
Carn Fearna Wind Farm
on behalf of Statkraft UK Ltd
Year 2 Ornithology Survey Report 2020-21



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1 INTRODUCTION

1.1 Background and Report Scope

- 1.1.1 Statkraft UK Ltd is investigating the possibility of developing a wind farm (Carn Fearna Wind Farm, hereafter the 'Proposed Development') which would be located on land at Carn Fearna, near Garve, in Ross-shire, Highlands (approximate central grid reference NH 41691 62618) (the 'Site').
- 1.1.2 The Proposed Development is for up to 14 turbines, as shown in **Figure 1**.
- 1.1.3 As part of the investigation and to inform the subsequent design and assessment of the proposed development, Avian Ecology Ltd. (AEL) was commissioned to undertake baseline ornithology surveys. The first year of baseline surveys, which was completed during the period September 2019 to August 2020, has been reported upon previously in the Year 1 Ornithology Report (AEL, 2020¹).
- 1.1.4 Baseline ornithology surveys continued during the period September 2020 to August 2021 (Year 2) and the purpose of this report is to detail the field surveys undertaken during this period, and to present an overview of the Year 2 survey findings.
- 1.1.5 Information related to consultation with NatureScot and details of the desk study undertaken are provided in the Year 1 report (AEL, 2020), and this information is not replicated in this report.
- 1.1.6 Note, the Site boundary has evolved since baseline surveys were conducted, with the boundary reduced in the north, and extended to the east. **Figure 1** shows the original and updated Site boundaries. For the purpose of this report, the original Site boundary is regarded, as the survey areas described were based on the original Site boundary and associated surrounding buffers. The changes made to the Site boundary and any limitations caused as a result are discussed within the report (see **Section 2.3**).

2 METHODOLOGY

2.1 Target Species

- 2.1.1 Target species for survey and recording were identified in accordance with NatureScot guidance (SNH, 2017²), through a review of existing information obtained from key sources supported by a reconnaissance survey visit (prior to Year 1 surveys) by a suitably competent ornithologist to establish habitats and likely bird population associations.
- 2.1.2 In accordance with NatureScot guidance (SNH, 2017² & SNH, 2018³) target species were identified as those which are afforded a higher level of legislative protection and potentially sensitive to wind farm developments, drawn from the following lists:
- Annex 1 of the EC Birds Directive;
 - Schedule 1 of the Wildlife & Countryside Act 1981;

¹ Avian Ecology Ltd. (2020) *Carn Fearna Wind Farm. Year 1 Ornithology Survey Report 2019-20*. On behalf of Statkraft UK Ltd. Confidential.

² SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Version 2, March 2017.

³ SNH (2018) *Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas*. SNH, Inverness.

- Red-listed Birds of Conservation Concern (from Stanbury *et al.*, 2021⁴); and,
- Annex 1 “Priority bird species for assessment when considering the development of onshore wind farms in Scotland” (SNH, 2018³).

2.2 Field Surveys

2.2.1 The following surveys have been undertaken between September 2020 and August 2021 (Year 2):

- Vantage Point (VP) Flight Activity Surveys;
- Moorland Breeding Bird Survey (MBBS);
- Annex 1 and Schedule 1 Breeding Raptor and Owl Searches;
- Breeding Black Grouse Searches; and,
- Breeding Diver Searches.

2.2.2 All surveys have been undertaken by suitably competent ornithologists; all of whom have extensive experience in the undertaking of bird surveys for proposed wind farm developments at comparable sites across Scotland.

Vantage Point (VP) Flight Activity Surveys

2.2.3 VP flight activity surveys were undertaken monthly between September 2020 and August 2021, in accordance with NatureScot guidance (SNH, 2017²).

2.2.4 A total of four VP locations have been used to provide maximum visual coverage of the required VP study area, as summarised within **Table 2.1** and illustrated in **Figure 2**. Visible areas for each viewshed were calculated using a Digital Elevation Model (DEM), before being ground-truthed.

2.2.5 The VP study area should comprise turbine locations plus a 500m buffer, in accordance with NatureScot guidance (SNH, 2017²). As the preliminary turbine locations proposed at the time of survey commencement may have been subject to change, the VP study area was extended to include all parts of the Site.

Table 2.1: VP locations.

VP	Grid reference	Orientation
1	NH 43987 61589	West
2	NH 42982 62942	West
3	NH 41163 61165	East north-east
4	NH 40517 64992	East

⁴ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D. & 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, 723-747.

- 2.2.6 The total survey effort (hours) at each VP location is summarised in **Table 2.2**, achieving the minimum 72 hours required under NatureScot guidance, divided between a single consecutive non-breeding and breeding season.
- 2.2.7 Additional survey effort was weighted towards February-April, to capture the main adult eagle display period, and September-October, to capture the main juvenile eagle dispersal period. 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.
- 2.2.8 Each VP survey session was no more than three hours in duration.

Table 2.2: VP flight activity survey effort – 2020 / 2021 (Year 2).

VP	2020					2021							Total Hrs
	Non-breeding Season <i>(includes eagle juvenile dispersal)</i>					Breeding Season <i>(includes early season eagle display period)</i>							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
VP1	12	12	6	6	3	12	15	12	6	6	12	6	108
VP2	12	12	6	6	6	12	12	12	6	6	12	6	108
VP3	12	12	6	6	6	12	12	12	6	6	12	6	108
VP4	12	9	9	6	6	12	12	12	6	6	12	6	108

- 2.2.9 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.
- 2.2.10 The following height bands were used in the field, to assign target species flight activity at, below or above collision risk height, based on the likely candidate turbine specification, as agreed with Statkraft, and also used during Year 1 surveys:
- Height Band 1 = <10m;
 - Height Band 2 = 10–25m;
 - Height Band 3 = 25-150m;
 - Height Band 4 = 150-180m; and,
 - Height Band 5 = >180m.
- 2.2.11 Target species comprised all Annex 1 and Schedule 1 listed raptors and owls, all waders, all geese, swans, ducks (excluding mallard *Anas platyrhynchos*), terns, black grouse, divers and other wetland species (such as herons and egrets) as observed during survey.
- 2.2.12 Secondary species were also noted in approximately 5-minute summary intervals, with the number of birds present and general behaviour recorded in order to build an overall picture of activity.
- 2.2.13 Secondary species were defined as commoner raptors (buzzard *Buteo buteo*, kestrel *Falco tinnunculus* and sparrowhawk *Accipiter nisus*), all other gulls, feral species, mallard and raven *Corvus corax*, along with any large concentrations of Schedule 1 or Red Listed passerines (from Stanbury *et al.* 2021⁴) as recorded during survey.

Moorland Breeding Bird Survey (MBBS)

- 2.2.14 A moorland breeding bird survey (MBBS) was undertaken following an adapted Brown and Shepherd (1993⁵) methodology, in accordance with NatureScot guidance (SNH, 2017²) and comprised four staggered visits, at least two weeks apart between April and July 2021, inclusive.
- 2.2.15 The survey methodology is appropriate for the survey of breeding moorland and open country species. Target species for the MBBS are typically wildfowl, waders, gulls and red grouse *Lagopus lagopus*.
- 2.2.16 The study area comprised all suitable open moorland habitats within the Site, extended out to 500m where access allowed.
- 2.2.17 During survey all observations of target species were recorded onto a base map, with the type of activity noted (e.g. calling, singing, displaying). Incidental observations of Schedule 1 passerines were also recorded.
- 2.2.18 All survey visits were undertaken in fine weather conditions conducive to survey and no limitations to the survey were experienced. Given the extent of the study area, survey visits were typically undertaken by a small team of surveyors and/or over consecutive days. Survey effort is summarised in **Table 2.3**.

Table 2.3: Moorland breeding bird survey effort (Year 2).

Visit	Date	Start time (24hrs)	Finish time (24hrs)
1	15/04/2021	08:30	15:00
2	17/05/2021	08:45	14:45
3	22/06/2021	08:30	16:15
4	20/07/2021	07:40	14:50
	21/07/2021	07:50	12:40

Annex 1 and Schedule 1 Breeding Raptor and Owl Searches

- 2.2.19 Searches for breeding Annex 1 and Schedule 1 listed raptors and owls were conducted between February and August 2021, inclusive, adopting species-specific survey advice from Hardey *et al.* (2013⁶), in accordance with NatureScot guidance (SNH, 2017²).
- 2.2.20 The study area comprised the Site and areas out to 2km for all Annex 1 and Schedule 1 listed raptor and owl species, extended to 6km for eagle species⁷, where access allowed. Searches consisted of a combination of walkover surveys and short point count watches over suitable habitat features to determine occupancy and/ or any breeding/ territorial behaviour. Surveys extending out of the Site were typically carried out from PRowWs (see **Section 2.3**).
- 2.2.21 All survey visits were undertaken in fine weather conditions conducive to survey. Given the extent of the study area, searches were generally undertaken by a small team of surveyors and/or over several days. Survey effort is summarised in **Table 2.4**.

⁵ Brown, A.F. & Shepherd, K.B. (1993) A method for censusing upland breeding waders. *Bird Study* 40, 189-195.

⁶ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) *Raptors: A field guide for surveying and monitoring*. Third Ed. The Stationary Office, Edinburgh.

⁷ Note that nest sites/breeding activity of other Annex 1 and Schedule 1 raptors and owls out to 6km were also recorded.

Table 2.4: Breeding raptor and owl search effort summary (Year 2).

Date	Start time (24hrs)	Finish time (24hrs)
21/02/2021	09:35	15:50
26/02/2021	07:30	13:30
18/03/2021	15:00	18:10
19/03/2021	08:30	11:30
31/03/2021	13:35	16:35
21/04/2021	10:00	16:00
17/05/2021	12:25	18:50
01/06/2021	08:35	14:35
28/06/2021	11:30	18:00
27/07/2021	10:00	16:00
29/07/2021	09:00	15:00
05/08/2021	08:30	14:35

Breeding Black Grouse Searches

- 2.2.22 Searches for black grouse leks were undertaken in 2021, with reference to species-specific methodologies outlined in Gilbert *et al.* (1998⁸), as per NatureScot guidance (SNH, 2017²).
- 2.2.23 The breeding black grouse study area comprised suitable habitats within the Site, extended out to at least 1.5km, as access allowed.
- 2.2.24 Search visits were undertaken in March and April. During searches all areas of suitable habitat (e.g. open moorland, woodland edges and tracks) within the study area were visited. All black grouse observed were recorded, with any leks more than 200m apart treated as separate leks.
- 2.2.25 All survey visits were undertaken in fine weather conditions conducive to survey. Surveys extending out of the Site were typically carried out from PRoWs (see **Section 2.3**). Given the extent of the study area, searches were generally undertaken by a small team of surveyors and/or over consecutive days as suitable weather conditions allowed. Survey effort is summarised in **Table 2.5**.

Table 2.5: Breeding black grouse search effort summary (Year 2).

Date	Start time (24hrs)	Finish time (24hrs)	Sunrise (24hrs)
19/03/2021	05:30	08:30	06:20
01/04/2021	05:45	08:05	06:44
02/04/2021	05:45	08:45	06:41

Breeding Diver Searches

⁸ Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird monitoring methods*. The Royal Society for the Protection of Birds, Sandy, Bedfordshire.

- 2.2.26 During the MBBS and Annex 1 and Schedule 1 breeding raptor and owl searches, waterbodies were checked for evidence of divers. Furthermore, two separate dedicated diver searches were undertaken with one search in spring and one search in summer.
- 2.2.27 Searches for breeding divers were undertaken with reference to species-specific methodologies outlined in Gilbert *et al.* (1998⁸), as per NatureScot guidance (SNH, 2017²), and involved searches of lochs/lochans on, and within 1km of, the Site.
- 2.2.28 Survey effort is summarised in **Table 2.6**.

Table 2.6: Breeding diver search effort summary (Year 2).

Date	Start time (24hrs)	Finish time (24hrs)
23/04/2021	08:30	11:30
01/06/2021	08:35	14:35

2.3 Limitations

- 2.3.1 The natural topography of the Site resulted in some steep hollows missing from coverage, however survey coverage is considered appropriate, and in accordance with NatureScot guidance (SNH, 2017²). DEM and ground-truthing were used to ensure maximum visual coverage of the required VP study area has been achieved using the minimum number of VPs, in accordance with the NatureScot guidance (SNH, 2017²). The final turbine layout will consider the extent of all VP viewsheds used to date, to ensure the turbine locations were sufficiently covered during the survey period.
- 2.3.2 NatureScot guidance (SNH, 2017²) recommends that VPs be sited outside the proposed development area to prevent the presence of the surveyor from altering flight behaviour and artificially reducing the level of activity within the site during the course of the survey. Both VPs 3 and 4 are located outside the turbine envelope. Although VPs 1 and 2 are now located within the turbine envelope, the surveyor at these VPs 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. Given VP2 is on the edge of the viewshed of VP1, these VPs were not undertaken simultaneously.
- 2.3.3 During the breeding raptor and owl searches, MBBS and breeding black grouse searches, direct access to land outside the Site for survey was restricted. Suitable habitat features were however scanned from appropriate vantage points within the Site and from PROWs to detect activity and likely breeding locations of key species. In conjunction with the desk study data, it is considered unlikely that breeding target species were overlooked.
- 2.3.4 The Site boundary has evolved since the baseline surveys were completed, with the boundary reduced in the north and extended in the east (see **Figure 1**). The surrounding buffers that were added to the original site boundary, and which made up the study areas covered during the baseline surveys, have meant that the eastern area of the new Site boundary has been largely covered (but without an associated buffer). The extreme east of the new Site boundary has not been covered during MBBS, but this is not considered a substantive constraint given the area is limited in extent, on the periphery of the Proposed Development, and the breeding bird assemblage, and ornithological importance, of the Site (and the surrounding area) has been established over a two-year period. Furthermore, likely habitat enhancement measures that will be recommended will benefit ground-nesting species, like wading species that are present at the locality.

3 OVERVIEW OF BASELINE SURVEY RESULTS – YEAR 2

3.1 Field Surveys

3.1.1 **Table 3.1** below presents a summary of the main findings of the bird surveys carried out in Year 2 (2020-21).

Table 3.2: Bird survey Year 2 summary.

Survey type	Summary of Main findings
VP Flight Activity Surveys	<p>Target species flight activity is summarised as follows, with flight lines illustrated on Figures 3a and 3b:</p> <ul style="list-style-type: none"> • Greylag goose <i>Anser anser</i> – 3 flights, 8 birds; • Pink-footed goose <i>Anser brachyrhynchus</i> – 11 flights, 1,190 birds; • Grey heron <i>Ardea cinerea</i> – 1 flight, 1 bird; • Red-throated diver <i>Gavia stellata</i> – 1 flight, 2 birds; • Black grouse – 3 flights, 6 birds; • Greenshank <i>Tringa nebularia</i> – 4 flights, 6 birds; • Oystercatcher <i>Haematopus ostralegus</i> – 1 flight, 3 birds; • Curlew <i>Numenius arquata</i> – 4 flights, 4 birds; • Golden plover <i>Pluvialis apricaria</i> – 1 flight, 11 birds; • Golden eagle <i>Aquila chrysaetos</i> – 45 flights, 48 birds; • Goshawk <i>Accipiter gentilis</i> – 1 flight, 1 bird; • Hen harrier <i>Circus cyaneus</i> – 5 flights, 5 birds; • Red kite <i>Milvus milvus</i> – 52 flights, 54 birds; • Merlin <i>Falco columbarius</i> – 3 flights, 4 birds; • Osprey <i>Pandion haliaetus</i> – 1 flight, 1 bird; and, • Peregrine <i>Falco peregrinus</i> – 4 flights, 5 birds. <p><i>All flights recorded during VP surveys are listed above, including those that were not at collision risk height and flights outside the proposed turbine area.</i></p>
MBBS	<p>The study area was found to support a small number of breeding territories, consisting of:</p> <ul style="list-style-type: none"> • Snipe <i>Gallinago gallinago</i> – 5 territories; • Curlew – 1 territory; • Oystercatcher – 1 territory; • Golden plover – 1 territory; • Ptarmigan <i>Lagopus muta</i> – 1 territory; • Red grouse – 5 territories; and, • Common crossbill <i>Loxia curvirostra</i> – 1 territory. <p>Figure 4 shows the approximate central location of breeding territories.</p>

Survey type	Summary of Main findings
Annex 1 and Schedule 1 Breeding Raptors and Owl Searches	<p>No breeding evidence of Annex 1 and Schedule 1 raptors and owls were record within the Site.</p> <p>In the wider study area, a suspected golden eagle breeding territory (possibly a pair identified during desk study), active osprey nest site (and another abandoned nest site) and suspected goshawk breeding range.</p> <p>Sensitive information into breeding Schedule 1 raptors is excluded</p>
Breeding Black Grouse Searches	<p>Three black grouse leks were recorded.</p> <p>Sensitive information into lek sites is excluded</p>
Breeding Diver Searches	<p>No breeding divers were recorded using any of the seven lochs/lochans on-Site or within 1km of Site, and which were covered during survey.</p> <p>During the entire Year 2 surveys, red-throated divers were only recorded during a VP flight activity survey in July 2021 when a pair flew and landed on Loch na Gearra. There was no evidence that the pair was using the loch to breed, and habitats at the locality were appraised as being unsuitable to support breeding divers.</p> <p>Figure 7 shows the study area for the breeding diver searches.</p>

4 SUMMARY

- 4.1.1 Based on Year 2 ornithology surveys, there have been no ornithological constraints identified that are likely to have significant implications for the proposed development within the Site.
- 4.1.2 The main ornithology survey results from Year 2, are the presence of a small number of black grouse leks and moderate-high golden eagle and red kite activity through, and close to, the Site. Much of the golden eagle activity was adults (including a male and female). Furthermore, a suspected golden breeding territory was identified.
- 4.1.3 The location of the black grouse leks should be considered in the scheme design; with 500m infrastructure buffers generally advised by NatureScot depending on the relative importance of the lek site (i.e. whether considered a 'main lek') and options for alternative mitigation/compensation measures (such as timing works to avoid the early morning period in April/May when grouse are lekking). All leks identified only consisted of small numbers of black grouse, however black grouse were recorded lekking at the northern lek and south-western lek during both Year 2 and Year 1 surveys, suggesting these are established lek sites. All identified lek sites have been provided to Statkraft, and these have been considered in the layout of the proposed development.
- 4.1.4 A further notable finding was a ptarmigan lek to the south-west of Little Wyvis. This is a Red Listed species, with only 2,000 breeding pairs, restricted to high tops of the Scottish Highlands, favouring montane habitats⁹. Birds were recorded on multiple surveys at the same locality, and thus this is considered an established lek. The lek site should be considered in the same way as the black grouse leks summarised above, and the location of the ptarmigan lek has also been provided to Statkraft and considered in the design layout.

⁹ <https://www.bto.org/understanding-birds/birdfacts/ptarmigan> (Accessed 10/11/2023).

- 4.1.5 An assessment of collision risk of those species with a high number of 'at risk' flights will be required, and this is likely to include golden eagle and red kite; and for golden eagle, corresponding effects on the Glen Affric to Strathconon Special Protection Area (SPA).
- 4.1.6 Effects on Ben Wyvis SPA and its qualifying feature (breeding dotterel), Glen Affric to Strathconon SPA (breeding golden eagle, which is the site's qualifying feature) and Cromarty Firth SPA and Inner Moray Firth SPA (both with greylag goose as qualifying feature) will be considered in the assessment. Note, this has been welcomed by NatureScot during formal scoping. An information to inform Habitats Regulations Appraisal (HRA) will be included within the ornithology chapter to accompany an application for the proposed development.

FIGURE 1: SITE PLAN AND INDICATIVE TURBINE LAYOUT.

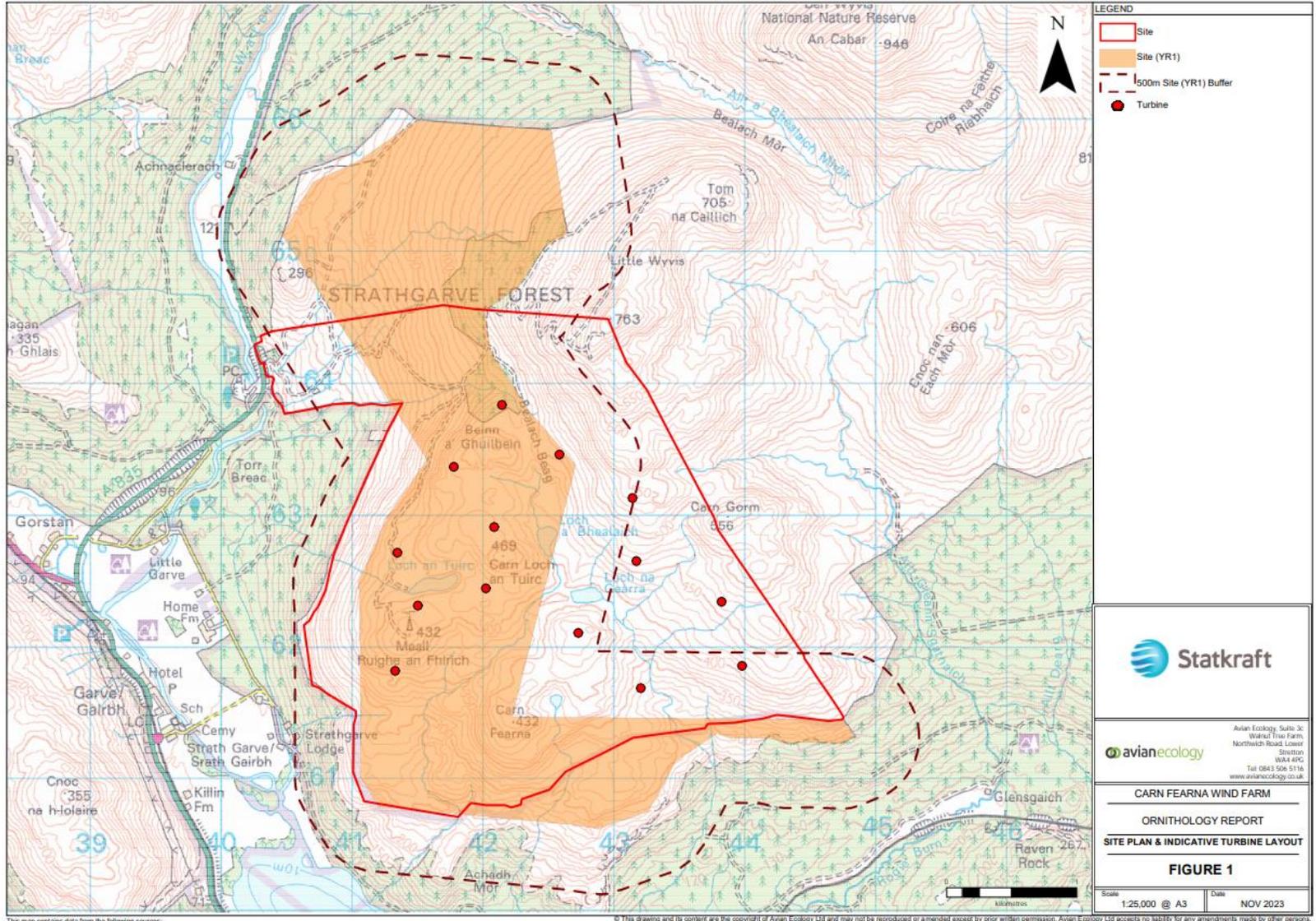


FIGURE 2: VP LOCATIONS AND VIEWSHEDS.

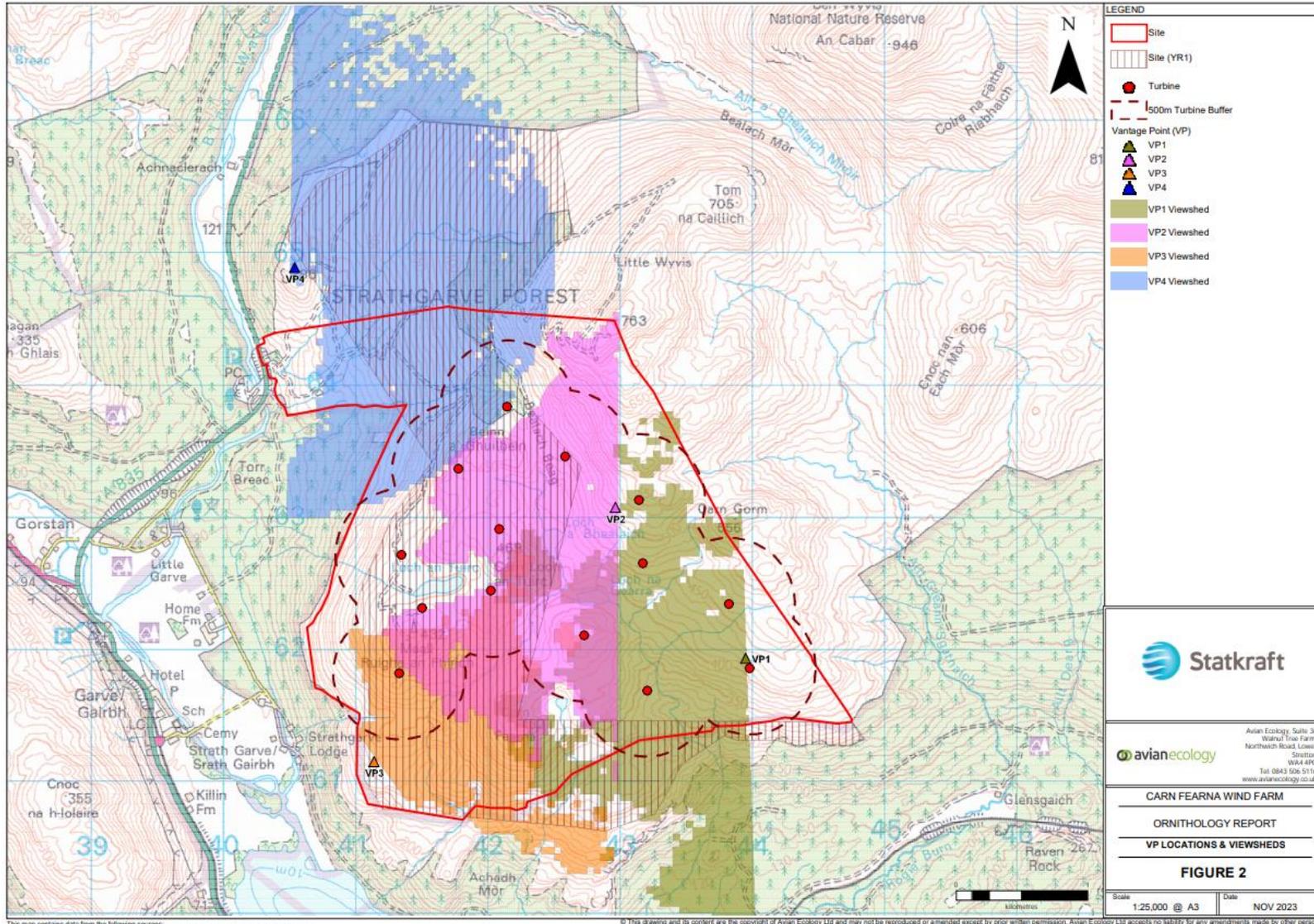
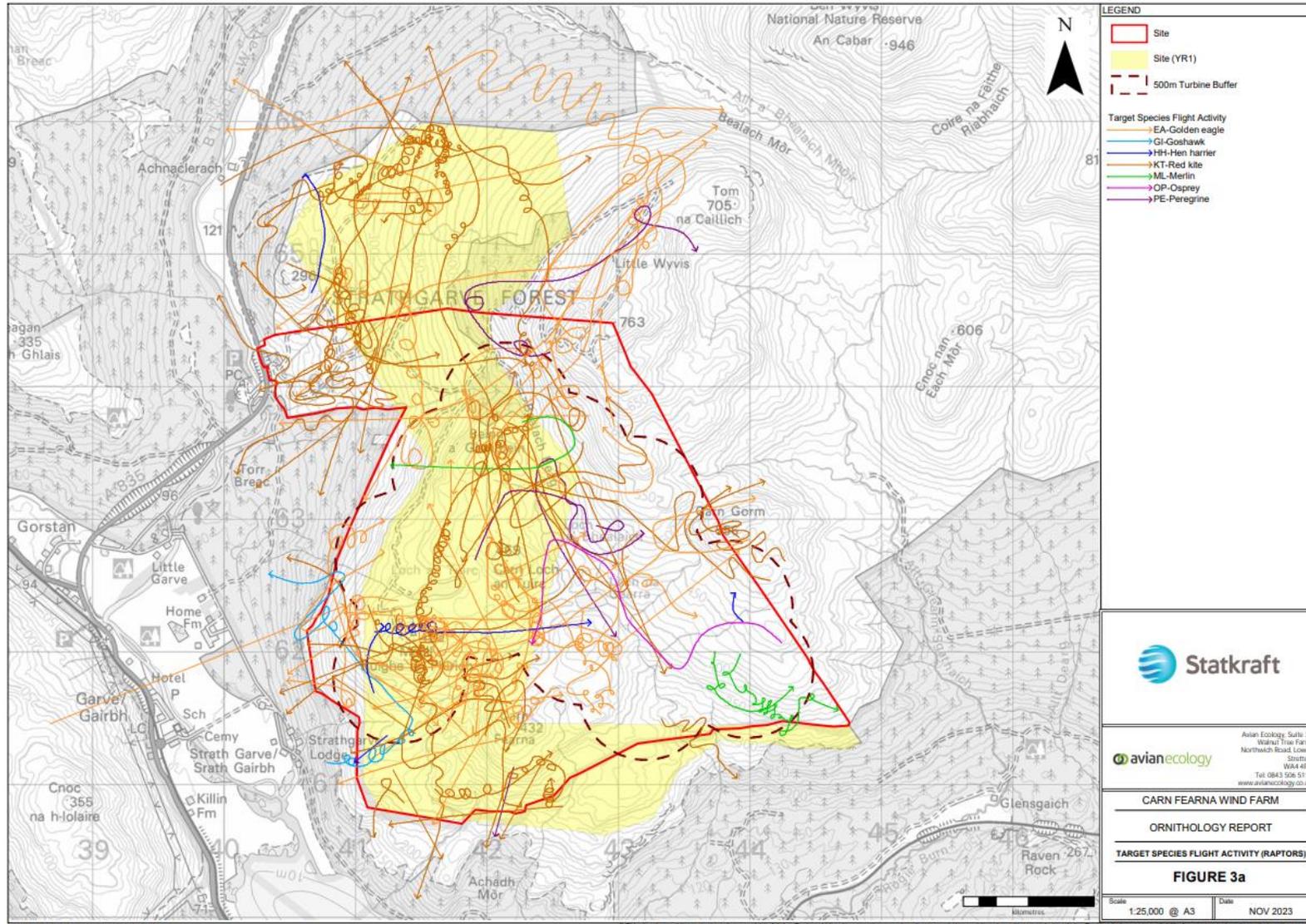


FIGURE 3A: TARGET SPECIES FLIGHT ACTIVITY (RAPTORS).



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FIGURE 3B: TARGET SPECIES FLIGHT ACTIVITY (OTHER SPECIES).

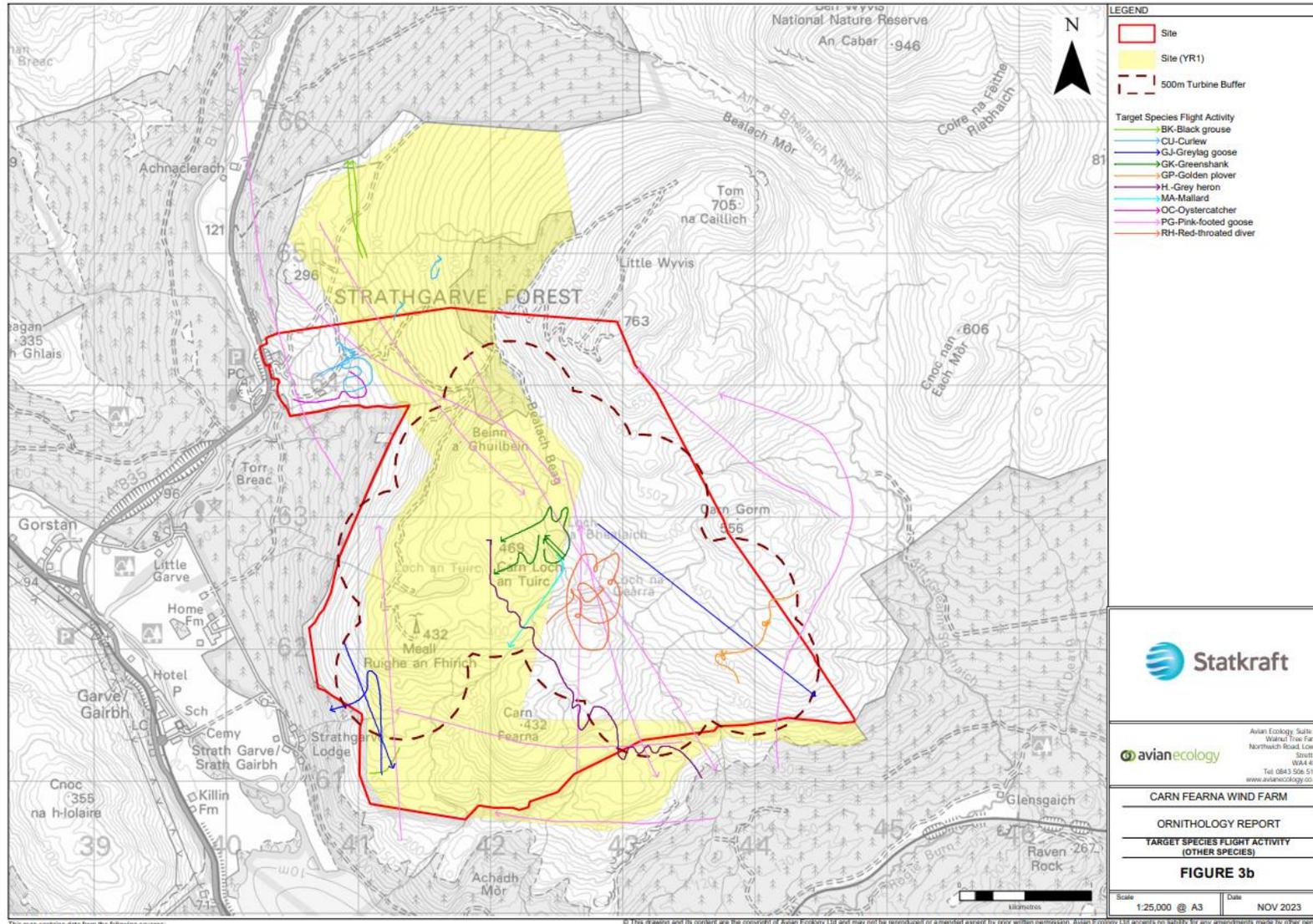
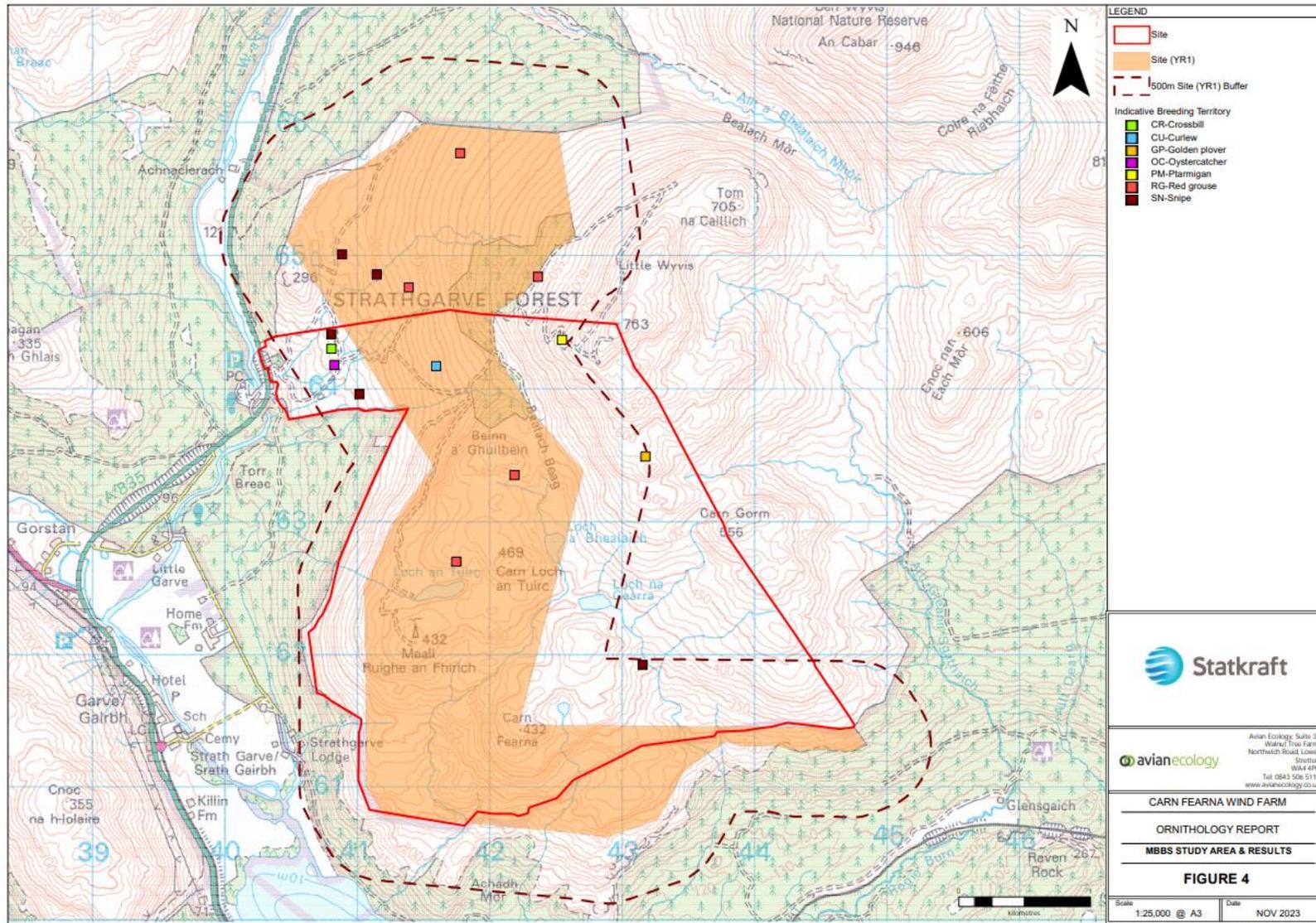


FIGURE 4: MBBS STUDY AREA AND RESULTS.



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FIGURE 5: BREEDING RAPTOR AND OWL STUDY AREA AND RESULTS.

SENSITIVE INFORMATION - EXCLUDED

FIGURE 6: BLACK GROUSE STUDY AREA AND RESULTS.

SENSITIVE INFORMATION - EXCLUDED

FIGURE 7: BREEDING DIVER STUDY AREA.

