



Foel Fach Wind Farm Limited.

Foel Fach Wind Farm – Environmental Statement Volume III

Appendix 6.1: Ornithology

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Energy for
generations



Foel Fach Wind Farm

on behalf of Foel Fach Wind Farm Limited

Environmental Statement

Appendix 6.1: Ornithology



CONTENTS

EXECUTIVE SUMMARY	1
1 INTRODUCTION	1
1.2 Key Guidance	1
1.3 Target Species.....	2
2 METHODOLOGY.....	3
2.1 Desk Study and Consultation	3
2.2 Field Surveys.....	4
3 RESULTS	9
3.1 Desk Study	9
3.2 Field Surveys.....	10
4 REFERENCES	12

ANNEXES

Annex 1: Bird Species Summary

Annex 2: Ornithology Field Survey Effort

Annex 3: VP Flight Activity Survey: Target Species Flights

EXECUTIVE SUMMARY

Baseline information gathered from desk study sources and two years of field surveys is provided in this Technical Appendix. Information herein is considered non-sensitive/non-confidential. The results suggest the Application Site (herein “the Site”) is used by a modest and narrow range of key bird species, with the most regular species encountered red kite (although there was no evidence of breeding of this species). Other species of interest recorded included breeding curlew and hobby.

1 INTRODUCTION

- 1.1.1 This Technical Appendix has been prepared to accompany Environmental Statement (**ES**) **Volume II, Chapter 6: Ornithology**, for the Proposed Development.
- 1.1.2 It presents detailed methodologies and results of desk study and field surveys completed to establish baseline ornithological conditions and should be read with reference to the following figures presented in **ES Volume IV**:
 - **Figure 6.1:** Ornithological Statutory Designated Sites
 - **Figure 6.2:** Vantage Point Flight Activity Survey Plan
 - **Figure 6.3:** Breeding Bird Survey Plan
 - **Figure 6.4a:** Target Species Flight Activity – Red Kite (Year 1)
 - **Figure 6.4b:** Target Species Flight Activity – Other Species (Year 1)
 - **Figure 6.5a:** Target Species Flight Activity – Red Kite (Year 2)
 - **Figure 6.5b:** Target Species Flight Activity – Other Species (Year 2)
 - **Figure 6.6:** Moorland Breeding Bird Survey Results (Year 1)
 - **Figure 6.7:** Moorland Breeding Bird Survey Results (Year 2)
 - **Figure 6.8a:** Existing Ornithological Records (Cofnod) (Confidential)
 - **Figure 6.8b:** Existing Ornithological Breeding Records (Cofnod) (Confidential)
 - **Figure 6.8c:** Existing Ornithological Records (RSPB) (Confidential)
 - **Figure 6.8d:** Existing Ornithological Breeding Records (RSPB) (Confidential)
 - **Figure 6.9a:** Breeding Raptor and Owl Survey Results (Year 1) (Confidential), and
 - **Figure 6.9b:** Breeding Raptor and Owl Survey Results (Year 2) (Confidential).
- 1.1.3 Information considered sensitive or ‘confidential’ will not be made publicly available but will be provided to Natural Resources Wales (NRW) and Gwynedd Council.
- 1.1.4 Only common species names are used throughout this Technical Appendix. Scientific names for all species referenced (and the conservation status as relevant) are provided in **Annex 1**.

1.2 Key Guidance

- 1.2.1 Ornithology survey methodologies and subsequent interpretation of results has made reference to the following key industry standard guidance:
 - Brown, A.F. and Shepherd, K.B. (1993). *A method for censusing upland breeding waders*. Bird Study 40, 189-195.

- NatureScot (2025a). *Recommended bird survey methods to inform impact assessment of onshore windfarms*. Updated: March 2025¹.
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). *Raptors: a field guide to survey and monitoring*. Third Edition. The Stationery Office, Edinburgh.
- Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird monitoring methods*. A manual of techniques for key UK species. RSPB, Sandy, Bedfordshire.
- Stanbury, A., Eaton, M., Aebscher, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. and Win, I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, 114, pp. 723-747.
- Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. and Taylor, R.C. (2022). Birds of Conservation Concern Wales 4: the population status of birds in Wales. *Milvus*, Online First, December 2022.
- Scottish Natural Heritage (SNH)² (2000). *Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action*. SNH Guidance Note.
- NatureScot (2025b). *Guidance note - Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected species*. March 2025³.
- SNH (2016). *Assessing connectivity with Special Protection Areas (SPAs)*. Guidance. Version 3 – June 2016.

1.2.2 In the absence of Welsh-specific wind farm guidance, baseline information gathering has been undertaken in accordance with NatureScot (previously SNH) guidance (listed above).

1.3 Target Species

1.3.1 Following NatureScot guidance (2025a and 2025b), target species are those which are afforded a higher level of legislative protection, and thus are principally drawn from these species' lists:

- Annex 1 of the EC Birds Directive
- Schedule 1 of the Wildlife & Countryside Act 1981, and

¹ Note, the surveys were undertaken in accordance with the previous version of the guidance given the updated NatureScot guidance was published this year (2025), thus after surveys were completed. The previous version of the guidance is Scottish Natural Heritage (SNH) (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2. March 2017. This approach to surveys was agreed with NRW during consultation as detailed in **ES Volume II, Chapter 6**. Consideration of the previous version of the guidance rather than the 2025 updated version for the approach to surveys is not considered a notable consideration or limitation, with the two versions of the guidance largely comparable.

² Now NatureScot.

³ The survey was based on the original version of the guidance given the latest guidance was only updated this year (2025), after the completion of surveys. The previous version of the guidance was SNH (2018). *Assessing significance of impacts from onshore wind farm outwith designated areas*. Guidance. Version 2 – February 2018. See footnote 1 for further information.

- Birds of Conservation Concern (BoCC) Red-listed in the UK (Stanbury *et al.*, 2021) and those BoCC Red-listed in Wales (Johnstone *et al.*, 2022).

1.3.2 Species listed on Section 7 of the Environment (Wales) Act, were also considered during surveys. Target species for the different survey types are reiterated in the respective sections below.

2 METHODOLOGY

2.1 Desk Study and Consultation

2.1.1 In accordance with NatureScot guidance (2025a), a desk study was undertaken to ascertain an overview of likely bird populations and designated sites in proximity to the Site, in order to identify possible target species to inform the requirements for survey.

2.1.2 The desk study included a review of the key sources summarised in **Table 2.1**. Note, ornithological records were restricted to the most recent available records (since, and including, 2013) and ‘target species’ as defined above in **Section 1.3**.

2.1.3 Additional peer reviewed literature and industry guidance has also been reviewed and is referred to where relevant.

2.1.4 Details of all consultation undertaken in relation to ornithology is presented in **ES Volume II, Chapter 6: Ornithology**.

Table 2.1: Desk study key sources and information sought.

Key Source	Date of Consultation	Information Sought	Search Area
NRW’s website https://naturalresources.wales/?lang=en DEFRA’s ‘MAGIC’ website https://magic.defra.gov.uk/magicmap.aspx	January 2025	Proximity to statutory designated sites.	Within 10 km of the Site, extended to 20 km for internationally designated sites with qualifying migratory waterfowl features (see ES Volume IV, Figure 6.1: Ornithological Statutory Designated Sites).
Cofnod (the local environmental records centre for North Wales)	November 2023	Existing ornithological records, and non-statutory designated sites.	Within 2 km of the Site ⁴ (as shown in ES Volume IV, Figures 6.8a: Existing Ornithological Records (Cofnod))

⁴ Note, this was based on an original Site boundary which was more extended than the final Site boundary, so the search area used during the desk study was greater than 2 km from the Site.

Key Source	Date of Consultation	Information Sought	Search Area
			<p>(Confidential) and 6.8b: Existing Ornithological Breeding Records (Cofnod) (Confidential).</p> <p>With regards to non-statutory sites ES Volume IV, Figure 5.2: Ecological Non-Statutory Designated Sites.</p>
Royal Society for the Protection of Birds (RSPB)	December 2023	Existing ornithological records.	<p>Within 6 km of the Site⁴ (as shown in ES Volume IV, Figures 6.8c: Existing Ornithological Records (RSPB) (Confidential) and 6.8d: Existing Ornithological Breeding Records (RSPB) (Confidential)).</p>

2.2 Field Surveys

2.2.1 Detailed knowledge of bird populations, distributions and flight activity in order to assess the potential effects of the Proposed Development upon ornithological features, has been derived from field surveys undertaken between 2021 and 2023.

2.2.2 The scope of surveys undertaken was informed through proximity to designated sites, existing knowledge of sensitive species, and with reference to NatureScot guidance (2025a and 2025b).

2.2.3 The following ornithological field surveys have been completed:

- Vantage Point (VP) flight activity surveys (September 2021 to August 2023)
- Moorland Breeding Bird Surveys (MBBS) (2022 and 2023), and
- Annex 1/Schedule 1 breeding raptor and owl searches (2022 and 2023).

VP Flight Activity Surveys

2.2.4 VP flight activity surveys were undertaken between September 2021 and August 2023, providing coverage of two full years.

VP Locations and Viewsheds

2.2.5 Two VP locations (termed 'VP1' and 'VP2') were used to provide a comprehensive visual coverage of the VP study area required for the Proposed Development in accordance with current NatureScot guidance (2025a), as illustrated in **ES Volume IV, Figure 6.2: Vantage Point Flight Activity Survey Plan** and summarised in **Table 2.2**.

2.2.6 Modelled areas of visibility within the 2 km viewsheds from each VP location are further detailed in **ES Volume III, Appendix 6.2: Collision Risk Model Analysis**.

Table 2.2: VP locations.

VP	Grid Reference	Orientation
1	SH 92894 41045	South south-east
2	SH 93878 42179	South south-east

VP Survey Effort

2.2.7 The total survey effort (hours) completed at each VP location between 2021 and 2023 is summarised in **Table 2.3**.

2.2.8 Full details of all survey times and weather conditions are presented in **Annex 2**.

Table 2.3: VP flight activity survey effort – 2021 to 2023.

VP	2021				2022								Total (Year 1)
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
1	6	6	6	6	6	6	6	9	9	9	9	9	87
2	6	6	6	6	6	6	6	9	9	9	9	9	87
VP	2022				2023								Total (Year 2)
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
1	6	3	9	9	3	6	6	9	9	9	9	6	84
2	6	3	9	3	9	6	6	9	9	6	12	6	84

2.2.9 Survey effort in Year 1 (2021-2022) and Year 2 (2022-2023) exceeded the minimum recommended survey effort outlined within NatureScot guidance (2025a) i.e. a minimum of 72 hours per VP location divided between breeding and non-breeding seasons. The breeding season is considered indicatively as March to August, and the non-breeding season as September to February.

2.2.10 Survey times were dispersed throughout the day and were also completed in a range of weather conditions, but always conducive to survey and safe access.

2.2.11 In accordance with NatureScot guidance (2025a), flight lines were mapped for all target species passing through the VP study area. Details of species, number of birds, flight height in bands, duration and direction were noted on standardised recording forms and field plans.

2.2.12 The following height bands (HT) were used in the field when recording flight activity:

- Height band 1 = <20 m
- Height band 2 = 20 – 50 m

- Height band 3 = 50 – 150 m
- Height band 4 = 150 – 180 m
- Height band 5 = 180 – 200 m
- Height band 6 = 200 – 250 m, and
- Height band 7 = >250 m.

Target Species

2.2.13 Target species recording comprised all Annex 1 and Schedule 1 listed raptors and owls, all waders, all geese, swans and ducks (apart from feral species and mallard), and other wetland species (including herons and egrets) as observed during survey. Kestrel, which is listed on the Environment (Wales) Act Section 7 and is a BoCC Red-listed species in Wales (Johnstone *et al.*, 2022), was also included⁵.

Secondary Species

2.2.14 Secondary species were also noted in approximately 15-minute summary intervals, with the number of birds present and general behaviour recorded in order to build an overall picture of activity.

2.2.15 Secondary species were defined as commoner raptors (buzzard and sparrowhawk), all gulls, feral species, mallard and raven, along with any large concentrations of Schedule 1 or BoCC Red-listed passerines (from Stanbury *et al.*, 2021 and/ or Johnstone *et al.*, 2022) as recorded during survey.

Collision Risk Mortality

2.2.16 For species for which there is sufficient (considered greater or equal to three flights, or greater or equal to ten birds if less than three flights during any survey year) ‘risk’ from collision flight activity data, collision risk mortality as a result of birds colliding with rotor blades has been assessed using collision risk modelling (CRM) analysis as detailed in Band (2024).

2.2.17 CRM analysis has accordingly been undertaken for red kite (in Years 1 and 2), golden plover (in Years 1 and 2) and kestrel (in Year 2 only) with explanation and results presented in **Appendix 6.2**.

Moorland Breeding Bird Surveys

2.2.18 MBBs were undertaken in 2022 and 2023.

2.2.19 A MBBS was undertaken following an adapted Brown and Shepherd (1993) methodology, in accordance with NatureScot guidance (2025a) and comprised staggered visits, at least two weeks apart between April and August 2022 (Year 1), and in Year 2, staggered visits, at least two weeks apart between April and July 2023.

2.2.20 Target species for survey included wildfowl (excluding mallard and feral species), waders and gulls. Observations of Schedule 1 passerines and those on Section 7 of the Environment (Wales) Act 2016 were also recorded.

2.2.21 The study area comprised suitable open moorland habitats extended out to (at least) 500 m from the proposed turbine locations, as access allowed and as shown on **ES Volume IV, Figure 6.3: Breeding Bird Survey Plan**.

⁵ Note, kestrel was included as a target species for the Year 2 surveys.

2.2.22 During survey all target species were recorded onto a base map, with the type of activity noted (e.g. calling, singing, seen, displaying).

2.2.23 All surveys were undertaken during daylight hours and in fine conditions conducive to survey. All surveys were timed to capture the main period optimal for MBBS (08:30 - 18:00 hrs), in accordance with standard guidance (NatureScot, 2025a). This ensured that the time when target species (described above) are most active was appropriately covered by the survey period. Survey effort is summarised in **Table 2.4**. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2**.

Table 2.4: MBBS effort.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2022 (Year 1)	1	13/04/2022	08:30	16:10
	2	31/05/2022	07:00	12:30
	3	23/06/2022	07:40	13:10
	4	21/07/2022	09:00	14:50
	5	23/08/2022	07:00	14:00
2023 (Year 2)	1	19/04/2023	08:10	14:25
	2	11/05/2023	07:40	14:30
	3	01/06/2023	07:30	13:30
	4	24/07/2023	09:10	16:30

Annex 1/Schedule 1 Breeding Raptor and Owl Searches

2.2.24 Searches for breeding Annex 1 and Schedule 1 listed raptors and owls were conducted between April and August 2022 (Year 1) and April and July 2023 (Year 2), adopting species-specific survey advice from Hardey *et al.* (2013), in accordance with NatureScot (2025a).

2.2.25 The study area comprised out to 2 km from the proposed turbine locations for all Annex 1 and Schedule 1 listed raptor and owl species, as access allowed and as shown on **ES Volume IV, Figure 6.3**. Evidence of kestrel was also searched for, given the species is a BoCC Red-listed species in Wales (Johnstone *et al.*, 2022) and a Section 7 of the Environment (Wales) Act species.

2.2.26 Searches consisted of a combination of walkover surveys and vantage point watches over suitable habitat features to determine occupancy and/or any breeding/ territorial behaviour.

2.2.27 All survey visits were undertaken in fine weather conditions conducive to survey. Surveys extending out of the Site were typically carried out from publicly accessible areas or from the Site looking offsite. Survey effort is summarised in **Table 2.5**. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2**.

Table 2.5: Breeding raptor and owl search effort summary.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2022 (Year 1)	1	27/04/2022	08:15	15:00
	2	20/05/2022	06:50	13:20
	3	14/06/2022	07:00	13:00

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
	4	29/07/2022	07:30	12:50
	5	12/08/2022	05:45	12:50
2023 (Year 2)	1	21/04/2023	07:00	11:45
	2	11/05/2023	07:45	13:30
	3	02/06/2023	07:30	13:30
	4	25/07/2023	10:20	16:45

Field Survey Personnel

2.2.28 All field surveys were completed by experienced and professional ornithologists named in **Annex 2**; all of whom are all fully conversant in recognised bird survey methodologies for proposed wind turbine developments.

Other Surveys

2.2.29 No further field surveys were undertaken. In accordance with standard guidance (NatureScot, 2025a) winter walkover surveys were not carried out, given the Site is not within 20 km of any designated site with qualifying migratory goose interests. Furthermore, the desk study baseline gathering exercise did not identify the Site (or surrounding area) as being a notable area for migratory species, and ornithology surveys (VP flight activity surveys) were undertaken during the non-breeding period which would have recorded any such bird use of the Site. No nightjar surveys were undertaken given the Proposed Development will not affect any suitable nightjar habitat (forestry edge, rides, etc).

Field Survey Limitations

2.2.30 The undulating topography of the Site provides some limitations to providing full visual coverage of the VP study area required for the Proposed Development, in accordance with NatureScot guidance (2025a). As can be seen in **ES Volume IV, Figure 6.2**, there are some minimal gaps in visibility, however these are considered to be very small relative to the extensive coverage provided across the study area. Furthermore, all proposed turbines have been appropriately covered.

2.2.31 Digital Elevation Model (DEM) and subsequent ground-truthing has sought to ensure maximum visual coverage (using the minimum number of VPs) in accordance with NatureScot (2025a).

2.2.32 During the MBBS and Annex 1/Schedule 1 breeding raptor and owl searches some areas within the respective 500 m and 2 km study areas were surveyed from nearby publicly accessible areas, and from searching using optical equipment from the Site itself. These study areas were appropriately covered from these adjacent areas. Breeding bird assemblages recorded are representative of the habitats within the Site and wider study areas, and no limitations for subsequent assessment are considered.

2.2.33 As shown in **ES Volume IV, Figure 6.3**, the western extreme of the proposed access track is outside the MBBS study area. This is not considered a limitation as this area was the access to the Site used during MBBS, so any target species (such as curlew) in this area would have been anecdotally recorded. The proposed access track also follows an existing rough, stone track through grazed pasture which is unremarkable habitat for supporting target species.

2.2.34 NatureScot guidance (2025a) recommends that VPs be sited outside the turbine area of the Proposed Development to prevent the presence of the surveyor from potentially altering flight behaviour and artificially reducing the level of activity during the course of the survey. VPs 1 and 2 are located within the turbine envelope (within 500 m, albeit both are several hundred metres from the nearest turbine). At all VPs, surveyors were positioned off the peaks and instead positioned on slopes (below the

skyline) and wore muted clothes to be as inconspicuous as possible, while maximising visibility of the study area. The recorded flight activity indicates no evidence of bird activity being influenced by the presence of surveyors.

2.2.35 During the MBBS, the estimated number of skylark territories was not recorded by field surveyors due to the high abundance of species activity. Skylark is listed on the Environment (Wales) Act Section 7 and is frequently common in open moorland habitat. As in Year 1, the species was observed throughout the study area, and its exclusion from the survey is not considered a key limitation to the assessment, particularly given open moorland passerines (like skylark) are not considered sensitive to wind farm developments (see NatureScot, 2025a). Furthermore, the habitat enhancement measures to be implemented would actively benefit skylark and other ground-nesting passerines.

2.2.36 The Site boundary has evolved since the start of the surveys, with the boundary retracted from the north and south, but extended to include the access track to the west (see **ES Volume II, Chapter 2: Description of the Proposed Development**). However, the area containing the Proposed Development, is considered appropriately covered by the ornithology surveys, so no substantive constraints are identified.

3 RESULTS

3.1 Desk Study

3.1.1 This section provides details of existing ornithological information and existing records of protected and notable bird species identified within and in proximity to the Site from desk study sources listed in **Table 2.1**.

Statutory Designated Sites for Nature Conservation

3.1.2 This section should be read with reference to **ES Volume IV, Figure 6.1**.

3.1.3 A review of DEFRA's MAGIC website and NRW website identifies that the Site does not form part of any statutory designated site for nature conservation with qualifying ornithological qualifying features.

3.1.4 **Table 3.1** summarises statutory designated sites with ornithological qualifying features. Distances specified within **Table 3.1** are taken from the Site boundary to the designation boundary at its nearest point.

3.1.5 There are no internationally designated sites with qualifying migratory waterfowl features located within 20 km of the Site.

Table 3.1: Designated sites for nature conservation.

SPA – Special Protection Area; SSSI – Site of Special Scientific Interest.

Designated Site	Distance / Orientation	Qualifying Ornithological Interest(s)
Migneint-Arenig-Dduallt SPA and SSSI	805 m, west	<p><i>Breeding</i></p> <ul style="list-style-type: none">• Hen harrier• Merlin, and• Peregrine. <p><i>The SSSI citation states that the site also supports other upland bird species which form part of an assemblage of special interest, and</i></p>

Designated Site	Distance / Orientation	Qualifying Ornithological Interest(s)
		<i>these include red grouse, black grouse, golden plover, dunlin, snipe, curlew, short-eared owl, whinchat, stonechat, wheatear, ring ouzel and raven.</i>
Berwyn SPA and SSSI	7.3 km, south-east	<p><i>Breeding</i></p> <ul style="list-style-type: none"> • Hen harrier • Merlin • Peregrine, and • Red kite. <p><i>The SSSI citation states that the site also supports significant proportions of the Welsh populations of other species including short-eared owl, golden plover, red grouse and black grouse.</i></p>

Non-statutory Designated Sites for Nature Conservation

3.1.6 In consultation with Cofnod, the Site is located within 2 km of 79 Wildlife Sites (these are all 'Candidate Wildlife Site'), with two ('Llandderfel' and 'Llwyn-y-brain heath') of those located within the Site boundary. A full list is presented in **ES Volume IV, Figure 5.2**. None of the Candidate Wildlife Sites (including the two Candidate Wildlife Sites on-site) specify ornithological interest as a qualifying feature.

Existing Ornithological Records

3.1.7 A summary of existing ornithological records received for the search areas is provided in **ES Volume IV, Figures 6.8a (Confidential) to Figures 6.8d (Confidential)**, and within **ES Volume III, Appendix 6.3: Ornithology (Confidential)**. Records (from the search area, out to 6 km from the Site) included breeding evidence of curlew, golden plover, hen harrier, peregrine, merlin, red kite and black grouse (lek sites).

3.2 Field Surveys

This section presents the results of baseline field surveys, including an overview of birds present within adopted study areas and their distribution.

VP Flight Activity Surveys

Target Species

3.2.1 Target species flight activity recorded during the entire VP survey period (September 2021 to August 2022 and September 2022 to August 2023) from both VPs combined is summarised in **Table 3.2**. The total number of flights, total number of birds and total flight duration recorded (across all height bands) is presented. This includes some flights which were not at-risk of collision from the Proposed Development.

3.2.2 Detailed flight records are presented in **Annex 3**, with flight lines illustrated in **ES Volume IV, Figures 6.4a: Target Species Flight Activity – Red Kite (Year 1)** to **ES Volume IV, Figure 6.5b: Target Species Flight Activity – Other Species (Year 2)**.

Table 3.2: Target species flight activity summary (all flights) from 2021 to 2023.

Species	Total. no. of flights	Total. no. of birds	Total flight time (secs)
Lapwing	1	1	95
Golden plover	19	537	3,292
Curlew	1	1	18
Snipe	1	1	10
Woodcock	1	1	75
Red kite	116	141	19,719
Hen harrier	5	5	571
Peregrine	2	2	200
Hobby	2	3	58
Kestrel	18	20	2,062

Secondary Species

3.2.3 Low levels of activity of the following secondary species were also recorded:

- Mallard
- Sparrowhawk, and
- Lesser black-backed gull
- Raven.
- Herring gull
- Buzzard

Moorland Breeding Bird Surveys

3.2.4 In summary, the MBBS study area supported a very narrow assemblage of breeding species considered typical of the locale and habitats present, in very low breeding number. The only ground-nesting wading species recorded was curlew (maximum of two pairs), with the majority of other breeding species recorded, passerines.

3.2.5 A summary of recorded breeding territories within the study area in 2022 (Year 1) and 2023 (year 2) is provided in **Table 3.3**, with approximate territory locations respectively illustrated in **ES Volume IV, Figure 6.6: Moorland Breeding Bird Survey Results (Year 1)** and **ES Volume IV, Figure 6.7: Moorland Breeding Bird Survey Results (Year 2)**.

Table 3.3: Breeding territories within the MBBS study area.

Species	No. of breeding territories	
	2022	2023
Red grouse	0	2
Cuckoo	3	3
Little grebe	2	1
Curlew	2	2
Wood warbler	0	2

Species	No. of breeding territories	
	2022	2023
Grasshopper warbler	2	1
Spotted flycatcher	1	1
Tree pipit	1	2
Linnet	3	2
Reed bunting	2	0
Common crossbill	3	0
Lesser redpoll	3	1

Annex 1/Schedule 1 Breeding Raptor and Owl Searches

3.2.6 In 2022 the study area was found to support a hobby breeding territory, with a family group found within suitable breeding habitat within the Site. The specific nest site was not found, however breeding was confirmed, given the presence of fledged young, and surveys in 2023 also found a pair of hobby using the same area and showing breeding behaviour. As a precaution these hobby records are treated as sensitive (and the location of a breeding territory) and are presented in **ES Volume IV, Figure 6.9a: Breeding Raptor and Owl Survey Results (Year 1) (Confidential)** and **Figure 6.9b: Breeding Raptor and Owl Survey Results (Year 2) (Confidential)**.

3.2.7 Red kite and kestrel were regularly seen hunting within the study area in both years, however neither species were seen to show behaviour indicative of the bird holding a breeding territory. No other Annex 1 or Schedule 1 raptor or owl species was observed with behaviour indicative of holding a breeding territory.

4 REFERENCES

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

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Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. and Win, I. (2015). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, 114, pp. 723-747.

ANNEX 1: BIRD SPECIES SUMMARY

Table A1-1 provides a list of bird species referred to within this Technical Appendix. Both common and species names are presented along with a summary of each species relevant conservation status using the following abbreviations:

- Ann1 - species listed on Annex 1 of the Birds Directive.
- Sch1.1, Sch1.2, Sch1A & Sch1.ZA1 - species listed on Schedule 1 (1.1 and 1.2), Schedule 1A or Schedule A1 respectively of the 1981 Wildlife and Countryside Act.
- BoCC - BoCCs as listed by leading bird conservation organisations in the UK, including the RSPB and BTO. Red and Amber categories are given (Stanbury *et al.*, 2021), or taken from Johnstone *et al.* (2023) if the conservation status in Wales is higher than in the UK (marked by *).
- S7 - species listed in Section 7 of the Environment (Wales) Act 2016.

Table A1-1: Summary of bird species.

Common Name	Species Name	Conservation Status
Mallard	<i>Anas platyrhynchos</i>	Amber
Red grouse	<i>Lagopus lagopus scotica</i>	Red*; S7
Black grouse	<i>Lyrurus tetrix</i>	Red; S7
Nightjar	<i>Caprimulgus europaeus</i>	Amber, S7
Cuckoo	<i>Cuculus canorus</i>	Red; S7
Little grebe	<i>Tachybaptus ruficollis</i>	Green
Lapwing	<i>Vanellus vanellus</i>	Red; S7
Golden plover	<i>Pluvialis apricaria</i>	Red*; Ann1; S7
Curlew	<i>Numenius arquata</i>	Red; S7
Woodcock	<i>Scolopax rusticola</i>	Red
Snipe	<i>Gallinago gallinago</i>	Amber
Herring gull	<i>Larus argentatus</i>	Red; S7
Lesser black-backed gull	<i>Larus fuscus</i>	Red*
Sparrowhawk	<i>Accipiter nisus</i>	Amber
Hen harrier	<i>Circus cyaneus</i>	Red; Sch1.1 & 1A; S7; Ann1;
Red kite	<i>Milvus milvus</i>	Green; Sch1.1 & 1A; Ann1
Buzzard	<i>Buteo buteo</i>	Green
Kestrel	<i>Falco tinnunculus</i>	Red*; S7
Merlin	<i>Falco columbarius</i>	Red; Sch1.1; Ann1;
Hobby	<i>Falco subbuteo</i>	Green; Sch1.1;
Peregrine	<i>Falco peregrinus</i>	Green; Sch1.1; Ann1;
Raven	<i>Corvus corax</i>	Green
Skylark	<i>Alauda arvensis</i>	Red; S7
Wood warbler	<i>Phylloscopus sibilatrix</i>	Red; S7

Common Name	Species Name	Conservation Status
Grasshopper warbler	<i>Locustella naevia</i>	Red; S7
Spotted flycatcher	<i>Muscicapa striata</i>	Red; S7
Tree pipit	<i>Anthus trivialis</i>	Red; S7
Linnet	<i>Linaria cannabina</i>	Red; S7
Lesser redpoll	<i>Acanthis cabaret</i>	Red; S7
Common crossbill	<i>Loxia curvirostra</i>	Green; Sch1.1
Reed bunting	<i>Emberiza schoeniclus</i>	Amber, S7

ANNEX 2: ORNITHOLOGY FIELD SURVEY EFFORT

The following codes are used to record weather conditions within **Tables A2-1 to A2-5**:

Wind Speed		Wind Direction		Cloud Height	
Calm	0	16-point compass		<150 m	0
Light air	1			150-500 m	1
Light breeze	2	Rain		>500 m	2
Gentle breeze	3	None	0		
Moderate breeze	4	Drizzle/mist	1	Frost	
Fresh breeze	5	Light showers	2	None	0
Strong breeze	6	Heavy showers	3	Ground	1
Moderate gale	7	Heavy rain	4	All day	2
Fresh gale	8				
Strong gale	9	Visibility		Snow	
Whole gale	10	Poor	0	None	0
Storm	11	<1 km	1	On site	1
		>1 km	2	High ground	2
Cloud cover 0-8 scale (with '0' no cloud & '8' 100 % cloud)					

Field surveys were undertaken by the following named surveyors:

P. Baker (PB), C. Bonnington (CB), A. Hulme (AH) and K. Love (KL).

Table A2-1: VP flight activity survey effort (September 2021 to August 2022, and September 2022 to August 2023).

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
15/09/2021	1	CB	11:30	14:30	3	1/1/1	SW/SW/SW	0/0/0	2/2/6	2/2/2	2/2/2	0/0/0	0/0/0
15/09/2021	2	CB	15:10	18:10	3	1/1/2	W/W/W	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
24/09/2021	1	CB	08:03	11:03	3	3/4/2	W/W/W	0/1/0	8/8/8	1/1/1	2/1/2	0/0/0	0/0/0
24/09/2021	2	CB	11:40	14:40	3	4/4/4	W/W/W	1/0/0	8/8/7	0/1/2	0-1/2/2	0/0/0	0/0/0
13/10/2021	1	CB	11:15	14:15	3	3/3/3	W/W/W	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
13/10/2021	2	CB	14:45	17:45	3	3/3/4	W/W/W	0-1/1/0	8/8/8	2/0-1/2	2/1-2/2	0/0/0	0/0/0
27/10/2021	1	CB	11:15	14:15	3	5/5/5	SW/SW/SW	0-1/0-2/0	8/8/8	2/1-2/2	2/1-2/2	0/0/0	0/0/0
27/10/2021	2	CB	14:45	17:45	3	6/6/6	SW/SW/SW	0/2/2	8/8/8	2/2/1-2	2/1-2/0-2	0/0/0	0/0/0
19/11/2021	1	CB	11:10	14:10	3	3/3/3	W/W/W	0/0/0	8/8/8	2/0-2/2	2/0-2/2	0/0/0	0/0/0
19/11/2021	2	PB	10:40	13:40	3	4/6/6	WSW/WSW/WSW	1/1/1	8/8/8	1/0/0	2/0/0	0/0/0	0/0/0
30/11/2021	1	PB	08:30	11:30	3	3/3/3	W/W/W	1/1/1	8/8/8	0/0/0	0/0/0	0/0/0	0/0/0
30/11/2021	2	PB	12:00	15:00	3	5/5/5	WNW/WNW/WNW	1/1/1	8/8/8	0/0/0	0/0/0-1	1/1/1	0/0/0
10/12/2021	1	PB	08:20	11:20	3	5/5/5	WNW/WNW/WNW	0/2/2	3/4/6	2/2/2	2/2/2	1/1/1	0/0/0
10/12/2021	2	PB	11:50	14:50	3	5/4/4	WNW/WNW/WNW	0/0/0	6/5/5	2/2/2	2/2/2	1/1/1	0/0/0
22/12/2021	1	PB	12:00	15:00	3	5/5/5	S/S/S	0/3/3	6/8/8	2/2/2	2/1/1	0/0/0	0/0/0
22/12/2021	2	PB	08:30	11:30	3	4/4/4	SSE/SSE/S	0/0/1	8/8/8	2/2/2	2/2/2	1/1/1	0/0/0
06/01/2022	1	PB	08:20	11:20	3	6/6/6	S/S/S	0/0/0	8/8/8	2-1/1/1	2-1/1/1	1/1/1	2/2/2
06/01/2022	2	PB	11:50	14:50	3	6/6/6	S/S/S	3/3/3	8/8/8	1/1/1	1/1/1	1/1/1	2/1/1
26/01/2022	1	PB	08:00	11:00	3	4/4/4	SW/SW/SW	0/0/0	5/6/8	2/2/2	2/2/2	0/0/0	0/0/0
26/01/2022	2	PB	11:30	14:30	3	5/5/6	WSW/WSW/WSW	0/0/0	8/5/5	2/2/2	2/2/2	0/0/0	0/0/0
11/02/2022	1	PB	08:00	11:00	3	3/3/3	SW/SW/SW	0/0/0	6/5/2	2/2/2	2/2/2	1/1/1	0/0/0
11/02/2022	2	PB	12:30	14:30	3	4/4/4	SW/SW/SW	0/0/0	6/5/5	2/2/2	2/2/2	1/0/0	0/0/0
28/02/2022	2	KL	09:45	12:45	3	6/6/6	SW/SW/SW	1/1/1	8/8/8	0/0/0	0/0/1	0/0/0	0/0/0
28/02/2022	1	PB	10:15	13:15	3	6/6/6	SSW/SSW/SSW	2/2/2	8/8/8	0/0/0	0-1/0-1/0-1	0/0/0	0/0/0
15/03/2022	1	PB	08:30	11:30	3	4/4/4	S/S/S	0/0/0	5/6/6	2/2/2	2/2/2	0/0/0	0/0/0
15/03/2022	2	PB	12:00	15:00	3	5/5/5	S/S/S	0/0/0	6/5/5	2/2/2	2/2/2	0/0/0	0/0/0
29/03/2022	1	PB	08:10	11:10	3	2/3/3	E/E/E	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
29/03/2022	2	PB	11:40	14:40	3	3/3/3	ESE/ESE/ESE	0/0/0	2/3/3	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
07/04/2022	1	PB	08:45	11:45	3	6/6/6	W/W/W	2/2/2	8/8/8	1-2/1-2/1-2	1-2/1-2/1-2	0/0/0	0/0/0
07/04/2022	2	PB	12:15	13:15	1	6	W	2	7	1-2	2/2/2	0/0/0	0/0/0
21/04/2022	2	PB	08:00	11:00	3	4/4/4	E/E/E	0/0/0	4/4/4	2/2/2	2/2/2	0/0/0	0/0/0
21/04/2022	2	PB	11:30	14:30	3	4/4/4	E/E/E	0/0/0	5/4/4	2/2/2	2/2/2	0/0/0	0/0/0
21/04/2022	1	PB	15:00	16:00	1	4	E	0	4	2	2	0	0
28/04/2022	2	PB	08:45	11:45	3	3/3/3	ESE/ESE/ESE	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
28/04/2022	1	PB	12:15	15:15	3	3/3/3	E/E/E	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
05/05/2022	1	PB	07:00	10:00	3	1/1/1	WSW/WSW/WSW	0/0/0	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0
05/05/2022	1	PB	10:30	13:30	3	1/1/1	WSW/WSW/WSW	0/0/0	5/4/4	2/2/2	2/2/2	0/0/0	0/0/0
12/05/2022	2	PB	09:15	12:15	3	3/4/4	WSW/WSW/WSW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
12/05/2022	1	PB	12:45	15:45	3	4/4/4	WSW/WSW/WSW	0/0/0	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0
27/05/2022	2	AH	07:35	10:35	3	5/5/5	NNE/NNE/NNE	0/0/0	5/6/6	2/2/2	2/2/2	0/0/0	0/0/0
27/05/2022	2	AH	11:05	14:05	3	5/4/3	NNE/NNE/NNE	0/0/0	5/6/5	2/2/2	2/2/2	0/0/0	0/0/0
01/06/2022	1	PB	07:30	10:30	3	2/2/2	NW/NW/NW	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
01/06/2022	1	PB	11:00	14:00	3	2/2/2	NW/NW/NW	0/0/0	4/4/4	2/2/2	2/2/2	0/0/0	0/0/0
08/06/2022	2	PB	08:00	11:00	3	4/4/4	WSW/WSW/WSW	1/1/1	7/5/5	1-0/1-2/1-2	1-0/2/2	0/0/0	0/0/0
08/06/2022	2	PB	11:30	14:30	3	4/4/4	WSW/WSW/WSW	1/1-0/0	7/5/5	1-2/2/2	2/2/2	0/0/0	0/0/0
22/06/2022	2	PB	07:15	10:15	3	1/1/2	NNE/NNE/NNE	0/0/0	1/1/2	2/2/2	2/2/2	0/0/0	0/0/0
22/06/2022	1	PB	10:45	13:45	3	1/1/1	NNE/NNE/NNE	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
07/07/2022	1	PB	08:30	11:30	3	4/3/3	NNW>NNW>NNW	0/0/0	8/8/7	0/0-1/2	0/0/2	0/0/0	0/0/0
07/07/2022	1	PB	12:00	15:00	3	3/3/3	NNW/NW/NW	0/0/0	7/7/3	2/2/2	2/2/2	0/0/0	0/0/0
15/07/2022	2	PB	09:00	12:00	3	4/4/4	W/W/WSW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
15/07/2022	2	PB	12:30	15:30	3	4/4/4	WSW/WSW/WSW	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
25/08/2022	1	PB	09:15	12:15	3	0/1/1	NW/NW/WNW	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
25/08/2022	1	PB	12:45	15:45	3	1/1/1	WNW/WNW/WNW	0/0/0	4/4/8	2/2/2	2/2/2	0/0/0	0/0/0
30/08/2022	2	PB	09:15	12:15	3	3/3/3	ENE/ENE/NE	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
30/08/2022	2	PB	12:45	15:45	3	3/3/3	NE/NE/NE	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
09/09/2022	1	CB	08:45	11:45	3	1/2/2	SW/SW/W	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
09/09/2022	1	CB	12:15	15:15	3	2/3/3-4	W/NWW/NW	0/0/0	5/7/6	2/2/2	2/2/2	0/0/0	0/0/0
28/09/2022	2	CB	10:00	13:00	3	3/3/3	NNW/NNW/NNW	0/0/0-3	7/6/8	2/2/2	2/2/2	0/0/0	0/0/0
28/09/2022	2	CB	13:30	16:30	3	3/4/3	NW/N/N	0-3/0/0	6/6/5	2/2/2	2/2/2	0/0/0	0/0/0
13/10/2022	1	PB	09:30	12:30	3	1/1/1	S/S/S	0/0/0	1/1/2	2/2/2	2/2/2	0/0/0	0/0/0
13/10/2022	2	PB	13:00	16:00	3	2/2/2	S/S/S	0/0/0	2/2/4	2/2/2	2/2/2	0/0/0	0/0/0
03/11/2022	2	AH	08:00	11:00	3	3/3/2	SW/SW/SW	0/0-4/4-0	3/3-8/8-3	2/2-1/1-2	1/1-1-2	0/0/0	0/0/0
03/11/2022	1	AH	12:00	15:00	3	3/2/2	SW/SW/SW	0/0/0	3/5/7	2/2/2	2/2/2	0/0/0	0/0/0
15/11/2022	1	PB	08:15	11:15	3	2/2/2	W/W/W	1/1/0-1	8/8/8	0-1/1-0/0-1-2	0-1/1-0/0-2	0/0/0	0/0/0
15/11/2022	2	PB	11:45	14:45	3	2/2/2	W/W/W	1/1/1-0	6/6-4/4	2/2/2	2/2/2	0/0/0	0/0/0
30/11/2022	1	PB	08:30	11:30	3	1/1/1	SSE/SSE/SSE	0/0/0	2/2/1	1-2/1-2/2	2/2/2	0-1/0-1/0-1	0/0/0
30/11/2022	2	PB	12:00	15:00	3	2/2/2	S/S/S	0/0/0	1/3/3	2/2/2	2/2/2	0-1/0/0	0/0/0
06/12/2022	1	PB	09:30	12:30	3	3/3/3	N/N/N	0/0/0	8/8/8	2/1-2/1-2	2/2/2	1/1/1	1/1/1
06/12/2022	2	PB	13:00	16:00	3	3/3/2	N/N/N	0/0/0	6/6/4	2/2/2	2/2/2	0/0/0	0/0/0
16/12/2022	1	PB	09:15	12:15	3	2/2/2	SSW/SSW/SSW	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	1/1/1
16/12/2022	1	PB	12:45	15:45	3	3/2/2	SW/SW/SW	0/0/0	4/4/5	2/2/2	2/2/2	0/0/0	1/1/1
17/01/2023	2	PB	08:15	11:15	3	2/2/2	WNW/WNW/WNW	0/0/0	4/6/7	2/2/2	2/2-1/1-2	2/2/2	2/2/2
17/01/2023	2	PB	11:45	14:45	3	2/2/2	WNW/WNW/WNW	0/0/0	5/4/8	2/2/2	2/2/2	2/2/2	2/2/2
31/01/2023	1	PB	08:00	11:00	3	5/5/5	W/W/W	0/0-1/1-0	3/5/5	2/2/2	2/2/2	0/0/0	0/0/0
31/01/2023	2	PB	11:30	14:30	3	5/5/5	WSW/WSW/WSW	0/0/0	4/4/4	2/2/2	2/2/2	0/0/0	0/0/0
09/02/2023	1	PB	09:00	12:00	3	2/2/2	SW/SW/SW	0/0/0	1/1/1	2/2/2	2/2/2	1/0/0	0/0/0
09/02/2023	2	PB	12:30	15:30	3	2/2/2	W/W/W	0/0/0	4/4/5	2/2/2	2/2/2	0/0/0	0/0/0
23/02/2023	1	PB	08:30	11:30	3	2/2/2	N/N/N	0/0/0	2/2/4	2/2/2	2/2/2	0/0/0	0/0/0
23/02/2023	2	PB	12:00	15:00	3	3/3/3	N/N/N	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
24/03/2023	1	CB	09:50	12:50	3	6/6/6	SW/SW/SW	0-1/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
24/03/2023	1	CB	13:20	16:20	3	6/6/6	SW/SW/SW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
27/03/2023	2	CB	09:25	12:25	3	1/1/1	SW/SW/SW	0/0/0	1/2/5	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
27/03/2023	2	CB	12:55	15:55	3	2/2/2	SW/SW/SW	0/0/0	5/4/3	2/2/2	2/2/2	0/0/0	0/0/0
18/04/2023	1	PB	09:00	12:00	3	3/3/3	E/E/E	0/0/0	8/5/5	0-1/1-2/2	0-1/1-2/2	0/0/0	0/0/0
18/04/2023	1	PB	12:30	15:30	3	3/3/3	E/E/E	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2023	2	PB	08:30	11:30	3	4/4/4	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2023	2	PB	12:00	15:00	3	4/3/3	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
25/04/2023	1	CB	11:14	14:14	3	1/1/1	SE/SE/SE	0/0/0	4/6/6	2/2/2	2/2/2	0/0/0	0/0/0
25/04/2023	2	CB	14:44	17:44	3	2/3/2	E/SSE/SE	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
25/05/2023	2	PB	07:45	10:45	3	2/2/1	NW/NW/NW	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
25/05/2023	2	PB	11:15	11:45	3	1/1/1	NW/NW/NW	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
26/05/2023	1	PB	08:15	11:15	3	1/1/1	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
26/05/2023	1	PB	11:45	14:45	3	1/1/1	ENE/ENE/ENE	0/0/0	1/3/4	2/2/2	2/2/2	0/0/0	0/0/0
31/05/2023	1	PB	08:45	11:45	3	3/3/3	ENE/ENE/ENE	0/0/0	8/7/5	2/2/2	2/2/2	0/0/0	0/0/0
31/05/2023	2	PB	12:15	15:15	3	3/3/3	ENE/ENE/ENE	0/0/0	4/4/4	2/2/2	2/2/2	0/0/0	0/0/0
26/06/2023	1	PB	10:00	13:00	3	3/3/3	WSW/WSW/WSW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
26/06/2023	1	PB	13:30	16:30	3	3/3/3	WSW/WSW/WSW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
27/06/2023	2	PB	08:15	11:15	3	3/3/3	SSW/SSW/SSW	1/1/1-2	8/8/8	2/2-0/0	2/2-1-0	0/0/0	0/0/0
29/06/2023	1	PB	08:15	11:15	3	1/1/2	WNW/WNW/NW	0/0/0	5/5/6	2/2/2	2/2/2	0/0/0	0/0/0
29/06/2023	2	PB	11:45	14:45	3	2/2/2	WNW/WNW/WNW	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
17/07/2023	1	PB	08:30	11:30	3	2/2/2	WSW/WSW/WSW	1-0/0-1-0/0-1-0	7/6/5	2/2/2	2/2/2	0/0/0	0/0/0
17/07/2023	1	PB	12:00	15:00	3	3/3/3	WSW/WSW/WSW	0/0-1-0/0	6/6/5	2/2/2	2/2/2	0/0/0	0/0/0
18/07/2023	2	PB	09:00	12:00	3	3/3/3	SSW/SSW/SSW	1-0/0-1-2/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
18/07/2023	2	PB	12:30	15:30	3	3/3/3	SSW/SSW/SSW	2/2-0/0-1-0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2023	2	PB	09:15	12:15	3	2/2/2	NW/NW/NW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2023	1	PB	12:45	15:45	3	2/2/2	NW/NW/NW	0/0/0	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0
24/07/2023	2	PB	11:30	14:30	3	3/3/3	N/N/N	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
22/08/2023	1	PB	10:15	13:15	3	3/3/3	WSW/WSW/WSW	1/1-0/0-1	8/8/7	2-1-2/2/2	2-1-2/2/2	0/0/0	0/0/0
22/08/2023	1	PB	13:45	16:45	3	3/3/3	WSW/WSW/WSW	0-1-0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time	Finish Time	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
23/08/2023	2	PB	10:15	13:15	3	3/3/3	SSW/SSW/SSW	0/0/0	8/8/8	1-2/2/2	1-2/2/2	0/0/0	0/0/0
23/08/2023	2	PB	13:45	16:45	3	3/3/3	SW/SW/SW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0

Table A2-2: MBBS effort - 2022.

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
13/04/2022	PB	08:30	16:10	2	WSW	0	4/8	2	2	0	0
31/05/2022	PB	07:00	12:30	1	WNW	0	5/8	2	2	0	0
23/06/2022	PB	07:40	13:10	1	SSE	0	1/8	2	2	0	0
21/07/2022	PB	09:00	14:50	2	NNW	0	5/8	2	2	0	0
23/08/2022	PB	07:00	14:00	1	SSW	0-1	7/8	2	2	0	0

Table A2-3: MBBS effort - 2023.

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/04/2023	PB	08:10	14:25	3	ENE	0	8/8	2	2	0	0
11/05/2023	PB	07:40	14:30	1	SW	0	7-3/8	2	2	0	0
01/06/2023	PB	07:30	13:30	2	ENE	0	1/8	2	2	0	0
24/07/2023	PB	09:10	16:30	2-3	N	0	5/5/4	2	2	0	0

Table A2-4: Annex 1/Schedule 1 Raptor and Owl Search effort – 2022.

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
27/04/2022	PB	08:15	15:00	2	E	0	1/8	2	2	0	0
20/05/2022	PB	06:50	13:20	3	S	0/1	7/8	2	2	0	0
14/06/2022	PB	07:00	13:00	2	SSW	0	4/8	2	2	0	0
29/07/2022	PB	07:30	12:50	2	SSW	0	5/8	2	2	0	0

12/08/2022	PB	05:45	12:50	2	W	0	4/8	2	2	0	0
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Table A2-5: Annex 1/Schedule 1 Raptor and Owl Search effort – 2023.

Date	Surveyor	Start Time	Finish Time	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
21/04/2023	PB	07:00	11:45	3	NE	0-1-0-2	8/8	2	2	0	0
11/05/2023	PB	07:45	13:30	2-3	NE	0	6-5/8	2	2	0	0
02/06/2023	PB	07:30	13:30	2-1	ENE	0	4/8	2	2	0	0
25/07/2023	PB	10:20	16:45	2	WNW	0	7/8	2	2	0	0

ANNEX 3: VP FLIGHT ACTIVITY SURVEY - TARGET SPECIES FLIGHTS

Table A3-1 presents details of target species flight lines recorded during VP flight activity surveys September 2021 to August 2022, and September 2022 and August 2023.

Table A3-1: Target species flights.

Date	VP	Species	No. of Birds	Start Time (24 hrs)	Duration (secs)	0-20 m	20-50 m	50-150 m	150-180 m	180-200 m	200-250 m	250 m+
15/09/2021	1	Red kite	1	12:12	130	0	30	100	0	0	0	0
15/09/2021	1	Red kite	2	12:18	175	0	0	160	15	0	0	0
15/09/2021	1	Red kite	1	12:21	137	0	0	30	15	15	77	0
15/09/2021	1	Red kite	1	14:12	143	0	38	105	0	0	0	0
15/09/2021	1	Red kite	1	14:29	32	0	0	32	0	0	0	0
15/09/2021	2	Red kite	1	16:08	40	0	40	0	0	0	0	0
15/09/2021	2	Red kite	1	16:12	14	0	14	0	0	0	0	0
24/09/2021	2	Golden plover	10	13:28	18	18	0	0	0	0	0	0
13/10/2021	1	Red kite	2	12:02	70	0	0	70	0	0	0	0
13/10/2021	1	Red kite	1	12:04	120	30	45	45	0	0	0	0
13/10/2021	1	Red kite	1	12:07	55	0	55	0	0	0	0	0
13/10/2021	1	Red kite	1	12:38	60	0	0	60	0	0	0	0
13/10/2021	1	Red kite	1	13:42	67	0	30	37	0	0	0	0
13/10/2021	1	Red kite	1	13:52	27	0	0	27	0	0	0	0
13/10/2021	2	Hen harrier	1	16:08	50	50	0	0	0	0	0	0
19/11/2021	1	Red kite	1	11:25	174	75	75	24	0	0	0	0
19/11/2021	1	Red kite	1	11:27	25	25	0	0	0	0	0	0
19/11/2021	1	Red kite	2	12:06	157	0	157	0	0	0	0	0
19/11/2021	1	Red kite	1	12:34	40	0	40	0	0	0	0	0
19/11/2021	1	Red kite	1	13:25	306	0	0	120	186	0	0	0
19/11/2021	1	Red kite	3	13:30	162	0	0	72	90	0	0	0
19/11/2021	1	Red kite	1	13:34	89	0	0	89	0	0	0	0
10/12/2021	1	Red kite	1	08:41	126	0	0	126	0	0	0	0

Date	VP	Species	No. of Birds	Start Time (24 hrs)	Duration (secs)	0-20 m	20-50 m	50-150 m	150-180 m	180-200 m	200-250 m	250 m+
22/12/2021	1	Red kite	1	13:02	225	0	0	225	0	0	0	0
26/01/2022	1	Red kite	1	08:50	28	28	0	0	0	0	0	0
26/01/2022	1	Red kite	1	09:43	139	0	0	0	139	0	0	0
26/01/2022	2	Red kite	1	11:46	963	150	450	288	75	0	0	0
26/01/2022	2	Red kite	1	12:24	154	0	124	30	0	0	0	0
11/02/2022	2	Golden plover	11	13:49	162	162	0	0	0	0	0	0
28/02/2022	1	Red kite	1	10:41	134	0	0	0	0	134	0	0
15/03/2022	1	Red kite	1	08:44	223	0	0	0	120	103	0	0
15/03/2022	1	Curlew	1	09:26	18	18	0	0	0	0	0	0
15/03/2022	1	Red kite	1	11:02	452	0	135	120	197	0	0	0
15/03/2022	2	Red kite	1	11:51	28	0	28	0	0	0	0	0
15/03/2022	2	Red kite	1	12:53	399	0	0	45	105	174	75	0
29/03/2022	2	Golden plover	22	12:09	437	0	0	15	75	210	137	0
29/03/2022	2	Red kite	1	13:18	28	28	0	0	0	0	0	0
07/04/2022	1	Red kite	1	13:29	163	0	0	0	0	163	0	0
21/04/2022	2	Golden plover	3	08:37	43	0	43	0	0	0	0	0
21/04/2022	2	Golden plover	1	08:39	7	0	7	0	0	0	0	0
21/04/2022	2	Golden plover	15	09:22	221	26	0	30	60	105	0	0
21/04/2022	2	Red kite	1	10:13	232	0	0	90	97	45	0	0
21/04/2022	2	Golden plover	35	10:28	130	0	0	0	130	0	0	0
21/04/2022	2	Red kite	2	11:11	147	0	0	15	30	102	0	0
21/04/2022	2	Red kite	1	11:55	162	0	0	0	0	0	162	0
21/04/2022	2	Red kite	1	12:49	194	0	30	15	60	44	45	0
28/04/2022	2	Red kite	1	10:30	130	0	0	0	130	0	0	0
28/04/2022	2	Red kite	1	11:27	54	0	0	0	54	0	0	0
28/04/2022	1	Red kite	1	11:48	180	0	0	0	0	0	180	0
28/04/2022	1	Red kite	1	13:31	104	0	0	0	104	0	0	0
28/04/2022	1	Curlew	2	16:20	N/A	0	0	0	0	0	0	0

Date	VP	Species	No. of Birds	Start Time (24 hrs)	Duration (secs)	0-20 m	20-50 m	50-150 m	150-180 m	180-200 m	200-250 m	250 m+
05/05/2022	1	Red kite	1	07:11	222	0	0	0	222	0	0	0
05/05/2022	1	Red kite	1	11:59	138	0	0	0	138	0	0	0
05/05/2022	1	Red kite	2	12:32	583	0	0	30	240	313	0	0
05/05/2022	1	Red kite	1	13:03	232	0	0	30	45	157	0	0
12/05/2022	2	Red kite	1	09:15	470	60	0	30	380	0	0	0
12/05/2022	2	Golden plover	1	10:12	49	0	0	0	0	0	49	0
12/05/2022	2	Red kite	1	12:01	78	0	0	48	30	0	0	0
12/05/2022	1	Red kite	1	13:57	113	0	0	0	0	0	0	113
27/05/2022	2	Red kite	3	13:26	120	0	30	60	30	0	0	0
27/05/2022	2	Red kite	1	13:33	70	0	15	30	0	15	0	0
27/05/2022	2	Red kite	1	13:50	20	0	20	0	0	0	0	0
27/05/2022	2	Red kite	2	13:52	30	0	30	0	0	0	0	0
01/06/2022	1	Red kite	1	08:02	168	0	0	0	0	168	0	0
08/06/2022	2	Red kite	2	10:01	288	0	0	0	45	243	0	0
08/06/2022	2	Red kite	1	10:22	137	0	0	0	107	30	0	0
08/06/2022	2	Red kite	1	10:46	64	0	0	0	64	0	0	0
08/06/2022	2	Red kite	2	13:37	406	0	0	0	90	241	75	0
22/06/2022	2	Hen harrier	1	07:15	46	0	15	31	0	0	0	0
22/06/2022	1	Red kite	1	11:28	178	0	0	0	0	0	0	178
22/06/2022	1	Red kite	1	11:37	347	0	0	0	0	45	302	0
07/07/2022	1	Red kite	1	13:39	125	0	0	30	95	0	0	0
15/07/2022	2	Red kite	1	09:46	174	0	0	75	99	0	0	0
15/07/2022	2	Red kite	1	11:37	120	0	0	0	120	0	0	0
15/07/2022	2	Red kite	1	12:13	138	0	0	0	138	0	0	0
15/07/2022	2	Red kite	1	13:20	324	0	0	0	135	189	0	0
03/08/2022	1	Red kite	1	09:02	348	0	0	0	93	60	195	0
03/08/2022	2	Red kite	1	11:49	418	0	0	60	253	105	0	0
03/08/2022	2	Red kite	1	12:32	186	0	0	0	156	30	0	0
25/08/2022	1	Hobby	2	12:45	15	0	0	15	0	0	0	0

Date	VP	Species	No. of Birds	Start Time (24 hrs)	Duration (secs)	0-20 m	20-50 m	50-150 m	150-180 m	180-200 m	200-250 m	250 m+
25/08/2022	1	Red kite	2	13:30	313	0	0	90	223	0	0	0
25/08/2022	1	Red kite	1	15:16	419	0	359	60	0	0	0	0
25/08/2022	1	Red kite	2	15:38	461	0	0	0	0	461	0	0
30/08/2022	2	Red kite	1	09:02	348	0	0	0	108	60	180	0
30/08/2022	2	Red kite	1	11:49	418	0	0	60	253	105	0	0
30/08/2022	2	Red kite	1	12:32	186	0	0	0	156	30	0	0
09/09/2022	1	Red kite	1	10:46	50	0	0	0	50	0	0	0
09/09/2022	1	Red kite	1	12:55	89	0	14	75	0	0	0	0
09/09/2022	1	Snipe	1	14:22	10	0	10	0	0	0	0	0
09/09/2022	1	Red kite	1	14:38	12	0	0	0	12	0	0	0
13/10/2022	1	Hen harrier	1	11:47	140	30	110	0	0	0	0	0
03/11/2022	2	Red kite	1	09:16	130	60	70	0	0	0	0	0
03/11/2022	2	Golden plover	5	09:57	20	0	0	0	20	0	0	0
03/11/2022	1	Red kite	1	12:02	70	0	70	0	0	0	0	0
03/11/2022	1	Red kite	1	12:21	110	0	45	30	35	0	0	0
03/11/2022	1	Red kite	1	12:21	80	0	15	30	35	0	0	0
15/11/2022	1	Red kite	1	11:02	68	0	0	0	68	0	0	0
15/11/2022	2	Red kite	1	13:01	160	0	115	45	0	0	0	0
30/11/2022	1	Golden plover	80	09:08	128	128	0	0	0	0	0	0
30/11/2022	1	Hen harrier	1	09:41	143	98	45	0	0	0	0	0
30/11/2022	1	Golden plover	80	10:22	340	15	15	55	15	240	0	0
30/11/2022	2	Golden plover	80	12:01	300	0	0	0	30	270	0	0
30/11/2022	2	Golden plover	80	12:14	720	0	0	0	0	435	135	150
06/12/2022	1	Red kite	1	09:33	148	0	0	0	0	148	0	0
06/12/2022	1	Golden plover	42	10:04	155	155	0	0	0	0	0	0
06/12/2022	2	Golden plover	5	13:23	48	0	0	48	0	0	0	0
06/12/2022	2	Golden plover	11	13:44	45	0	0	45	0	0	0	0
16/12/2022	1	Lapwing	1	12:08	95	0	30	15	50	0	0	0
16/12/2022	1	Woodcock	1	13:52	75	45	30	0	0	0	0	0

Date	VP	Species	No. of Birds	Start Time (24 hrs)	Duration (secs)	0-20 m	20-50 m	50-150 m	150-180 m	180-200 m	200-250 m	250 m+
16/12/2022	1	Red kite	1	15:09	225	0	60	105	60	0	0	0
31/01/2023	2	Red kite	1	12:32	80	0	0	20	30	30	0	0
31/01/2023	2	Red kite	1	12:50	130	0	45	85	0	0	0	0
09/02/2023	1	Red kite	1	10:43	255	30	45	135	45	0	0	0
09/02/2023	1	Kestrel	1	11:04	170	170	0	0	0	0	0	0
09/02/2023	1	Red kite	1	11:27	85	85	0	0	0	0	0	0
09/02/2023	1	Red kite	1	11:51	160	0	0	40	30	90	0	0
09/02/2023	1	Golden plover	18	13:04	320	60	230	30	0	0	0	0
09/02/2023	1	Peregrine	1	13:27	165	0	0	45	120	0	0	0
09/02/2023	1	Red kite	1	13:31	30	30	0	0	0	0	0	0
23/02/2023	1	Red kite	1	09:48	48	48	0	0	0	0	0	0
23/02/2023	1	Red kite	2	09:53	225	0	0	15	45	15	45	105
23/02/2023	1	Kestrel	1	10:18	70	70	0	0	0	0	0	0
23/02/2023	1	Peregrine	1	10:47	35	0	0	20	15	0	0	0
27/03/2023	2	Red kite	1	10:02	210	30	105	75	0	0	0	0
27/03/2023	2	Golden plover	33	10:25	120	120	0	0	0	0	0	0
27/03/2023	2	Red kite	1	11:07	195	0	60	135	0	0	0	0
27/03/2023	2	Golden plover	5	11:50	29	29	0	0	0	0	0	0
27/03/2023	2	Kestrel	1	13:05	41	41	0	0	0	0	0	0
27/03/2023	2	Kestrel	1	13:08	49	49	0	0	0	0	0	0
27/03/2023	2	Kestrel	2	13:13	115	0	15	100	0	0	0	0
18/04/2023	1	Kestrel	1	14:13	315	15	225	75	0	0	0	0
18/04/2023	1	Kestrel	1	14:15	80	50	30	0	0	0	0	0
18/04/2023	1	Kestrel	1	14:42	98	8	60	30	0	0	0	0
25/04/2023	1	Red kite	1	12:23	90	0	0	90	0	0	0	0
25/04/2023	2	Red kite	1	15:14	67	0	0	0	0	0	30	37
25/04/2023	2	Red kite	1	17:23	58	0	0	30	28	0	0	0
25/05/2023	2	Red kite	1	12:53	472	97	45	45	90	60	105	30
26/05/2023	1	Red kite	1	11:49	160	100	60	0	0	0	0	0

Date	VP	Species	No. of Birds	Start Time (24 hrs)	Duration (secs)	0-20 m	20-50 m	50-150 m	150-180 m	180-200 m	200-250 m	250 m+
26/05/2023	1	Red kite	1	14:04	35	0	35	0	0	0	0	0
31/05/2023	1	Kestrel	1	11:18	218	218	0	0	0	0	0	0
26/06/2023	1	Hen harrier	1	11:47	192	192	0	0	0	0	0	0
26/06/2023	1	Hobby	1	12:44	43	0	43	0	0	0	0	0
29/06/2023	1	Kestrel	1	10:42	231	231	0	0	0	0	0	0
29/06/2023	1	Red kite	1	11:02	98	98	0	0	0	0	0	0
29/06/2023	2	Kestrel	1	12:42	111	36	75	0	0	0	0	0
17/07/2023	1	Kestrel	1	09:26	36	36	0	0	0	0	0	0
17/07/2023	1	Kestrel	1	09:28	16	16	0	0	0	0	0	0
17/07/2023	1	Red kite	1	09:51	198	198	0	0	0	0	0	0
17/07/2023	1	Red kite	1	10:24	259	139	120	0	0	0	0	0
17/07/2023	1	Kestrel	1	12:44	18	18	0	0	0	0	0	0
17/07/2023	1	Red kite	1	13:24	49	0	49	0	0	0	0	0
17/07/2023	1	Kestrel	1	13:39	272	272	0	0	0	0	0	0
17/07/2023	1	Kestrel	1	13:46	45	45	0	0	0	0	0	0
18/07/2023	2	Kestrel	2	13:02	145	115	30	0	0	0	0	0
18/07/2023	2	Red kite	1	14:21	292	37	45	90	120	0	0	0
19/07/2023	2	Red kite	1	09:59	32	0	0	0	4	0	0	0
19/07/2023	1	Red kite	1	14:28	408	0	33	105	270	0	0	0
19/07/2023	1	Kestrel	1	15:12	32	32	0	0	0	0	0	0
24/07/2023	2	Red kite	1	12:19	460	0	0	0	45	210	205	0
24/07/2023	2	Red kite	1	12:57	102	0	27	30	45	0	0	0
22/08/2023	1	Red kite	2	12:14	72	72	0	0	0	0	0	0
22/08/2023	1	Red kite	1	14:29	223	58	165	0	0	0	0	0
22/08/2023	1	Red kite	1	15:01	58	58	0	0	0	0	0	0
22/08/2023	1	Red kite	5	15:07	25	25	0	0	0	0	0	0
22/08/2023	1	Red kite	5	15:26	46	46	0	0	0	0	0	0
22/08/2023	1	Red kite	1	15:53	25	25	0	0	0	0	0	0
22/08/2023	1	Red kite	2	16:27	42	42	0	0	0	0	0	0