IG	1030	1330	2	2	NE	0	4	2	2	0	0
03/06/2022	7	FL	1030	1315	2	1	ENE	0	4	2	2	0	0
03/06/2022	7	IG	1030	1330	3	2	NE	0	4	2	2	0	0
03/06/2022	7	FL	1030	1315	3	1	ENE	0	4	2	2	0	0
09/06/2022	7	IG	1015	1315	1	3	S	0	8	2	2	0	0
09/06/2022	7	IG	1015	1315	2	3	S	0	8	2	2	0	0
09/06/2022	7	IG	1015	1315	3	3	S	0	7	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
09/06/2022	7	FL	1415	1625	1	3	S	0	7	2	2	0	0
09/06/2022	7	FL	1415	1625	2	3	SW	0	6	2	2	0	0
14/06/2022	7	FL	1500	1800	1	2	SW	2	8	2	2	0	0
14/06/2022	7	FL	1500	1800	2	2	SW	0	8	2	2	0	0
14/06/2022	7	FL	1500	1800	3	2	SW	0	8	2	2	0	0
05/07/2022	8	FL	1530	1800	1	1	S	0	7	2	2	0	0
05/07/2022	8	FL	1530	1800	2	2	S	0	6	2	2	0	0
05/07/2022	8	FL	1530	1800	3	2	S	0	7	2	2	0	0
06/07/2022	8	FL	1400	1645	1	4	W	0	5	2	2	0	0
06/07/2022	8	FL	1400	1645	2	3	W	0	6	2	2	0	0
06/07/2022	8	FL	1400	1645	3	3	W	0	8	2	2	0	0
07/07/2022	8	FL	0900	1230	1	2	W	0	2	2	2	0	0
07/07/2022	8	FL	0900	1230	2	1	SW	0	1	2	2	0	0
07/07/2022	8	FL	0900	1230	3	1	SW	0	1	2	2	0	0
07/07/2022	8	FL	0900	1230	4	1	SW	0	1	2	2	0	0
10/07/2022	8	FL	0940	1055	1	1	NE	0	0	2	2	0	0
10/07/2022	8	FL	0940	1055	2	1	E	0	0	2	2	0	0
10/07/2022	8	FL	1425	1725	1	2	E	0	1	2	2	0	0
10/07/2022	8	FL	1425	1725	2	2	E	0	1	2	2	0	0
10/07/2022	8	FL	1425	1725	3	2	E	0	2	2	2	0	0

C.3 Winter Walkover Surveys

Winter walkover surveys were undertaken during the 2020/2021 and 2021/2022 non-breeding seasons. **Table C-5** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-5 Meteorological conditions during winter walkover surveys at Hill of Fare Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
16/11/2020	1	AB	1445	1545	1	2	SW	0	4	2	2	0	0
19/11/2020	1	AB	1415	1515	1	4	NW	0	2	2	2	0	1
23/11/2020	1	AB	1400	1600	1	3	N	0	8	2	2	0	0
23/11/2020	1	AB	1400	1600	2	3	N	0	3	2	2	0	0
25/11/2020	1	PS	0830	1430	1	3	W	0	2	2	2	0	0
25/11/2020	1	PS	0830	1430	2	3	SW	0	1	2	2	0	0
25/11/2020	1	PS	0830	1430	3	2	SW	0	0	2	2	0	0
25/11/2020	1	PS	0830	1430	4	0	-	0	0	2	2	0	0
25/11/2020	1	PS	0830	1430	5	2	W	0	0	2	2	0	0
25/11/2020	1	PS	0830	1430	6	0	-	0	0	2	2	0	0
26/11/2020	1	AB	1500	1600	1	1	S	0	1	2	2	0	0
27/11/2020	1	AB	1100	1300	1	1	S	0	1	2	2	0	0
27/11/2020	1	AB	1100	1300	2	1	S	0	2	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
24/12/2020	2	AB	1400	1600	1	4	N	0	7	2	2	2	1
24/12/2020	2	AB	1400	1600	2	4	N	0	8	2	2	2	1
10/03/2021	3	AB	1015	1615	1	3	SW	0	6	2	2	1	1
10/03/2021	3	AB	1015	1615	2	3	SW	0	7	2	2	0	1
10/03/2021	3	AB	1015	1615	3	4	S	0	7	2	2	0	1
10/03/2021	3	AB	1015	1615	4	4	S	0	6	2	2	0	1
10/03/2021	3	AB	1015	1615	5	3	S	2	8	2	2	0	1
10/03/2021	3	AB	1015	1615	6	3	S	1	8	2	2	0	1
11/03/2021	3	AB	1030	1630	1	3	W	0	8	2	2	0	2
11/03/2021	3	AB	1030	1630	2	3	W	0	8	2	2	0	2
11/03/2021	3	AB	1030	1630	3	3	W	0	8	2	2	0	2
11/03/2021	3	AB	1030	1630	4	3	W	0	8	2	2	0	2
11/03/2021	3	AB	1030	1630	5	3	W	0	7	2	2	0	2
11/03/2021	3	AB	1030	1630	6	3	W	0	6	2	2	0	2
13/09/2021	4	IG	1700	2000	1	3	SSE	0	7	2	2	0	0
13/09/2021	4	IG	1700	2000	2	2	SSE	0	7	2	2	0	0
13/09/2021	4	IG	1700	2000	3	1	SSE	0	7	2	2	0	0
13/09/2021	4	FL	1705	2005	1	2	SSW	0	2	2	2	0	0
13/09/2021	4	FL	1705	2005	2	2	SSW	0	4	2	2	0	0
13/09/2021	4	FL	1705	2005	3	1	SSW	0	5	2	2	0	0
14/09/2021	4	FL	1645	1945	1	1	S	0	8	2	2	0	0
14/09/2021	4	FL	1645	1945	2	0	-	0	8	2	2	0	0
14/09/2021	4	FL	1645	1945	3	0	-	0	8	2	2	0	0
14/09/2021	4	IG	1700	2000	1	4	S	0	8	2	2	0	0
14/09/2021	4	IG	1700	2000	2	3	S	0	8	1	2	0	0
14/09/2021	4	IG	1700	2000	3	3	SE	0	8	1	2	0	0
15/10/2021	5	FL	1300	1415	1	2	NW	0	1	2	2	0	0
15/10/2021	5	FL	1445	1530	1	2	NW	0	3	2	2	0	0
15/10/2021	5	FL	1530	1830	1	1	NW	0	3	2	2	0	0
15/10/2021	5	IG	1530	1830	1	3	WNW	0	4	2	2	0	0
15/10/2021	5	FL	1530	1830	2	1	NW	0	7	2	2	0	0
15/10/2021	5	IG	1530	1830	2	4	WNW	0	6	2	2	0	0
15/10/2021	5	FL	1530	1830	3	1	NW	0	7	2	2	0	0
15/10/2021	5	IG	1530	1830	3	4	WNW	0	8	2	2	0	0
20/10/2021	5	IG	1530	1830	1	4	W	0	3	2	2	0	0
20/10/2021	5	IG	1530	1830	2	4	WNW	0	5	2	2	0	0
20/10/2021	5	IG	1530	1830	3	5	WNW	1	8	1	1	0	0
20/10/2021	5	FL	1715	1800	1	2	W	2	8	1	2	0	0
10/11/2021	6	FL	1045	1315	1	1	SW	0	4	2	2	0	0
10/11/2021	6	FL	1045	1315	2	1	SW	0	3	2	2	0	0
10/11/2021	6	FL	1045	1315	3	2	SW	0	5	2	2	0	0
10/11/2021	6	IG	1330	1700	1	3	WSW	0	6	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
10/11/2021	6	IG	1330	1700	2	3	WSW	0	6	2	2	0	0
10/11/2021	6	IG	1330	1700	3	3	SW	0	5	2	2	0	0
10/11/2021	6	IG	1330	1700	4	2	SW	0	5	2	2	0	0
16/11/2021	6	FL	1520	1620	1	4	SW	0	7	2	2	0	0
17/11/2021	6	IG	1030	1330	1	3	SW	0	3	2	2	0	0
17/11/2021	6	IG	1030	1330	2	3	SW	0	4	2	2	0	0
17/11/2021	6	IG	1030	1330	3	3	SW	0	4	2	2	0	0
17/11/2021	6	IG	1330	1630	1	3	SW	0	5	2	2	0	0
17/11/2021	6	IG	1330	1630	2	3	SW	0	5	2	2	0	0
17/11/2021	6	IG	1330	1630	3	3	SW	0	6	2	2	0	0
07/12/2021	7	FL	0900	1030	1	0	-	0	8	2	2	2	2
07/12/2021	7	FL	0900	1030	2	0	-	0	8	2	2	2	2
07/12/2021	7	IG	1115	1330	1	2	SE	0	7	2	2	0	0
07/12/2021	7	IG	1115	1330	2	3	SE	0	8	2	2	0	0
07/12/2021	7	IG	1115	1330	3	3	SE	0	8	1	2	0	0
16/12/2021	7	FL	1200	1615	1	2	SSW	0	2	2	2	0	0
16/12/2021	7	FL	1200	1615	2	1	SSW	0	3	2	2	0	0
16/12/2021	7	FL	1200	1615	3	0	-	0	4	2	2	0	0
16/12/2021	7	FL	1200	1615	4	0	-	0	4	2	2	0	0
16/12/2021	7	IG	1400	1615	1	3	SW	0	6	2	2	0	0
16/12/2021	7	IG	1400	1615	2	3	WSW	0	7	2	2	0	0
16/12/2021	7	IG	1400	1615	3	3	WSW	0	7	2	2	0	0
18/12/2021	7	FL	1445	1600	1	0	-	0	0	2	2	1	0
18/12/2021	7	FL	1445	1600	2	0	-	0	0	2	2	1	0
12/01/2022	8	IG/FL	1345	1645	1	3	W	0	0	2	2	0	0
12/01/2022	8	IG/FL	1345	1645	2	3	W	0	0	2	2	0	0
12/01/2022	8	IG/FL	1345	1645	3	3	W	0	0	2	2	0	0
26/01/2022	8	FL	1145	1215	1	3	S	0	4	2	2	0	0
26/01/2022	8	IG	1400	1700	1	4	SW	0	6	2	2	0	0
26/01/2022	8	IG	1400	1700	2	5	SW	0	7	2	2	0	0
26/01/2022	8	IG	1400	1700	3	3	SW	0	7	2	2	0	0
26/01/2022	8	FL	1535	1720	2	2	SW	0	4	2	2	0	0
26/01/2022	8	FL	1535	1720	3	2	SW	0	4	2	2	0	0
09/02/2022	9	IG	0815	1115	1	5	SW	0	2	2	2	0	0
09/02/2022	9	IG	0815	1115	2	4	SW	0	2	2	2	0	0
09/02/2022	9	IG	0815	1115	3	5	SW	0	3	2	2	0	0
09/02/2022	9	FL	1150	1420	1	5	SW	0	0	2	2	1	0
09/02/2022	9	FL	1150	1420	2	5	SW	0	0	2	2	1	0
09/02/2022	9	FL	1150	1420	3	4	SW	0	0	2	2	1	0
22/02/2022	9	FL	0800	845	1	4	NW	0	1	2	2	1	1
22/02/2022	9	FL	1125	1210	2	5	NW	0	8	2	2	0	1

C.4 Scarce Breeding Bird Surveys

Scarce breeding bird surveys were undertaken during the 2021 and 2022 breeding seasons. **Table C-6** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-6 Meteorological conditions during scarce breeding bird surveys at Hill of Fare Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
16/03/2021	1	AB	0730	1030	1	2	W	1	8	2	2	0	2
16/03/2021	1	AB	0730	1030	2	3	W	0	7	2	2	0	2
16/03/2021	1	AB	0730	1030	3	3	W	0	1	2	2	0	2
17/03/2021	1	AB	0600	1500	1	1	N	0	8	2	2	0	0
17/03/2021	1	AB	0600	1500	2	1	N	0	7	2	2	0	0
17/03/2021	1	AB	0600	1500	3	1	N	0	8	2	2	0	0
17/03/2021	1	AB	0600	1500	4	1	N	0	4	2	2	0	0
17/03/2021	1	AB	0600	1500	5	1	N	0	7	2	2	0	0
17/03/2021	1	AB	0600	1500	6	2	N	0	6	2	2	0	0
17/03/2021	1	AB	0600	1500	7	1	N	0	6	2	2	0	0
17/03/2021	1	AB	0600	1500	8	1	N	0	6	2	2	0	0
17/03/2021	1	AB	0600	1500	9	1	N	0	4	2	2	0	0
22/03/2021	1	AB	1700	1800	1	0	-	0	6	2	2	0	0
23/03/2021	1	AB	0545	1045	1	1	S	0	8	2	2	0	0
23/03/2021	1	AB	0545	1045	2	1	S	0	6	2	2	0	0
23/03/2021	1	AB	0545	1045	3	1	S	0	5	2	2	0	0
23/03/2021	1	AB	0545	1045	4	2	S	0	3	2	2	0	0
23/03/2021	1	AB	0545	1045	5	2	S	0	5	2	2	0	0
01/04/2021	2	FL	0930	1530	1	3	NW	0	8	2	2	0	0
01/04/2021	2	IG	0930	1530	1	3	NW	0	8	2	2	0	0
01/04/2021	2	FL	0930	1530	2	3	NW	0	8	2	2	0	0
01/04/2021	2	IG	0930	1530	2	3	NW	0	6	2	2	0	0
01/04/2021	2	FL	0930	1530	3	2	NW	0	6	2	2	0	0
01/04/2021	2	IG	0930	1530	3	3	NW	0	5	2	2	0	0
01/04/2021	2	FL	0930	1530	4	2	NW	0	5	2	2	0	0
01/04/2021	2	IG	0930	1530	4	2	NW	0	4	2	2	0	0
01/04/2021	2	FL	0930	1530	5	2	NW	0	4	2	2	0	0
01/04/2021	2	IG	0930	1530	5	2	NW	0	3	2	2	0	0
01/04/2021	2	FL	0930	1530	6	2	NW	0	3	2	2	0	0
01/04/2021	2	IG	0930	1530	6	2	NW	0	3	2	2	0	0
07/04/2021	2	IG	1100	1800	1	3	N	0	8	2	2	0	1
07/04/2021	2	IG	1100	1800	2	3	N	0	7	2	2	0	1
07/04/2021	2	IG	1100	1800	3	5	NW	0	7	2	2	0	1
07/04/2021	2	IG	1100	1800	4	3	NW	0	7	2	2	0	1
07/04/2021	2	IG	1100	1800	5	3	NW	0	7	2	2	0	1
07/04/2021	2	IG	1100	1800	6	3	NW	0	7	2	2	0	1
07/04/2021	2	IG	1100	1800	7	3	NW	0	7	2	2	0	1

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
08/04/2021	2	FL	0830	1100	1	4	W	0	5	2	2	0	0
08/04/2021	2	FL	0830	1100	2	4	W	0	5	2	2	0	0
08/04/2021	2	FL	0830	1100	3	4	W	0	5	2	2	0	0
22/04/2021	2	IG	1130	1630	1	2	SW	0	2	2	2	0	0
22/04/2021	2	IG	1130	1630	2	3	S	0	2	2	2	0	0
22/04/2021	2	IG	1130	1630	3	3	S	0	1	2	2	0	0
22/04/2021	2	IG	1130	1630	4	2	SE	0	1	2	2	0	0
22/04/2021	2	IG	1130	1630	5	2	SE	0	1	2	2	0	0
26/04/2021	2	FL	0800	1300	1	0	-	0	8	2	2	0	0
26/04/2021	2	FL	0800	1300	2	0	-	0	8	2	2	0	0
26/04/2021	2	FL	0800	1300	3	1	SW	2	8	2	1	0	0
26/04/2021	2	FL	0800	1300	4	1	SW	0	7	2	2	0	0
26/04/2021	2	FL	0800	1300	5	2	SW	0	8	2	2	0	0
07/05/2021	3	FL	0800	1400	1	4	WNW	0	4	2	2	0	0
07/05/2021	3	FL	0800	1400	2	4	WNW	0	4	2	2	0	0
07/05/2021	3	FL	0800	1400	3	3	WNW	0	4	2	2	0	0
07/05/2021	3	FL	0800	1400	4	3	NW	0	6	2	2	0	0
07/05/2021	3	FL	0800	1400	5	3	NW	0	6	2	2	0	0
07/05/2021	3	FL	0800	1400	6	3	NW	2	6	2	2	0	0
25/05/2021	3	IG	1100	1400	1	2	NE	0	8	0	1	0	0
25/05/2021	3	IG	1100	1400	2	3	NE	0	8	0	1	0	0
25/05/2021	3	IG	1100	1400	3	3	NE	0	8	0	1	0	0
25/05/2021	3	FL	1110	1410	1	2	N	1	8	1	1	0	0
25/05/2021	3	FL	1110	1410	2	2	N	0	7	1	2	0	0
25/05/2021	3	FL	1110	1410	3	2	N	0	7	2	2	0	0
25/05/2021	3	IG	1700	1800	4	3	NE	0	8	0	1	0	0
26/05/2021	3	FL	0830	1200	1	4	N	2	8	1	1	0	0
26/05/2021	3	FL	0830	1200	2	4	N	2	8	1	1	0	0
26/05/2021	3	FL	0830	1200	3	4	N	2	8	2	2	0	0
26/05/2021	3	IG	0900	1200	1	2	N	2	8	1	1	0	0
26/05/2021	3	IG	0900	1200	2	2	N	2	8	1	2	0	0
26/05/2021	3	IG	0900	1200	3	2	N	0	8	1	2	0	0
26/05/2021	3	FL	1230	1300	4	2	N	0	6	2	2	0	0
27/05/2021	3	FL	1715	2015	1	0	-	0	1	2	2	0	0
27/05/2021	3	FL	1715	2015	2	0	-	0	1	2	2	0	0
27/05/2021	3	FL	1715	2015	3	0	-	0	1	2	2	0	0
28/05/2021	3	IG	1345	1745	1	2	NE	0	1	2	2	0	0
28/05/2021	3	IG	1345	1745	2	2	NE	0	1	2	2	0	0
28/05/2021	3	IG	1345	1745	3	2	NE	0	2	2	2	0	0
28/05/2021	3	IG	1345	1745	4	2	NE	0	2	2	2	0	0
08/06/2021	4	IG	1030	1330	1	4	SW	0	4	2	2	0	0
08/06/2021	4	IG	1030	1330	2	4	SW	0	4	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
08/06/2021	4	IG	1030	1330	3	4	SW	0	5	2	2	0	0
09/06/2021	4	IG	1430	2030	1	4	SW	0	8	2	2	0	0
09/06/2021	4	IG	1430	2030	2	4	SW	2	8	2	2	0	0
09/06/2021	4	IG	1430	2030	3	3	SW	0	8	2	2	0	0
09/06/2021	4	IG	1430	2030	4	3	SW	0	8	2	2	0	0
09/06/2021	4	IG	1430	2030	5	4	SW	0	8	2	2	0	0
09/06/2021	4	IG	1430	2030	6	4	SW	0	8	2	2	0	0
09/06/2021	4	FL	1500	1700	1	3	SW	0	8	2	2	0	0
09/06/2021	4	FL	1500	1700	2	2	SW	2	8	2	2	0	0
10/06/2021	4	FL	0930	1235	1	4	S	0	5	2	2	0	0
10/06/2021	4	FL	0930	1235	2	3	S	0	6	2	2	0	0
10/06/2021	4	FL	0930	1235	3	3	S	0	7	2	2	0	0
16/06/2021	4	IG	1015	1515	1	2	S	0	7	2	2	0	0
16/06/2021	4	IG	1015	1515	2	2	S	0	6	2	2	0	0
16/06/2021	4	IG	1015	1515	3	2	SW	0	7	2	2	0	0
16/06/2021	4	IG	1015	1515	4	3	SW	0	8	2	2	0	0
16/06/2021	4	IG	1015	1515	5	3	SW	0	7	2	2	0	0
17/06/2021	4	FL	1000	1600	1	1	SW	0	1	2	2	0	0
17/06/2021	4	IG	1000	1600	1	2	SW	0	1	2	2	0	0
17/06/2021	4	FL	1000	1600	2	1	SW	0	3	2	2	0	0
17/06/2021	4	IG	1000	1600	2	3	SW	0	4	2	2	0	0
17/06/2021	4	FL	1000	1600	3	1	SW	0	6	2	2	0	0
17/06/2021	4	IG	1000	1600	3	3	SW	0	4	2	2	0	0
17/06/2021	4	FL	1000	1600	4	1	SW	0	4	2	2	0	0
17/06/2021	4	IG	1000	1600	4	3	SW	0	5	2	2	0	0
17/06/2021	4	FL	1000	1600	5	1	SW	0	4	2	2	0	0
17/06/2021	4	IG	1000	1600	5	3	N	0	7	2	2	0	0
17/06/2021	4	FL	1000	1600	6	1	SW	0	4	2	2	0	0
17/06/2021	4	IG	1000	1600	6	3	NE	0	7	2	2	0	0
21/07/2021	5	FL/IG	0600	0800	1	0	-	0	8	1	2	0	0
21/07/2021	5	FL/IG	0600	0800	2	0	-	0	6	1	2	0	0
21/07/2021	5	FL	0815	1215	1	0	-	0	1	2	2	0	0
21/07/2021	5	FL	0815	1215	2	0	-	0	1	2	2	0	0
21/07/2021	5	FL	0815	1215	3	0	-	0	2	2	2	0	0
21/07/2021	5	FL	0815	1215	4	1	SE	0	2	2	2	0	0
21/07/2021	5	IG	1115	1215	1	2	E	0	3	1	2	0	0
23/07/2021	5	IG/FL	1000	1400	1	0	-	0	1	2	2	0	0
23/07/2021	5	IG/FL	1000	1400	2	0	-	0	1	2	2	0	0
23/07/2021	5	IG/FL	1000	1400	3	0	-	0	1	2	2	0	0
23/07/2021	5	IG/FL	1000	1400	4	0	-	0	1	2	2	0	0
23/07/2021	5	FL/IG	1500	1700	1	1	SE	0	1	2	2	0	0
23/07/2021	5	FL/IG	1500	1700	2	1	SE	0	1	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
28/07/2021	5	FL	1615	1915	1	1	SE	0	8	2	2	0	0
28/07/2021	5	FL	1615	1915	2	1	SE	0	8	2	2	0	0
28/07/2021	5	FL	1615	1915	3	1	SE	0	8	2	2	0	0
30/07/2021	5	IG	0600	1100	1	1	WNW	0	8	2	2	0	0
30/07/2021	5	IG	0600	1100	2	1	WNW	0	8	2	2	0	0
30/07/2021	5	IG	0600	1100	3	2	WNW	0	7	2	2	0	0
30/07/2021	5	IG	0600	1100	4	2	WNW	0	7	2	2	0	0
30/07/2021	5	IG	0600	1100	5	2	WNW	0	6	2	2	0	0
30/07/2021	5	FL	0930	1030	1	2	NNW	0	8	2	2	0	0
18/08/2021	6	IG	1345	1645	1	3	NNW	0	4	2	2	0	0
18/08/2021	6	IG	1345	1645	2	3	NNW	0	5	2	2	0	0
18/08/2021	6	IG	1345	1645	3	4	NW	0	6	2	2	0	0
18/08/2021	6	FL	1415	1645	1	4	NNW	0	5	2	2	0	0
18/08/2021	6	FL	1415	1645	2	5	NNW	0	5	2	2	0	0
18/08/2021	6	FL	1415	1645	3	5	NNW	0	5	2	2	0	0
20/08/2021	6	FL/IG	1430	1600	1	0	-	1	8	1	0	0	0
23/08/2021	6	FL	1045	1215	1	0	-	0	8	1	2	0	0
23/08/2021	6	FL	1045	1215	2	0	-	0	7	2	2	0	0
06/03/2022	7	FL	0830	1230	1	0	-	0	0	0	2	1	0
06/03/2022	7	FL	0830	1230	2	1	NW	0	0	0	2	1	0
06/03/2022	7	FL	0830	1230	3	0	-	0	0	0	2	0	0
06/03/2022	7	FL	0830	1230	4	1	NW	0	0	0	2	0	0
07/03/2022	7	IG	0900	1200	1	2	S	0	3	2	2	0	0
07/03/2022	7	IG	0900	1200	2	3	S	0	3	2	2	0	0
07/03/2022	7	IG	0900	1200	3	3	S	0	4	2	2	0	0
07/03/2022	7	FL	1230	1530	1	4	S	0	1	2	2	0	0
07/03/2022	7	FL	1230	1530	2	3	S	0	1	2	2	0	0
07/03/2022	7	FL	1230	1530	3	3	S	0	1	2	2	0	0
08/03/2022	7	FL	1030	1330	1	6	SE	0	7	2	2	0	0
08/03/2022	7	FL	1030	1330	2	5	SE	0	6	2	2	0	0
08/03/2022	7	FL	1030	1330	3	6	SE	0	6	2	2	0	0
08/03/2022	7	IG	1345	1645	1	5	SSE	0	4	2	2	0	0
08/03/2022	7	IG	1345	1645	2	4	SSE	0	4	2	2	0	0
08/03/2022	7	IG	1345	1645	3	5	SSE	0	4	2	2	0	0
17/03/2022	7	FL	0915	1215	1	3	S	0	2	2	2	0	0
17/03/2022	7	FL	0915	1215	2	3	S	0	1	2	2	0	0
17/03/2022	7	FL	0915	1215	3	4	S	0	2	2	2	0	0
17/03/2022	7	IG	1230	1530	1	5	SSW	0	4	2	2	0	0
17/03/2022	7	IG	1230	1530	2	5	SSW	0	3	2	2	0	0
17/03/2022	7	IG	1230	1530	3	4	SSW	0	3	2	2	0	0
18/03/2022	7	IG	1100	1700	1	3	S	0	7	2	2	0	0
18/03/2022	7	IG	1100	1700	2	5	SSW	0	6	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
18/03/2022	7	IG	1100	1700	3	5	SSW	0	5	2	2	0	0
18/03/2022	7	IG	1100	1700	4	5	S	0	5	2	2	0	0
18/03/2022	7	IG	1100	1700	5	5	S	0	6	2	2	0	0
18/03/2022	7	IG	1100	1700	6	4	S	0	6	2	2	0	0
08/04/2022	8	FL	0915	1215	1	4	NW	0	4	2	2	0	1
08/04/2022	8	FL	0915	1215	2	4	NW	2	4	2	2	0	1
08/04/2022	8	FL	0915	1215	3	4	NW	0	4	2	2	0	1
08/04/2022	8	IG	1230	1530	1	4	NW	0	6	2	2	0	1
08/04/2022	8	IG	1230	1530	2	4	NW	0	6	2	2	0	1
08/04/2022	8	IG	1230	1530	3	3	NW	0	6	2	2	0	1
14/04/2022	8	FL	1030	1500	1	1	S	0	8	2	2	0	0
14/04/2022	8	FL	1030	1500	2	1	S	0	8	2	2	0	0
14/04/2022	8	FL	1030	1500	3	1	S	0	8	2	2	0	0
14/04/2022	8	FL	1030	1500	4	1	S	0	8	2	2	0	0
14/04/2022	8	FL	1030	1500	5	1	S	0	8	2	2	0	0
15/04/2022	8	FL	0900	1400	1	1	S	2	8	2	2	0	0
15/04/2022	8	FL	0900	1400	2	1	S	0	7	2	2	0	0
15/04/2022	8	FL	0900	1400	3	2	S	0	7	2	2	0	0
15/04/2022	8	FL	0900	1400	4	2	S	0	6	2	2	0	0
15/04/2022	8	FL	0900	1400	5	1	S	0	5	2	2	0	0
25/04/2022	8	IG	1600	1900	1	2	E	0	5	2	2	0	0
25/04/2022	8	IG	1600	1900	2	2	ESE	0	6	2	2	0	0
25/04/2022	8	IG	1600	1900	3	2	E	0	6	2	2	0	0
26/04/2022	8	FI	1000	1600	1	2	NE	0	8	2	2	0	0
26/04/2022	8	IG	1000	1600	1	2	NE	0	8	2	2	0	0
26/04/2022	8	FI	1000	1600	2	2	NE	0	8	2	2	0	0
26/04/2022	8	IG	1000	1600	2	2	N	0	7	2	2	0	0
26/04/2022	8	FI	1000	1600	3	2	NE	0	8	2	2	0	0
26/04/2022	8	IG	1000	1600	3	2	NW	0	5	2	2	0	0
26/04/2022	8	FI	1000	1600	4	2	NE	0	8	2	2	0	0
26/04/2022	8	IG	1000	1600	4	2	NW	0	4	2	2	0	0
26/04/2022	8	FI	1000	1600	5	2	NE	0	8	2	2	0	0
26/04/2022	8	IG	1000	1600	5	2	NW	0	5	2	2	0	0
26/04/2022	8	FI	1000	1600	6	2	NE	0	8	2	2	0	0
26/04/2022	8	IG	1000	1600	6	2	NW	0	4	2	2	0	0
11/05/2022	9	IG	1515	1945	1	4	WNW	0	6	2	2	0	0
11/05/2022	9	IG	1515	1945	2	4	WNW	1	8	2	2	0	0
11/05/2022	9	IG	1515	1945	3	3	WNW	0	6	2	2	0	0
11/05/2022	9	IG	1515	1945	4	3	WNW	0	5	2	2	0	0
11/05/2022	9	IG	1515	1945	5	3	WNW	0	5	2	2	0	0
11/05/2022	9	FL	1800	1930	1	2	W	0	1	2	2	0	0
11/05/2022	9	FL	1800	1930	2	2	W	0	1	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
12/05/2022	9	FL	0800	0830	1	0	SW	0	7	2	2	0	0
17/05/2022	9	IG	0930	1230	1	3	SSW	0	8	0	1	0	0
17/05/2022	9	IG	0930	1230	2	3	SW	0	5	1	2	0	0
17/05/2022	9	IG	0930	1230	3	3	S	0	3	2	2	0	0
31/05/2022	9	FL	0615	0800	1	1	N	0	8	1	2	0	0
31/05/2022	9	FL	0615	0800	2	1	N	0	8	1	2	0	0
31/05/2022	9	IG	1015	1615	1	2	ENE	0	6	1	2	0	0
31/05/2022	9	IG	1015	1615	2	2	NE	1	8	1	2	0	0
31/05/2022	9	IG	1015	1615	3	1	NE	0	8	2	2	0	0
31/05/2022	9	IG	1015	1615	4	1	NE	0	7	2	2	0	0
31/05/2022	9	IG	1015	1615	5	2	NE	0	6	2	2	0	0
31/05/2022	9	IG	1015	1615	6	2	NE	0	5	2	2	0	0
31/05/2022	9	FL	1100	1130	1	1	N	0	8	2	2	0	0
03/06/2022	10	IG	1330	1630	1	2	NE	0	4	2	2	0	0
03/06/2022	10	IG	1330	1630	2	3	E	0	3	2	2	0	0
03/06/2022	10	IG	1330	1630	3	3	E	0	2	2	2	0	0
09/06/2022	10	IG	1330	1700	1	2	SSW	0	5	2	2	0	0
09/06/2022	10	IG	1330	1700	2	3	SW	0	5	2	2	0	0
09/06/2022	10	IG	1330	1700	3	3	SW	0	4	2	2	0	0
15/06/2022	10	IG	1030	1330	1	3	SSW	0	2	2	2	0	0
15/06/2022	10	IG	1030	1330	2	3	SW	0	3	2	2	0	0
15/06/2022	10	IG	1030	1330	3	3	SW	0	4	2	2	0	0
15/06/2022	10	FL	1130	1630	1	2	W	0	4	2	2	0	0
15/06/2022	10	FL	1130	1630	2	2	W	0	4	2	2	0	0
15/06/2022	10	FL	1130	1630	3	2	W	0	4	2	2	0	0
15/06/2022	10	FL	1130	1630	4	2	W	0	5	2	2	0	0
15/06/2022	10	FL	1130	1630	5	2	W	0	6	2	2	0	0
15/06/2022	10	IG	1400	1700	1	2	SSW	0	4	2	2	0	0
15/06/2022	10	IG	1400	1700	2	3	SSW	0	3	2	2	0	0
15/06/2022	10	IG	1400	1700	3	3	SSW	0	4	2	2	0	0
20/06/2022	10	FL	0830	1130	1	1	NW	0	1	2	2	0	0
20/06/2022	10	FL	0830	1130	2	0	-	0	2	2	2	0	0
20/06/2022	10	FL	0830	1130	3	0	-	0	2	2	2	0	0
23/06/2022	10	FL	1850	2050	1	4	W	0	0	2	2	0	0
23/06/2022	10	FL	1850	2050	2	4	W	0	0	2	2	0	0
05/07/2022	11	FL	2100	2130	1	1	S	0	7	2	2	0	0
06/07/2022	11	FL	2000	2130	1	4	NW	0	7	2	2	0	0
06/07/2022	11	FL	2000	2130	2	3	NW	0	7	2	2	0	0
07/07/2022	11	FL	0500	0600	1	2	NW	0	6	1	2	0	0
26/07/2022	11	IG	0945	1745	1	2	W	1	7	2	2	0	0
26/07/2022	11	FL	0945	1745	1	2	W	1	7	2	2	0	0
26/07/2022	11	IG	0945	1745	2	2	W	1	7	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
26/07/2022	11	FL	0945	1745	2	2	W	1	7	2	2	0	0
26/07/2022	11	IG	0945	1745	3	2	W	0	6	2	2	0	0
26/07/2022	11	FL	0945	1745	3	2	W	0	6	2	2	0	0
26/07/2022	11	IG	0945	1745	4	2	W	0	6	2	2	0	0
26/07/2022	11	FL	0945	1745	4	2	W	0	6	2	2	0	0
26/07/2022	11	IG	0945	1745	5	1	W	0	6	2	2	0	0
26/07/2022	11	FL	0945	1745	5	1	W	0	6	2	2	0	0
26/07/2022	11	IG	0945	1745	6	1	W	0	6	2	2	0	0
26/07/2022	11	FL	0945	1745	6	1	W	0	6	2	2	0	0
26/07/2022	11	IG	0945	1745	7	1	W	0	6	2	2	0	0
26/07/2022	11	FL	0945	1745	7	1	W	0	6	2	2	0	0
26/07/2022	11	IG	0945	1745	8	1	W	0	6	2	2	0	0
26/07/2022	11	FL	0945	1745	8	1	W	0	6	2	2	0	0
05/08/2022	12	FL	0900	1000	1	2	NW	0	4	2	2	0	0
05/08/2022	12	FL	1100	1300	1	3	NW	0	4	2	2	0	0
05/08/2022	12	FL	1100	1300	2	3	NW	0	5	2	2	0	0
12/08/2022	12	FL	0830	0930	1	1	E	0	3	2	2	0	0
25/08/2022	12	IG	0900	1000	1	3	S	0	2	2	2	0	0
25/08/2022	12	FL	1030	1330	1	2	W	0	6	2	2	0	0
25/08/2022	12	FL	1030	1330	2	2	W	0	7	2	2	0	0
25/08/2022	12	FL	1030	1330	3	2	W	0	7	2	2	0	0
25/08/2022	12	IG	1300	1700	1	3	SW	0	6	2	2	0	0
25/08/2022	12	IG	1300	1700	2	3	WSW	0	6	2	2	0	0
25/08/2022	12	IG	1300	1700	3	3	WSW	0	5	2	2	0	0
25/08/2022	12	IG	1300	1700	4	3	WSW	0	5	2	2	0	0

C.5 Black Grouse Surveys

Black grouse surveys were undertaken during the 2021 and 2022 breeding seasons. **Table C-7** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-7 Meteorological conditions during black grouse surveys at Hill of Fare Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
08/04/2021	1	FL	0530	0830	1	5	NW	0	7	2	2	2	1
08/04/2021	1	IG	0530	0830	1	2	WSW	0	7	2	2	2	1
08/04/2021	1	FL	0530	0830	2	5	NW	0	6	2	2	2	1
08/04/2021	1	IG	0530	0830	2	3	WSW	0	6	2	2	2	1
08/04/2021	1	FL	0530	0830	3	5	W	0	5	2	2	2	1
08/04/2021	1	IG	0530	0830	3	3	WSW	0	5	2	2	2	1
20/04/2021	1	FL	0510	0820	1	0	-	2	8	1	2	0	0
20/04/2021	1	FL	0510	0820	2	0	-	2	8	1	2	0	0
20/04/2021	1	FL	0510	0820	3	0	-	2	8	1	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
22/04/2021	1	FL	0530	0830	1	0	-	0	0	2	2	1	0
22/04/2021	1	IG	0530	0830	1	2	SW	0	1	2	2	0	0
22/04/2021	1	FL	0530	0830	2	1	N	0	0	2	2	0	0
22/04/2021	1	IG	0530	0830	2	2	SW	0	1	2	2	0	0
22/04/2021	1	FL	0530	0830	3	1	N	0	1	2	2	0	0
22/04/2021	1	IG	0530	0830	3	2	SW	0	1	2	2	0	0
26/04/2021	1	FL	0500	0745	1	0	-	0	8	2	2	0	0
26/04/2021	1	FL	0500	0745	2	0	-	0	8	2	2	0	0
26/04/2021	1	FL	0500	0745	3	0	-	0	8	2	2	0	0
07/05/2021	2	FL	0500	0800	1	2	WNW	0	2	2	2	1	0
07/05/2021	2	FL	0500	0800	2	2	WNW	0	2	2	2	0	0
07/05/2021	2	FL	0500	0800	3	2	WNW	0	2	2	2	0	0
10/05/2021	2	FL	0430	0730	1	0	-	0	8	2	2	0	0
10/05/2021	2	FL	0430	0730	2	0	-	0	8	2	2	0	0
10/05/2021	2	FL	0430	0730	3	0	-	0	8	2	2	0	0
15/04/2022	3	FL	0600	0900	1	0	-	0	8	2	2	0	0
15/04/2022	3	FL	0600	0900	2	1	S	0	8	2	2	0	0
15/04/2022	3	FL	0600	0900	3	1	S	2	8	2	2	0	0
26/04/2022	3	FL	0500	0800	1	2	NE	1	8	1	0	0	0
26/04/2022	3	IG	0500	0800	1	1	NNE	1	8	1	1	0	0
26/04/2022	3	FL	0500	0800	2	2	NE	2	8	1	0	0	0
26/04/2022	3	IG	0500	0800	2	1	NNE	0	8	1	1	0	0
26/04/2022	3	FL	0500	0800	3	2	NE	0	8	1	1	0	0
26/04/2022	3	IG	0500	0800	3	2	NNE	0	7	2	2	0	0
12/05/2022	4	FL	0500	0800	1	1	SW	0	6	2	2	0	0
12/05/2022	4	IG	0500	0800	1	0	-	0	7	2	2	0	0
12/05/2022	4	FL	0500	0800	2	1	SW	0	7	2	2	0	0
12/05/2022	4	IG	0500	0800	2	1	W	0	6	2	2	0	0
12/05/2022	4	FL	0500	0800	3	1	SW	0	7	2	2	0	0
12/05/2022	4	IG	0500	0800	3	2	W	0	7	2	2	0	0
15/05/2022	4	FL	0430	0730	1	0	-	0	3	2	2	0	0
15/05/2022	4	FL	0430	0730	2	0	-	0	2	2	2	0	0
15/05/2022	4	FL	0430	0730	3	0	-	0	2	2	2	0	0

ANNEX D. Ornithological Survey Results

D.1 Flight Activity Records: Target Species

In accordance with NatureScot guidance (SNH 2017), target species are those which may be considered to be at risk from the potential effects of wind farms. All flights of target species within the turbine area and the surrounding area were mapped and are detailed in **Table D-1**.

Table D-1 Details of target species recorded during flight activity surveys (sorted by species)

Date	Observer	VP	Flight start time	Species	No. of birds	Duration (s)	Seconds per height band				
							0-20 m	21-40 m	41-100 m	101-150 m	>150 m
15/12/2020	AB	3	1218	Goshawk	1	25	15	10			
15/12/2020	AB	3	1231	Goshawk	1	65	65				
22/04/2021	FL	4	1605	Goshawk	1	430		10	45	105	270
10/05/2021	FL	4	0748	Goshawk	1	50	50				
28/05/2021	FL	3	1650	Goshawk	1	12		12			
28/05/2021	FL	3	1716	Goshawk	1	120				105	15
12/01/2022	FL	3	1249	Goshawk	1	35	35				
24/02/2022	FL	4	0943	Goshawk	1	63		3	30	30	
07/03/2022	IG	3	1316	Goshawk	1	490	30			135	325
07/03/2022	FL	4	1114	Goshawk	1	1378			120	28	1230
07/03/2022	FL	4	1153	Goshawk	1	130	10			30	90
17/03/2022	IG	3	1025	Goshawk	1	206			30	60	116
17/03/2022	IG	3	1056	Goshawk	1	35		5	15	15	
17/05/2022	FL	4	1210	Goshawk	1	234			144	90	
10/07/2022	FL	3	1150	Goshawk	1	560			45	45	470
10/07/2022	FL	3	1202	Goshawk	1	20	5		15		
15/12/2020	AB	3	0942	Greylag goose	20	50	15	35			
17/12/2020	AB	4	1003	Hen harrier	1	54	54				
17/12/2020	AB	4	1131	Hen harrier	1	10	10				
03/06/2022	FL	4	1500	Hen harrier	1	203	150	53			
08/06/2021	FL	3	1320	Herring gull	1	201		30	30	15	126
09/06/2021	FL	4	1815	Herring gull	4	101				30	71
16/06/2021	FL	3	1632	Herring gull	2	146	56		90		
20/06/2022	FL	3	0804	Osprey	3	450			120	330	
25/08/2022	IG	4	1051	Osprey	1	167		30	45	75	17
08/06/2021	FL	3	1128	Peregrine falcon	1	448				60	388
18/08/2021	FL	3	1731	Peregrine falcon	1	7			7		
20/10/2021	IG	4	1305	Peregrine falcon	1	187		45	45	30	67
26/01/2022	FL	4	1310	Peregrine falcon	1	40	10	30			
05/07/2022	FL	4	1833	Peregrine falcon	1	85		10	60	15	
10/03/2021	AB	4	0701	Pink-footed goose	6	65			30	30	5
22/03/2021	AB	4	1051	Pink-footed goose	35	100			15	85	
22/04/2021	FL	3	1112	Pink-footed goose	120	180					180
20/10/2021	IG	4	1249	Pink-footed goose	35	380					380
25/10/2021	FL	4	0852	Pink-footed goose	220	120					120

Date	Observer	VP	Flight start time	Species	No. of birds	Duration (s)	Seconds per height band				
							0-20 m	21-40 m	41-100 m	101-150 m	>150 m
25/10/2021	FL	4	0852	Pink-footed goose	60	110					110
17/11/2021	FL	3	1535	Pink-footed goose	200	240				210	30
13/12/2021	FL	4	0929	Pink-footed goose	28	73			73		
13/12/2021	FL	4	0942	Pink-footed goose	100	173				120	53
13/12/2021	FL	4	1014	Pink-footed goose	60	180					180
07/03/2022	FL	4	1146	Pink-footed goose	45	150				75	75
08/03/2022	IG	3	1116	Pink-footed goose	41	252			72	90	90
22/03/2021	AB	4	1020	Red kite	1	90	15	45	30		
22/03/2021	AB	4	1349	Red kite	1	150			120	30	
22/04/2021	FL	4	1656	Red kite	1	480	405	75			
10/05/2021	FL	4	0910	Red kite	1	469		135	120	135	79
10/05/2021	FL	4	0931	Red kite	1	240		75	45	60	60
28/05/2021	FL	3	0902	Red kite	1	679		90	240	75	274
28/05/2021	FL	3	1453	Red kite	1	82		15	67		
28/05/2021	FL	3	1543	Red kite	1	280	205	75			
28/05/2021	FL	3	1609	Red kite	1	228		30	168	30	
28/05/2021	IG	4	0905	Red kite	1	377		30	75	60	212
08/06/2021	FL	3	1259	Red kite	1	191		30	60	101	
10/06/2021	IG	3	0958	Red kite	1	91				45	46
16/06/2021	FL	3	1425	Red kite	1	170				120	50
16/06/2021	FL	3	1521	Red kite	1	286	61	60	105	60	
13/09/2021	IG	4	1621	Red kite	1	68		30	38		
25/10/2021	FL	4	1026	Red kite	1	230	30	45	60	95	
25/10/2021	FL	4	1108	Red kite	1	88		28	60		
25/10/2021	FL	4	1108	Red kite	1	84		84			
10/11/2021	IG	3	1234	Red kite	1	168				120	48
07/12/2021	FL	4	1254	Red kite	1	278	180	98			
13/12/2021	FL	4	1012	Red kite	1	105	30	75			
26/01/2022	IG	3	1250	Red kite	1	290		60	75	120	35
07/03/2022	IG	3	1408	Red kite	2	108	33	75			
17/03/2022	IG	3	0924	Red kite	1	123		30	45	48	
17/03/2022	IG	3	0924	Red kite	1	282		45	237		
17/03/2022	IG	3	0950	Red kite	1	148			30	60	58
17/03/2022	IG	3	1038	Red kite	1	144			99	45	
18/03/2022	FL	3	1712	Red kite	1	829	15	60	150	604	
18/03/2022	FL	3	1712	Red kite	1	245		60	105	80	
14/04/2022	FL	4	0810	Red kite	1	75	45	30			
14/04/2022	FL	4	0956	Red kite	2	440		90	120	230	
17/05/2022	FL	4	1142	Red kite	1	396	75	120	60	141	
17/05/2022	FL	4	1204	Red kite	1	635	425	180	30		
03/06/2022	FL	4	1440	Red kite	1	214		79	135		
03/06/2022	FL	4	1510	Red kite	1	458		143	225	90	

Date	Observer	VP	Flight start time	Species	No. of birds	Duration (s)	Seconds per height band				
							0-20 m	21-40 m	41-100 m	101-150 m	>150 m
03/06/2022	FL	4	1511	Red kite	1	38		38			
03/06/2022	FL	4	1533	Red kite	1	1764	654	705	195	165	45
05/07/2022	FL	4	1828	Red kite	1	390		135	180	30	45
07/07/2022	FL	4	0740	Red kite	1	117		75	15	15	12

D.2 Moorland Breeding Bird Records

Moorland breeding bird surveys were undertaken during the 2021 and 2022 breeding seasons and focussed on recording activity of upland wader species within the survey area (Table D-2). Survey methodology is detailed in Annex B and survey timing/weather conditions in Annex C.

Table D-2 Wader activity recorded during moorland breeding bird surveys

Date	Observer	Survey visit	Species	Number recorded	Notes
23/03/2021	AB	SBBS 1	Curlew	1	Calling.
07/05/2021	FL	SBBS 3	Golden plover	1	Call and flyover
10/06/2021	FL	BBS 3	Curlew	1	Flying and calling (not alarm or display); seen at distance; lost view behind hill.
14/04/2022	FL	VP 4	Curlew	2	Disturbed by passing red kite; circling and alarm calling.
14/04/2022	FL	VP 4	Curlew	-	Heard only.
15/04/2022	FL	SBBS 8	Curlew	3	
15/04/2022	FL	SBBS 8	Snipe	1	Displaying.
15/04/2022	FL	SBBS 8	Snipe	1	Displaying.
25/04/2022	IG	BBS 3	Golden plover	1	
12/05/2022	FL	BK 4	Curlew	-	Heard only.
15/05/2022	FL	BK 4	Curlew	1	Heard only.
15/05/2022	FL	BK 4	Snipe	2	Heard only; displaying.

D.3 Winter Walkover Records

Table D-3 details all the species recorded. Refer to Annex B for survey methodology and Annex C for weather data.

Table D-3 Winter walkover survey records: 2020/2021 and 2021/2022 non-breeding seasons

Date	Observer	Survey visit	Species	Number recorded	Notes
27/10/2020	AB	1	Pink-footed goose	25	
28/10/2020	AB	1	Pink-footed goose	210	
16/11/2020	AB	1	Bullfinch	1	
16/11/2020	AB	1	Coal tit	1	
16/11/2020	AB	1	Coal tit	2	
16/11/2020	AB	1	Golden plover	16	
16/11/2020	AB	1	Goshawk	1	Aggressive encounter with raven.
16/11/2020	AB	1	Greylag goose	14	
16/11/2020	AB	1	Jay	1	
16/11/2020	AB	1	Raven	1	Stationary on ridge by Greymore.
16/11/2020	AB	1	Raven	1	
16/11/2020	AB	1	Red grouse	1	
16/11/2020	AB	1	Red grouse	1	
16/11/2020	AB	1	Red grouse	3	
16/11/2020	AB	1	Red grouse	3	

Date	Observer	Survey visit	Species	Number recorded	Notes
16/11/2020	AB	1	Skylark	1	
16/11/2020	AB	1	Stonechat	1	
17/11/2020	AB	1	Pink-footed goose	55	
17/11/2020	AB	1	Pink-footed goose	70	
17/11/2020	AB	1	Pink-footed goose	120	
18/11/2020	AB	1	Goshawk	1	Adult female.
18/11/2020	AB	1	Pink-footed goose	15	
19/11/2020	AB	1	Bullfinch	5	
19/11/2020	AB	1	Golden plover	20	
19/11/2020	AB	1	Pink-footed goose	37	
19/11/2020	AB	1	Red grouse	1	
19/11/2020	AB	1	Woodcock	1	Stationary south of The Skairs.
24/11/2020	AB	1	Hen harrier	1	Adult male.
25/11/2020	PS	1	Buzzard	1	
25/11/2020	PS	1	Buzzard	1	Flying east at Brown Hill.
25/11/2020	AB	1	Goshawk	1	
25/11/2020	PS	1	Kestrel	1	Stationary by Blackyduds.
25/11/2020	PS	1	Meadow pipit	50	
25/11/2020	AB	1	Pink-footed goose	55	
25/11/2020	PS	1	Raven	1	
25/11/2020	PS	1	Red grouse	6	
25/11/2020	PS	1	Red grouse	3	
25/11/2020	PS	1	Red grouse	1	
25/11/2020	PS	1	Red grouse	2	
25/11/2020	PS	1	Red grouse	2	
25/11/2020	PS	1	Red grouse	1	
25/11/2020	PS	1	Snow bunting	2	Stationary by Craigrath.
25/11/2020	PS	1	Stonechat	1	
25/11/2020	PS	1	Stonechat	1	
25/11/2020	PS	1	Stonechat	1	
25/11/2020	PS	1	Stonechat	1	
26/11/2020	AB	1	Goshawk	1	Briefly landed on sapling.
26/11/2020	AB	1	Greylag goose	110	
26/11/2020	AB	1	Greylag goose	45	
26/11/2020	AB	1	Greylag goose	50	
26/11/2020	PS	1	Greylag goose	100	
26/11/2020	AB	1	Lesser redpoll	2	
27/11/2020	AB	1	Woodcock	1	Stationary.
23/12/2020	AB	2	Pink-footed goose	60	Flying south towards Meikle Tap.
23/12/2020	AB	2	Pink-footed goose	35	Flying south-east.
10/03/2021	AB	3	Buzzard	1	Flying north-east.
10/03/2021	AB	3	Kestrel	1	Flying north-east.

Date	Observer	Survey visit	Species	Number recorded	Notes
10/03/2021	AB	3	Red grouse	2	
10/03/2021	AB	3	Red grouse	2	
10/03/2021	AB	3	Red kite	1	Flying in loops.
10/03/2021	AB	3	Skylark	1	
10/03/2021	AB	3	Skylark	1	
10/03/2021	AB	3	Skylark	1	
10/03/2021	AB	3	Stonechat	1	
10/03/2021	AB	3	Swift	10	
10/03/2021	AB	3	Wren	1	
11/03/2021	AB	3	Bullfinch	3	
11/03/2021	AB	3	Bullfinch	20	
11/03/2021	AB	3	Buzzard	2	Flying north-east towards Cat's Cairn.
11/03/2021	AB	3	Goshawk	1	Flying at 1140; north-west.
11/03/2021	AB	3	Robin	1	
11/03/2021	AB	3	Stonechat	1	
11/03/2021	AB	3	Woodcock	1	Flying north-east by Gordon's How.
15/10/2021	FL	5	Buzzard	1	Perched, south of Brown Hill.
15/10/2021	FL	5	Common crossbill	8	
15/10/2021	FL	5	Kestrel	1	
15/10/2021	FL	5	Kestrel	1	
15/10/2021	FL	5	Mistle thrush	6	
15/10/2021	FL	5	Mistle thrush	16	Minimum count.
15/10/2021	FL	5	Peregrine falcon	1	Perched on tree at quarry.
15/10/2021	FL	5	Pink-footed goose	46	Flying east across site.
15/10/2021	FL	5	Red kite	3	Flying north, circling over Cormoir Wood, then north at 13:42
15/10/2021	FL	5	Red kite	2	In flight, Green Farm.
15/10/2021	FL	5	Whooper swan	13	Flying south over Hill of Corfeidly at 13:05.
15/10/2021	FL	5	Whooper swan	6	Flying south across site.
10/11/2021	IG	6	Common crossbill	50	Near Brown Hill.
10/11/2021	FL	6	Golden eagle	1	11:52 - drifting off from low over hill ridge.
10/11/2021	IG	6	Goshawk	1	Perched 14:40-14:48.
10/11/2021	FL	6	Red grouse	2	
10/11/2021	FL	6	Red kite	1	11:52 - flew low along ridge.
10/11/2021	FL	6	Snipe	1	10:55 - flushed from on or near track.
16/11/2021	FL	6	Buzzard	1	In flight, Craigrath.
17/11/2021	IG	6	Common crossbill	1	
17/11/2021	IG	6	Golden plover	1	11:55 - flushed
17/11/2021	IG	6	Kestrel	1	Hunting.
17/11/2021	IG	6	Kestrel	1	

¹ Annex 1 of the EU Bird Directive

Date	Observer	Survey visit	Species	Number recorded	Notes
17/11/2021	IG	6	Pink-footed goose	500	In flight, heading south-east outside survey area.
07/12/2021	FL	7	Bullfinch	2	
07/12/2021	IG	7	Bullfinch	4	
07/12/2021	IG	7	Common crossbill	14	
07/12/2021	FL	7	Fieldfare	22	
07/12/2021	IG	7	Stonechat	3	
16/12/2021	FL	7	Kestrel	1	Landed in trees.
16/12/2021	FL	7	Red grouse	3	Flushed.
16/12/2021	FL	7	Red grouse	1	Flushed.
16/12/2021	IG	7	Red grouse	2	Flushed.
12/01/2022	IG	8	Buzzard	1	
12/01/2022	IG	8	Goshawk	1	
26/01/2022	IG	8	Bullfinch	3	
26/01/2022	IG	8	Common crossbill	7	
26/01/2022	FL	8	Peregrine falcon	1	Observed whilst driving off site; perched on tree near track.
09/02/2022	IG	9	Bullfinch	1	
09/02/2022	IG	9	Red grouse	1	

D.4 Scarce Breeding Bird Records

Table D-4 details all records of raptors and owls recorded during surveys, however only Annex 1¹ or Schedule 1² species are considered to be scarce breeding birds (i.e. target species). Refer to **Annex B** for survey methodology, **Annex C** for weather data and **Confidential Technical Appendix 9.2** for confidential data relating to goshawk and peregrine falcon.

Table D-4 Raptor and owl records: 2021 and 2022 breeding seasons

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
22/03/2021	Buzzard	1	-	-	-	Flying south-west; looping by Hill of Corfeidly.
07/04/2021	Buzzard	1	-	-	-	Hunting.
07/04/2021	Buzzard	1	-	-	-	Hunting; landed on tree.
07/04/2021	Buzzard	1	-	-	-	Circling.
22/04/2021	Buzzard	1	-	-	-	
22/04/2021	Buzzard	1	-	-	-	
22/04/2021	Buzzard	1	-	-	-	Hunting.
22/04/2021	Buzzard	1	-	-	-	Hunting.
22/04/2021	Buzzard	1	-	-	-	Hunting.
22/04/2021	Buzzard	1	-	-	-	
22/04/2021	Buzzard	1	-	-	-	Hunting.
22/04/2021	Buzzard	1	-	-	-	
10/05/2021	Buzzard	1	-	-	-	Hunting by Hill of Fare.
28/05/2021	Buzzard	1	-	-	-	Soaring by Brown Hill.
28/05/2021	Buzzard	1	-	-	-	Flying north-west by Craigrath.

² Schedule 1 of the Wildlife and Countryside Act 1981, as amended by the Nature Conservation Act (Scotland) 2004

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
28/05/2021	Buzzard	1	-	-	-	Circling by Blackyduds.
28/05/2021	Buzzard	1	-	-	-	Hovering by Tornamean.
28/05/2021	Buzzard	1	-	-	-	Flying north-east.
28/05/2021	Buzzard	1	-	-	-	
28/05/2021	Buzzard	1	-	-	-	Hovering over Burn of Lythebauds.
28/05/2021	Buzzard	2	-	-	-	Flying north and circling.
08/06/2021	Buzzard	1	-	-	-	
08/06/2021	Buzzard	1	-	-	-	
10/03/2021	Buzzard	1	-	-	-	Flying north-east.
10/03/2021	Kestrel	1	-	-	-	Flying north-east.
10/03/2021	Red kite	1	-	Adult	-	Flying in loops.
11/03/2021	Buzzard	2	-	-	-	Flying north-east towards Cat's Cairn.
11/03/2021	Goshawk	1	Female	Immature	-	Flying at 1140; north-west.
16/03/2021	Buzzard	2	-	-	-	Flying north-east by Blairhead.
16/03/2021	Red kite	1	-	Adult	-	By Blairhead.
16/03/2021	Red kite	1	-	Adult	-	Flying north-east by Hill of Corfeidly.
16/03/2021	Red kite	1	-	Adult	-	Flying north-east by Hill of Kennerty.
17/03/2021	Buzzard	2	-	-	-	Flying north-east by The Green.
17/03/2021	Buzzard	3	-	-	-	Flying towards Landerberry.
17/03/2021	Buzzard	1	-	-	-	Flying north of Landerberry.
17/03/2021	Buzzard	1	-	-	-	Flying north of Midmar Forest.
17/03/2021	Goshawk	1	-	Adult	-	Cicling then flew north-east.
17/03/2021	Goshawk	1	Female	Adult	-	Flying near Landerberry.
17/03/2021	Red kite	1	-	Adult	-	Flying north-east by The Green.
17/03/2021	Red kite	1	-	Adult	-	Flying north by Meikle Top.
17/03/2021	Red kite	1	-	Adult	-	Stationary south-east of Meikle Top.
17/03/2021	Sparrowhawk	1	-	-	-	Flying by Corfeidly.
22/03/2021	Peregrine falcon	2	Male & Female	Adult	PE_1	Pair at nest.
09/06/2021	Buzzard	1	-	-	-	
23/03/2021	Buzzard	4	-	-	-	
01/04/2021	Peregrine falcon	1	-	-	PE_1	Seen perched at nest on way off site.
01/04/2021	Red kite	1	-	Adult	-	Perched on hut at 10:00 then flew.
01/04/2021	Buzzard	5	-	-	-	
07/04/2021	Osprey	1	-	Adult	-	11:30; flying South
07/04/2021	Red kite	1	-	Adult	-	16:28; flying low over trees West
09/06/2021	Buzzard	1	-	-	-	
09/06/2021	Buzzard	1	-	-	-	
10/06/2021	Buzzard	1	-	-	-	Commuting.
21/04/2021	Buzzard	1	-	-	-	
10/06/2021	Buzzard	1	-	-	-	Hunting.
10/06/2021	Buzzard	1	-	-	-	Hunting.
10/06/2021	Buzzard	1	-	-	-	Hunting.
16/06/2021	Buzzard	1	-	-	-	
16/06/2021	Buzzard	1	-	-	-	
21/07/2021	Buzzard	1	-	-	-	Circling high.
21/07/2021	Buzzard	1	-	-	-	
28/07/2021	Buzzard	1	-	-	-	Low, direct flight.
29/07/2021	Buzzard	1	-	-	-	Hunting.
18/08/2021	Buzzard	1	-	-	-	
18/08/2021	Buzzard	1	-	-	-	

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
26/04/2021	Goshawk	1	-	Adult	-	Low through tree stand clearing; mobbed by crows
07/05/2021	Goshawk	1	-	Adult	GI_3	11:15; circled up and over observer
07/05/2021	Red kite	1	-	Adult	-	10:30; low behind wood over fields
07/05/2021	Red kite	1	-	Adult	-	14:50; over Campfield Road end (at petrol station)
23/08/2021	Buzzard	1	-	-	-	Landed in trees.
23/08/2021	Buzzard	1	-	-	-	
25/05/2021	Red kite	1	-	Adult	-	
25/05/2021	Red kite	1	-	Adult	-	Beyond 2 km buffer
25/05/2021	Red kite	1	-	Adult	-	Gamekeeper had some gralloch near High Seat, bird was investigating
25/05/2021	Buzzard	1	-	-	-	
25/05/2021	Red kite	1	-	Adult	-	Circling then landed in field; flew from field to plantation
26/05/2021	Red kite	1	-	Adult	-	
26/05/2021	Goshawk	1	-	Adult	-	Low through trees
26/05/2021	Peregrine falcon	2	Male & Female	Adult	PE_1	Pair.
26/05/2021	Goshawk	1	Male	Adult	-	Seen on the way to the survey
27/05/2021	Goshawk	1	-	Adult	-	Circling very high; 18:03
27/05/2021	Goshawk	1	Male	Adult	GI_3	Aggressive encounter with buzzard; 18:35
27/05/2021	Red kite	1	-	Adult	-	Drifting along and gaining height; 17:45
27/05/2021	Red kite	1	-	Adult	-	Flying low; 19:17
28/05/2021	Goshawk	1	Female	Adult	-	Flying low at 11:11.
28/05/2021	Red kite	1	-	Adult	-	11:30
28/05/2021	Red kite	1	-	Adult	-	12:57; tagged adult; looked like white letters on dark tags .
28/05/2021	Buzzard	2	-	-	-	11:35
28/05/2021	Red kite	1	-	Adult	-	12:42; hunting; seen to catch vole; headed off south-west.
28/05/2021	Sparrowhawk	1	-	-	-	Female; 11:48.
28/05/2021	Buzzard	1	-	-	-	Circling; 14:35
28/05/2021	Buzzard	1	-	-	-	Commuting; 15:51
28/05/2021	Buzzard	1	-	-	-	Commuting; 16:50
28/05/2021	Buzzard	1	-	-	-	Circling; 17:38
28/05/2021	Red kite	1	-	Adult	-	Commuting; 16:07
23/08/2021	Buzzard	1	-	-	-	
23/08/2021	Buzzard	1	-	-	-	
23/08/2021	Buzzard	10	-	-	-	
23/08/2021	Buzzard	5	-	-	-	
08/06/2021	Buzzard	1	-	-	-	
08/06/2021	Buzzard	1	-	-	-	Hunting
08/06/2021	Buzzard	1	-	-	-	Hunting
08/06/2021	Buzzard	1	-	-	-	Circling
08/06/2021	Buzzard	1	-	-	-	In transit, then circling over woodland
08/06/2021	Red kite	1	-	Adult	-	13:04; commuting
09/06/2021	Buzzard	1	-	-	-	
09/06/2021	Peregrine falcon	2	Male & Female	Adult	PE_1	Pair alarm calling near nest
09/06/2021	Buzzard	1	-	-	-	Hunting over fields; 16:05

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
09/06/2021	Buzzard	1	-	-	-	Hunting then flew to interact with goshawk.
09/06/2021	Buzzard	1	-	-	-	
09/06/2021	Buzzard	1	-	-	-	
09/06/2021	Goshawk	1	Male	Adult	GI_3	Chased buzzard then displayed; heard and seen alarming at 66335,02698; first sighting 16:15
07/03/2022	Buzzard	2	-	-	-	
17/03/2022	Buzzard	1	-	-	-	
17/03/2022	Buzzard	1	-	-	-	
16/06/2021	Buzzard	1	-	-	-	Hunting over field; 11:19
16/06/2021	Buzzard	1	-	-	-	Commuting; 11:52
16/06/2021	Buzzard	2	-	-	-	Hunting
16/06/2021	Buzzard	1	-	-	-	Hunting; 14:11
16/06/2021	Goshawk	1	Male	Adult	GI_3	Chasing buzzard; 12:24
16/06/2021	Goshawk	1	Female	Adult	GI_2	Alarming; seen perched in wood 12:55; 14:20
18/03/2022	Buzzard	1	-	-	-	Hunting.
18/03/2022	Buzzard	1	-	-	-	Hunting.
17/06/2021	Buzzard	1	-	-	-	Commuting; 10:42
17/06/2021	Buzzard	1	-	-	-	Circling; 11:53
17/06/2021	Buzzard	1	-	-	-	Circling then moved off; 13:30
08/07/2021	Buzzard	1	-	-	-	
08/07/2021	Buzzard	1	-	-	-	
08/07/2021	Red kite	1	-	Adult	-	Being chased by buzzard.
21/07/2021	Goshawk	1	-	Adult	GI_3	Perched
21/07/2021	Red kite	2	-	Adult	-	Circling
21/07/2021	Goshawk	1	-	Immature	GI_2	In flight
18/03/2022	Buzzard	1	-	-	-	Hunting.
16/04/2022	Buzzard	1	-	-	-	In flight, near Tornamean.
23/07/2021	Red kite	1	-	Adult	-	In flight; out of survey area; seen on walk out
16/04/2022	Buzzard	1	-	-	-	In flight, near Hill of Corfeidly.
16/04/2022	Buzzard	1	-	-	-	In flight, near Tornamean.
18/08/2021	Buzzard	1	-	-	-	Flew through; landed in wood
25/04/2022	Buzzard	1	-	-	-	Hunting.
25/04/2022	Buzzard	1	-	-	-	Hunting.
23/08/2021	Buzzard	2	-	-	-	Two juveniles; present for most of the survey period
25/04/2022	Buzzard	1	-	-	-	Hunting.
25/04/2022	Buzzard	1	-	-	-	Hunting.
25/04/2022	Buzzard	1	-	-	-	
12/05/2022	Buzzard	1	-	-	-	In flight near gravel pit; hunting.
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; hunting; landed on ground seen taking off.
17/05/2022	Buzzard	1	-	-	-	In flight, near Low's Howe.
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; carrying prey.
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare.
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; landed.
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare.
17/05/2022	Buzzard	1	-	-	-	In flight, near Craigrath.
17/05/2022	Buzzard	1	-	-	-	In flight, near Craigrath.

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare.
17/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; hunting.
17/05/2022	Buzzard	1	-	-	-	In flight, near Craigrath; mobbed by goshawk.
31/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; hunting.
31/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; hunting.
31/05/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare; hunting.
31/05/2022	Buzzard	1	-	-	-	In flight, near Craigrath; hunting.
03/06/2022	Buzzard	1	-	-	-	In flight, near Hill of Cornfeidly; hunting; caught prey.
03/06/2022	Buzzard	1	-	-	-	In flight, near Tornamean.
03/06/2022	Buzzard	1	-	-	-	In flight, near Hill of Cornfeidly.
03/06/2022	Buzzard	1	-	-	-	In flight, near Hill of Cornfeidly.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Tornamean.
09/06/2022	Buzzard	1	-	-	-	In flight, near Tornamean.
09/06/2022	Buzzard	1	-	-	-	In flight, near Greymore.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Hile of Fare.
09/06/2022	Buzzard	1	-	-	-	In flight, near Greymore.
09/06/2022	Buzzard	1	-	-	-	In flight, near Greymore.
20/06/2022	Buzzard	1	-	-	-	In flight, near Tornamean.
20/06/2022	Buzzard	1	-	-	-	In flight, near Craigrath; landed on tree in copse.
05/07/2022	Buzzard	1	-	-	-	In flight, near Craigrath.
06/07/2022	Buzzard	1	-	-	-	In flight, near Blackyduds; hunting.
06/07/2022	Buzzard	1	-	-	-	In flight, near Hill of Fare.
06/07/2022	Buzzard	1	-	-	-	In flight, near Hill of Corfeidly.
06/07/2022	Buzzard	1	-	-	-	In flight, near Craigrath.
07/07/2022	Buzzard	1	-	-	-	In flight, west of Hill of Fare; hunting.
07/07/2022	Buzzard	1	-	-	-	In flight, west of Hill of Fare; hunting.
10/07/2022	Buzzard	1	-	-	-	In flight, Green Shiels; mobbing goshawk.
10/07/2022	Buzzard	1	-	-	-	In flight, near Low's Howe; mobbing goshawk.
06/03/2022	Goshawk	1	-	Adult	GI_3	Circling then perched on larch tree for an hour.
07/03/2022	Buzzard	4	-	-	-	
07/03/2022	Buzzard	2	-	-	-	
07/03/2022	Red kite	1	-	Adult	-	Eating on the wing
10/07/2022	Buzzard	1	-	-	-	In flight, near Tornamean; hovering.
10/07/2022	Buzzard	1	-	-	-	In flight, near Tornamean; hovering.
08/03/2022	Buzzard	1	-	-	-	Perched on tree.
12/08/2022	Buzzard	2	-	-	-	In flight at NJ 750 025; juvenile heard calling nearby.
25/08/2022	Buzzard	1	-	-	-	
17/03/2022	Buzzard	1	-	-	-	Landed.
17/03/2022	Buzzard	2	-	-	-	
17/03/2022	Buzzard	1	-	-	-	Carrying nesting material.

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
17/03/2022	Buzzard	1	-	-	-	
17/03/2022	Goshawk	1	-	Adult	-	Hunting.
17/03/2022	Goshawk	1	-	Adult	-	Hunting.
17/03/2022	Goshawk	1	-	Adult	-	Hunting.
17/03/2022	Goshawk	1	-	Adult	Gl_3	
17/03/2022	Goshawk	1	Female	Adult	Gl_3	Displaying.
17/03/2022	Peregrine falcon	1	-	Adult	-	
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	Hunting.
18/03/2022	Buzzard	1	-	-	-	In flight, Coirmor.
18/03/2022	Buzzard	2	-	-	-	Circling in Turks wood at 1348.
18/03/2022	Buzzard	2	-	-	-	In flight, Craigmad.
18/03/2022	Goshawk	1	Female	Adult	Gl_3	Aggression towards buzzards.
18/03/2022	Goshawk	1	Male	Adult	Gl_3	Aggression towards buzzards.
18/03/2022	Goshawk	1	Female	Adult	Gl_2	Pair; circling over woodland then diverged.
18/03/2022	Goshawk	1	Male	Adult	Gl_2	Pair; circling over woodland then diverged.
18/03/2022	Kestrel	1	-	-	-	Female.
18/03/2022	Kestrel	1	-	-	-	Male.
18/03/2022	Red kite	1	-	Adult	-	Hunting.
18/03/2022	Red kite	1	-	Adult	-	
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	Hunting.
08/04/2022	Buzzard	1	-	-	-	In flight.
08/04/2022	Osprey	1	-	Adult	-	Observed 3 times between 12:15 and 15:15.
08/04/2022	Osprey	1	-	Adult	-	Lost sight as bird flew high into bright sky.
08/04/2022	Buzzard	1	-	-	-	In flight, Craigmad.
08/04/2022	Goshawk	1	-	Adult	Gl_2	Landed.
08/04/2022	Red kite	1	-	Adult	-	
14/04/2022	Buzzard	2	-	-	-	Following red kite.
14/04/2022	Buzzard	1	-	-	-	In flight.
14/04/2022	Golden eagle	1	-	Sub-adult	-	Mobbed by buzzards.
14/04/2022	Goshawk	1	Female	Adult	-	
14/04/2022	Red kite	1	-	Adult	-	
15/04/2022	Sparrowhawk	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	Hunting.
25/08/2022	Buzzard	1	-	-	-	
25/04/2022	Red kite	1	-	Adult	-	
25/04/2022	Red kite	1	-	Adult	-	
25/04/2022	Red Kite	1	-	Adult	-	
25/04/2022	Buzzard	1	-	-	-	In flight.
26/04/2022	Buzzard	2	-	-	-	
26/04/2022	Buzzard	1	-	-	-	In flight.
26/04/2022	Buzzard	1	-	-	-	
26/04/2022	Red kite	1	-	Adult	-	
26/04/2022	Buzzard	1	-	-	-	Hunting.
26/04/2022	Buzzard	1	-	-	-	Hunting.
26/04/2022	Goshawk	1	-	Adult	-	
27/04/2022	Goshawk	1	-	Adult	-	
11/05/2022	Buzzard	1	-	-	-	In flight over woodland.

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
11/05/2022	Buzzard	1	-	-	-	Hunting.
11/05/2022	Buzzard	1	-	-	-	
11/05/2022	Buzzard	1	-	-	-	In flight over woodland.
11/05/2022	Goshawk	1	-	Adult	-	Landed in woodland.
11/05/2022	Red kite	1	-	Adult	-	
12/05/2022	Goshawk	1	-	Adult	-	Carrying large prey item - possible a red grouse.
12/05/2022	Red kite	1	-	Adult	-	
17/05/2022	Buzzard	1	-	-	-	
17/05/2022	Buzzard	1	-	-	-	Landed.
17/05/2022	Buzzard	1	-	-	-	Hunting.
17/05/2022	Kestrel	1	-	-	-	In flight; male.
22/04/2021	Kestrel	1	-	-	-	Male; hunting.
28/05/2021	Kestrel	1	-	-	-	Male; hunting.
08/06/2021	Kestrel	1	-	-	-	
23/08/2021	Kestrel	1	-	-	-	
23/08/2021	Kestrel	1	-	-	-	
23/08/2021	Kestrel	1	-	-	-	
31/05/2022	Buzzard	1	-	-	-	Hunting.
31/05/2022	Goshawk	1	Male	Adult	-	
31/05/2022	Red kite	1	-	Adult	-	
31/05/2022	Buzzard	1	-	-	-	Hunting.
31/05/2022	Buzzard	2	-	-	-	Interacting.
31/05/2022	Buzzard	1	-	-	-	
31/05/2022	Buzzard	1	-	-	-	
31/05/2022	Red kite	2	-	Adult	-	
03/06/2022	Buzzard	1	-	-	-	Hunting.
03/06/2022	Red kite	1	-	Adult	-	
03/06/2022	Buzzard	1	-	-	-	Chasing red kite.
03/06/2022	Buzzard	1	-	-	-	
03/06/2022	Buzzard	1	-	-	-	
03/06/2022	Goshawk	1	Male	Adult	-	Flushed in woodland.
03/06/2022	Goshawk	1	-	Adult	Gl_2	
03/06/2022	Red kite	1	-	Adult	-	Hunting; mobbed by buzzards.
09/06/2022	Red kite	1	-	Adult	-	
09/06/2022	Red kite	1	-	Adult	-	
09/06/2022	Buzzard	1	-	-	-	In flight, Craigmad.
09/06/2022	Buzzard	2	-	-	-	In flight, Cormoir.
09/06/2022	Buzzard	1	-	-	-	In flight; Greyore; hunting.
09/06/2022	Osprey	2	-	Adult	-	
09/06/2022	Red kite	1	-	Adult	-	Hunting.
09/06/2022	Red kite	2	-	Adult	-	Hunting.
09/06/2022	Red kite	1	-	Adult	-	Hunting; carrying prey.
09/06/2022	Red kite	2	-	Adult	-	
07/03/2022	Kestrel	1	-	-	-	
08/03/2022	Kestrel	1	-	-	-	
15/06/2022	Buzzard	1	-	-	-	
15/06/2022	Buzzard	1	-	-	-	
15/06/2022	Red kite	1	-	Adult	-	Hunting.
15/06/2022	Buzzard	1	-	-	-	Hun
15/06/2022	Buzzard	1	-	-	-	In flight, Thronant.
15/06/2022	Goshawk	1	-	Adult	-	

Date	Species	Number recorded	Sex	Age	Nest ID	Notes
15/06/2022	Red kite	1	-	Adult	-	Hunting.
20/06/2022	Red kite	1	-	Adult	-	
20/06/2022	Red kite	1	-	Adult	-	
08/03/2022	Kestrel	1	-	-	-	Hunting.
18/03/2022	Kestrel	1	-	-	-	Hunting.
03/06/2022	Kestrel	1	-	-	-	In flight, near Hill of Cornfeidly; hunting.
23/06/2022	Goshawk	1	-	Adult	-	Initially hunting, then gained height and stooped over woodland.
25/08/2022	Kestrel	1	-	-	-	Hunting.
06/07/2022	Buzzard	1	-	-	-	
06/07/2022	Buzzard	1	-	-	-	Perched.
06/07/2022	Red kite	1	-	Adult	-	
25/08/2022	Kestrel	1	-	-	-	Hunting.
25/08/2022	Kestrel	1	-	-	-	
25/08/2022	Kestrel	1	-	-	-	Hunting.
07/07/2022	Red kite	1	-	Adult	-	
07/07/2022	Red kite	1	-	Adult	-	1 of 2 birds.
07/07/2022	Red kite	1	-	Adult	-	1 of 2 birds.
10/07/2022	Buzzard	1	-	-	-	
26/07/2022	Tawny owl	2	-	-	-	Disturbed from roost.
26/07/2022	Buzzard	1	-	-	-	Calling.
26/07/2022	Buzzard	1	-	-	-	Calling in woodland.
26/07/2022	Goshawk	1	-	Adult	GI_2	Alarm calling.
26/07/2022	Red kite	1	-	Adult	-	
26/07/2022	Red kite	1	-	Adult	-	
05/08/2022	Buzzard	1	-	-	-	
05/08/2022	Buzzard	1	-	-	-	
05/08/2022	Buzzard	1	-	-	-	
05/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	Juvenile; calling frequently.
25/08/2022	Buzzard	1	-	-	-	Perched and calling.
25/08/2022	Kestrel	1	-	-	-	Hunting then aggressive interaction with sparrowhawk.
25/08/2022	Kestrel	1	-	-	-	Hunting.
25/08/2022	Sparrowhawk	1	-	-	-	Hunting meadow pipits.
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Buzzard	1	-	-	-	
25/08/2022	Goshawk	1	-	Adult	GI_2	Calling.
25/08/2022	Kestrel	1	-	-	-	

D.5 Black Grouse Records

No black grouse or signs of black grouse were recorded within 1.5 km of the Proposed Development across all surveys. Refer to **Annex B** for survey methodology and **Annex C** for weather data.

D.6 Bird Species Index

A total of 54 bird species or signs was recorded at, or adjacent, to the Proposed Development during the ornithological surveys. **Table D-5** comprises a list of all these species along with their conservation status.

Table D-5 All bird species recorded at Hill of Fare Wind Farm (October 2020 to August 2022)

Species	Conservation status	Species	Conservation status
Brambling	Schedule 1, BoCC Green	Osprey	Annex 1, Schedule 1, BoCC Amber
Bullfinch	BoCC Amber	Peregrine falcon	Annex 1, Schedule 1, BoCC Green
Buzzard	BoCC Green	Pink-footed goose	BoCC Amber
Chaffinch	BoCC Green	Raven	BoCC Green
Coal tit	BoCC Green	Red grouse	BoCC Green
Common crossbill	Schedule 1, BoCC Green	Red kite	Annex 1, Schedule 1, BoCC Green
Common gull	BoCC Amber	Redwing	Schedule 1, BoCC Amber
Common redstart	BoCC Amber	Ring ouzel	BoCC Red
Cuckoo	BoCC Red	Robin	BoCC Green
Curlew	BoCC Red	Sand martin	BoCC Green
Fieldfare	Schedule 1, BoCC Red	Skylark	BoCC Red
Golden eagle	Annex 1, Schedule 1, BoCC Green	Snipe	BoCC Amber
Golden plover	Annex 1, BoCC Green	Snow bunting	Schedule 1, BoCC Amber
Goldfinch	BoCC Green	Sparrowhawk	BoCC Amber
Goosander	BoCC Green	Spotted flycatcher	BoCC Red
Goshawk	Schedule 1, BoCC Green	Stonechat	BoCC Green
Great spotted woodpecker	BoCC Green	Swallow	BoCC Green
Greylag goose	BoCC Amber	Swift	BoCC Red
Hen harrier	Annex 1, Schedule 1, BoCC Red	Tawny owl	BoCC Amber
Herring gull	BoCC Red	Teal	BoCC Amber
House martin	BoCC Red	Tree pipit	BoCC Red
Jay	BoCC Green	Whooper swan	Annex 1, Schedule 1, BoCC Amber
Kestrel	BoCC Amber	Willow warbler	BoCC Amber
Lesser redpoll	BoCC Red	Wood warbler	BoCC Red
Mallard	BoCC Amber	Woodcock	BoCC Red
Meadow pipit	BoCC Amber	Woodpigeon	BoCC Green
Mistle thrush	BoCC Red	Wren	BoCC Green

ANNEX E. COLLISION RISK ASSESSMENTS

Delaunay Triangulation¹ from the proposed turbine locations was used to create a wind farm area² and from this the Collision Risk Analysis Area (CRAA) was created using a 500 metre (m) buffer (**Figure 9.2**). Using the larger 500m area around the turbines accounts for possible inaccuracies in the recording of flightlines and ensures the assessment is precautionary.

The ultimate aim is to have 100% coverage of the turbines and associated CRAA by the viewsheds, however in practice this is often unachievable as a result of the topography of the Proposed Development and limited to no access outwith the Proposed Development. For the Proposed Development, although some small areas of the CRAA remain 'invisible' at 20m above ground level (**Figure 9.2**), the habitat within these areas is of sufficient similarity such that the survey data collected and subsequently assessed are considered to be representative of the whole CRAA. In addition, there were no records made during any of the surveys which would suggest that this area was of any particular importance to target species. Furthermore, the flying time at risk height (secsHahr¹) for each species is calculated as a single mean activity rate within the entirety of the CRAA.

Table E-1, Table E-2 and **Table E-3** present the parameters which apply to each Collision Risk Model (CRM).

Table E-1 Wind farm parameters

Size of wind farm envelope	797.97	hectares (ha)
Number of turbines	16	turbines
Rotor diameter	155	metres (m)
Hub height	102.5	m
Max. rotor depth	1.2	m (at 15° pitch angle)
Max. chord	4.5	m
Pitch	15	degrees (°)
Rotation period	4.27	seconds (secs)
Turbine operation time	0.85	percent (%)
Risk height: lowest	25 / 45	m
Risk height: highest	180 / 200	m
Flight risk volume	1236848937	m ³

Table E-2 CRM parameters per species

Species	Length (m)	Wingspan (m)	Assumed flight speed, v (ms ⁻¹)	Avoidance rate	Probability of collision	Bird transit time (secs)
Goshawk	0.62	1.65	9.7	0.98	0.0989	0.1840
Greylag goose	0.825	1.635	17.1	0.998	0.0738	0.1164
Hen harrier	0.48	1.1	12	0.99	0.0745	0.1371
Herring gull	0.64	1.5	12.8	0.98	0.0803	0.1410
Osprey	0.58	1.7	11.4	0.98	0.0848	0.1530
Peregrine falcon	0.48	1.1	12.1	0.98	0.0741	0.1359
Pink-footed goose	0.675	1.525	17.3	0.998	0.0674	0.1063
Red kite	0.66	1.95	12	0.99	0.0866	0.1521

¹ Delaunay triangulation is a form of mathematical/computational geometry where a given set of points (in this case the turbine locations) are all joined to create discrete triangles. Further information is available here:

Table E-3 Visible area within the CRAA per vantage point

VP	Area (ha)
3	226.53
4	294.63

Birds are assumed to be active during all the daylight hours and this is estimated by calculating the number of hours per day between sunrise and sunset (adjusting for correct latitude) for the survey seasons as defined in **Table E-4** below.

Table E-4 Season definitions per species/species group

Species	Breeding season		Hours presumed present	Non-breeding season		Hours presumed present
	Start date	End date		Start date	End date	
Geese	15 th May	31 st August	1,828	1 st September	14 th May	2,675
Gulls	15 th March	31 st August	2,689	1 st September	14 th March	1,815
Raptors	15 th March	31 st August	2,689	1 st September	14 th March	1,815

Outputs for the CRM for the following species are presented in the following order below:

- Goshawk;
- Greylag goose;
- Hen harrier;
- Herring gull;
- Osprey;
- Peregrine falcon;
- Pink-footed goose; and
- Red kite.

<https://uk.mathworks.com/help/matlab/math/delaunay-triangulation.html>

² This was adjusted where appropriate depending on the spatial location of the turbines in relation to other turbines.

E.1 Goshawk

Non-Breeding Season 2020/2021: 180 m Tip

Table E-5 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	5.84	5889.71	0.00000012
4	0	7660.36	0

Table E-6 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.00010	hr ¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	0.1734	hrs/season
Bird occupancy of rotor swept volume	0.2720	bird-sec
No. of transits through rotors	1.4783	per season
Estimated collisions	0.1462	per season
Estimated collisions after correction for operation	0.1243	per season
Estimated collisions after avoidance factor	0.0025	per season
Equivalent to 1 bird every	402	seasons

Breeding Season 2021: 180 m Tip

Table E-7 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	3.49	8154.99	0.00000001
4	195.68	10606.65892	0.00000029

Table E-8 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.0024	hr ¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	6.3267	hrs/season
Bird occupancy of rotor swept volume	9.9220	bird-sec
No. of transits through rotors	53.9275	per season
Estimated collisions	5.3334	per season
Estimated collisions after correction for operation	4.5333	per season
Estimated collisions after avoidance factor	0.0907	per season
Equivalent to 1 bird every	11	seasons

Non-Breeding Season 2021/2022: 180 m Tip

Table E-9 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	25.67	8608.04	0.00000036
4	13.97	11195.92	0.00000002

Table E-10 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.00044	hr ¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	0.8050	hrs/season
Bird occupancy of rotor swept volume	1.2625	bird-sec
No. of transits through rotors	6.8620	per season
Estimated collisions	0.6786	per season
Estimated collisions after correction for operation	0.5768	per season
Estimated collisions after avoidance factor	0.0115	per season
Equivalent to 1 bird every	87	seasons

Breeding Season 2022: 180 m Tip

Table E-11 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	17.00	8154.99	0.00000025
4	25.85	10606.66	0.00000038

Table E-12 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.00051	hr ¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	1.3611	hrs/season
Bird occupancy of rotor swept volume	2.1346	bird-sec
No. of transits through rotors	11.6020	per season
Estimated collisions	1.1474	per season
Estimated collisions after correction for operation	0.9753	per season
Estimated collisions after avoidance factor	0.0195	per season
Equivalent to 1 bird every	51	seasons

Breeding Season 2021: 200 m Tip

Table E-13 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	8154.99	0
4	230.69	10606.66	0.0000034

Table E-14 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.0027	hr ⁻¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	7.3276	hrs/season
Bird occupancy of rotor swept volume	11.4917	bird-sec
No. of transits through rotors	62.4588	per season
Estimated collisions	6.1771	per season
Estimated collisions after correction for operation	5.2505	per season
Estimated collisions after avoidance factor	0.1050	per season
Equivalent to 1 bird every	9.5	seasons

Non-Breeding Season 2021/2022: 200 m Tip

Table E-15 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	32.83	8608.04	0.00000046
4	16.58	11195.92	0.00000023

Table E-16 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.00055	hr ⁻¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	1.004	hrs/season
Bird occupancy of rotor swept volume	1.5738	bird-sec
No. of transits through rotors	8.5541	per season
Estimated collisions	0.8460	per season
Estimated collisions after correction for operation	0.7191	per season
Estimated collisions after avoidance factor	0.0144	per season
Equivalent to 1 bird every	70	seasons

Breeding Season 2022: 200 m Tip

Table E-17 Goshawk flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	23.62	8154.99	0.00000035
4	24.53	10606.66	0.00000036

Table E-18 Goshawk mortality estimates

Mean activity in wind farm at rotor height	0.00057	hr ⁻¹
Total Combined rotor swept volume	538809	m ³
Bird occupancy	1.5294	hrs/season
Bird occupancy of rotor swept volume	2.3986	bird-sec
No. of transits through rotors	13.0366	per season
Estimated collisions	1.2893	per season
Estimated collisions after correction for operation	1.0959	per season
Estimated collisions after avoidance factor	0.0219	per season
Equivalent to 1 bird every	46	seasons

E.2 Greylag Goose

Non-Breeding Season 2020/2021: 180 m Tip

Table E-19 Greylag goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	325.09	8608.04	0.00000044
4	0	12079.81	0

Table E-20 Greylag goose mortality estimates

Mean activity in wind farm at rotor height	0.0035	hr ⁻¹
Total Combined rotor swept volume	600700	m ³
Bird occupancy	9.3176	hrs/season
Bird occupancy of rotor swept volume	16.2911	bird-sec
No. of transits through rotors	140.0107	per season
Estimated collisions	10.3277	per season
Estimated collisions after correction for operation	8.7786	per season
Estimated collisions after avoidance factor	0.0176	per season
Equivalent to 1 bird every	57	seasons

E.3 Hen Harrier

Breeding Season 2022: 180 m Tip

Table E-21 Hen harrier flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	8154.99	0
4	14.96	10606.66	0.00000022

Table E-22 Hen harrier mortality estimates

Mean activity in wind farm at rotor height	0.00018	hr ¹
Total Combined rotor swept volume	496542	m ³
Bird occupancy	0.4752	hrs/season
Bird occupancy of rotor swept volume	0.6868	bird-sec
No. of transits through rotors	5.0110	per season
Estimated collisions	0.3735	per season
Estimated collisions after correction for operation	0.3175	per season
Estimated collisions after avoidance factor	0.0032	per season
Equivalent to 1 bird every	315	seasons

E.4 Herring Gull

Breeding Season 2021: 180 m Tip

Table E-23 Herring gull flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	40.50	8154.99	0.0000006
4	0	10606.66	0

Table E-24 Herring gull mortality estimates

Mean activity in wind farm at rotor height	0.00048	hr ¹
Total Combined rotor swept volume	544847	m ³
Bird occupancy	1.2864	hrs/season
Bird occupancy of rotor swept volume	2.0400	bird-sec
No. of transits through rotors	14.47	per season
Estimated collisions	1.16	per season
Estimated collisions after correction for operation	0.9878	per season
Estimated collisions after avoidance factor	0.0198	per season
Equivalent to 1 bird every	51	seasons

Breeding Season 2021: 200 m Tip

Table E-25 Herring gull flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	40.56	8154.99	0.0000006
4	0	10606.66	0

Table E-26 Herring gull mortality estimates

Mean activity in wind farm at rotor height	0.00048	hr ¹
Total Combined rotor swept volume	544847	m ³
Bird occupancy	1.2885	hrs/season
Bird occupancy of rotor swept volume	2.0434	bird-sec
No. of transits through rotors	14.4928	per season
Estimated collisions	1.1640	per season
Estimated collisions after correction for operation	0.9894	per season
Estimated collisions after avoidance factor	0.0198	per season
Equivalent to 1 bird every	51	seasons

E.5 Osprey

Breeding Season 2022: 180 m Tip

Table E-27 Osprey flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	8154.99	0
4	111.31	10606.66	0.0000016

Table E-28 Osprey mortality estimates

Mean activity in wind farm at rotor height	0.0013	hr ¹
Total Combined rotor swept volume	526733	m ³
Bird occupancy	3.5357	hrs/season
Bird occupancy of rotor swept volume	5.4206	bird-sec
No. of transits through rotors	35.4192	per season
Estimated collisions	3.0022	per season
Estimated collisions after correction for operation	2.5519	per season
Estimated collisions after avoidance factor	0.0510	per season
Equivalent to 1 bird every	19.6	seasons

Breeding Season 2022: 200 m Tip

Table E-29 Osprey flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	8154.99	0
4	94.08	10606.66	0.0000014

Table E-30 Osprey mortality estimates

Mean activity in wind farm at rotor height	0.0011	hr ⁻¹
Total Combined rotor swept volume	526733	m ³
Bird occupancy	2.9883	hrs/season
Bird occupancy of rotor swept volume	4.5814	bird-sec
No. of transits through rotors	29.9356	per season
Estimated collisions	2.5374	per season
Estimated collisions after correction for operation	2.1568	per season
Estimated collisions after avoidance factor	0.0431	per season
Equivalent to 1 bird every	23.2	seasons

E.6 Peregrine Falcon

Breeding Season 2021: 180 m Tip

Table E-31 Peregrine falcon flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	7	8154.99	0.0000001
4	0	10606.66	0

Table E-32 Peregrine falcon mortality estimates

Mean activity in wind farm at rotor height	0.000083	hr ⁻¹
Total Combined rotor swept volume	496542	m ³
Bird occupancy	0.2224	hrs/season
Bird occupancy of rotor swept volume	0.3214	bird-sec
No. of transits through rotors	2.3642	per season
Estimated collisions	0.1752	per season
Estimated collisions after correction for operation	0.1489	per season
Estimated collisions after avoidance factor	0.0030	per season
Equivalent to 1 bird every	336	seasons

Non-Breeding Season 2021/2022: 180 m Tip

Table E-33 Peregrine falcon flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	8608.04	0
4	151.40	11195.92	0.0000021

Table E-34 Peregrine falcon mortality estimates

Mean activity in wind farm at rotor height	0.0017	hr ⁻¹
Total Combined rotor swept volume	496542	m ³
Bird occupancy	3.0750	hrs/season
Bird occupancy of rotor swept volume	4.4442	bird-sec
No. of transits through rotors	32.6959	per season
Estimated collisions	2.4224	per season
Estimated collisions after correction for operation	2.0590	per season
Estimated collisions after avoidance factor	0.0412	per season
Equivalent to 1 bird every	24.3	seasons

Breeding Season 2021: 200 m Tip

Table E-35 Peregrine falcon flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	6.42	8154.99	0.0000001
4	0	10606.66	0

Table E-36 Peregrine falcon mortality estimates

Mean activity in wind farm at rotor height	0.000076	hr ⁻¹
Total Combined rotor swept volume	496542	m ³
Bird occupancy	0.2038	hrs/season
Bird occupancy of rotor swept volume	0.2946	bird-sec
No. of transits through rotors	2.1672	per season
Estimated collisions	0.1606	per season
Estimated collisions after correction for operation	0.1365	per season
Estimated collisions after avoidance factor	0.0027	per season
Equivalent to 1 bird every	366	seasons

Non-Breeding Season 2021/2022: 200 m Tip

Table E-37 Peregrine falcon flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	8608.04	0
4	104.78	11195.92	0.0000015

Table E-38 Peregrine falcon mortality estimates

Mean activity in wind farm at rotor height	0.0012	hr ⁻¹
Total Combined rotor swept volume	496542	m ³
Bird occupancy	2.1283	hrs/season
Bird occupancy of rotor swept volume	3.0759	bird-sec
No. of transits through rotors	22.6292	per season
Estimated collisions	1.6766	per season
Estimated collisions after correction for operation	1.4251	per season
Estimated collisions after avoidance factor	0.0285	per season
Equivalent to 1 bird every	35	seasons

E.7 Pink-footed Goose

Non-Breeding Season 2020/2021: 180 m Tip

Table E-39 Pink-footed goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	1871.15	8608.04	0.000025
4	147.22	12079.81	0.000002

Table E-40 Pink-footed goose mortality estimates

Mean activity in wind farm at rotor height	0.022	hr ⁻¹
Total Combined rotor swept volume	555414	m ³
Bird occupancy	57.84919937	hrs/season
Bird occupancy of rotor swept volume	93.5191	bird-sec
No. of transits through rotors	879.4325925	per season
Estimated collisions	59.2791	per season
Estimated collisions after correction for operation	50.3872	per season
Estimated collisions after avoidance factor	0.1008	per season
Equivalent to 1 bird every	10	seasons

Non-Breeding Season 2021/2022: 180 m Tip

Table E-41 Pink-footed goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	11326.37	0
4	3057.34	15615.36	0.000032

Table E-42 Pink-footed goose mortality estimates

Mean activity in wind farm at rotor height	0.025	hr ⁻¹
Total Combined rotor swept volume	555414	m ³
Bird occupancy	67.2867	hrs/season
Bird occupancy of rotor swept volume	108.7757815	bird-sec
No. of transits through rotors	1022.9035	per season
Estimated collisions	68.9499	per season
Estimated collisions after correction for operation	58.60740286	per season
Estimated collisions after avoidance factor	0.1172	per season
Equivalent to 1 bird every	8.5	seasons

Non-Breeding Season 2020/2021: 200 m Tip

Table E-43 Pink-footed goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	3114.44	8608.04	0.000042
4	143.63	12079.81	0.0000019

Table E-44 Pink-footed goose mortality estimates

Mean activity in wind farm at rotor height	0.035	hr ⁻¹
Total Combined rotor swept volume	555414	m ³
Bird occupancy	93.3805	hrs/season
Bird occupancy of rotor swept volume	150.959	bird-sec
No. of transits through rotors	1419.585223	per season
Estimated collisions	95.6886	per season
Estimated collisions after correction for operation	81.3353	per season
Estimated collisions after avoidance factor	0.1627	per season
Equivalent to 1 bird every	6.1	seasons

Non-Breeding Season 2021/2022: 200 m Tip

Table E-45 Pink-footed goose flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	0	11326.37	0
4	4841.17	15615.36	0.00005

Table E-46 Pink-footed goose mortality estimates

Mean activity in wind farm at rotor height	0.04	hr ⁻¹
Total Combined rotor swept volume	555414	m ³
Bird occupancy	106.5459783	hrs/season
Bird occupancy of rotor swept volume	172.2422919	bird-sec
No. of transits through rotors	1619.728655	per season
Estimated collisions	109.1795084	per season
Estimated collisions after correction for operation	92.8026	per season
Estimated collisions after avoidance factor	0.1856	per season
Equivalent to 1 bird every	5.4	seasons

E.8 Red Kite

Breeding Season 2021: 180 m Tip

Table E-47 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	417.35	8154.99	0.0000062
4	778.74	10606.66	0.000012

Table E-48 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.014	hr ⁻¹
Total Combined rotor swept volume	550885	m ³
Bird occupancy	37.9933	hrs/season
Bird occupancy of rotor swept volume	60.9193	bird-sec
No. of transits through rotors	400.6341	per season
Estimated collisions	34.7145	per season
Estimated collisions after correction for operation	29.5073	per season
Estimated collisions after avoidance factor	0.2951	per season
Equivalent to 1 bird every	3.4	seasons

Non-Breeding Season 2021/2022: 180 m Tip

Table E-49 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	221.32	8608.04	0.0000031
4	262.15	11195.92	0.0000037

Table E-50 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.0054	hr ⁻¹
Total Combined rotor swept volume	550885	m ³
Bird occupancy	9.8198	hrs/season
Bird occupancy of rotor swept volume	15.7453	bird-sec
No. of transits through rotors	103.5484	per season
Estimated collisions	8.9723	per season
Estimated collisions after correction for operation	7.6265	per season
Estimated collisions after avoidance factor	0.0763	per season
Equivalent to 1 bird every	13	seasons

Breeding Season 2022: 180 m Tip

Table E-51 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	29.89	8154.99	0.00000044
4	2471.87	10606.66	0.000037

Table E-52 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.03	hr ⁻¹
Total Combined rotor swept volume	550885	m ³
Bird occupancy	79.4669	hrs/season
Bird occupancy of rotor swept volume	127.418797	bird-sec
No. of transits through rotors	837.9665391	per season
Estimated collisions	72.60879888	per season
Estimated collisions after correction for operation	61.7175	per season
Estimated collisions after avoidance factor	0.6172	per season
Equivalent to 1 bird every	1.6	seasons

Breeding Season 2021: 200 m Tip

Table E-53 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	337.45	8154.99	0.000005
4	607.68	10606.66	0.000009

Table E-54 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.011	hr ⁻¹
Total Combined rotor swept volume	550885	m ³
Bird occupancy	30.0213	hrs/season
Bird occupancy of rotor swept volume	48.1368	bird-sec
No. of transits through rotors	316.5705534	per season
Estimated collisions	27.4305	per season
Estimated collisions after correction for operation	23.3159	per season
Estimated collisions after avoidance factor	0.2332	per season
Equivalent to 1 bird every	4.3	seasons

Non-Breeding Season 2021/2022: 200 m Tip

Table E-55 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	89.60	8608.04	0.0000013
4	101.08	11195.92	0.0000014

Table E-56 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.0021	hr ⁻¹
Total Combined rotor swept volume	550885	m ³
Bird occupancy	3.8729	hrs/season
Bird occupancy of rotor swept volume	6.2099	bird-sec
No. of transits through rotors	40.8391	per season
Estimated collisions	3.5387	per season
Estimated collisions after correction for operation	3.008	per season
Estimated collisions after avoidance factor	0.0301	per season
Equivalent to 1 bird every	33	seasons

Breeding Season 2022: 200m Tip

Table E-57 Red kite flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr ¹)
3	27.73	8154.99	0.00000041
4	1394.51	10606.66	0.000021

Table E-58 Red kite mortality estimates

Mean activity in wind farm at rotor height	0.017	hr ⁻¹
Total Combined rotor swept volume	550885	m ³
Bird occupancy	45.1768	hrs/season
Bird occupancy of rotor swept volume	72.4374	bird-sec
No. of transits through rotors	476.3827905	per season
Estimated collisions	41.27799931	per season
Estimated collisions after correction for operation	35.08629941	per season
Estimated collisions after avoidance factor	0.3509	per season
Equivalent to 1 bird every	2.9	seasons