



TECHNICAL APPENDIX 7.2: BALGRAY WIND FARM: BREEDING BIRD SURVEYS 2022

Report to Fred Olsen Renewables Ltd



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TABLE OF CONTENTS

INTRODUCTION	3
STUDY AREA	3
BREEDING BIRD SURVEY METHODS	4
<i>Core Breeding Bird Surveys.....</i>	<i>4</i>
<i>Raptor and Owl Breeding Surveys.....</i>	<i>4</i>
<i>Black Grouse Surveys.....</i>	<i>4</i>
<i>Vantage Point Surveys.....</i>	<i>5</i>
BREEDING BIRD SURVEYS 2022: RESULTS	6
<i>Raptor Survey Results.....</i>	<i>8</i>
<i>Black Grouse Survey Results.....</i>	<i>9</i>
<i>Vantage Point Survey Results.....</i>	<i>9</i>
CONSERVATION EVALUATION OF BREEDING BIRD POPULATIONS	10
CONCLUSIONS	35
REFERENCES.....	35





BALGRAY WIND FARM: BREEDING BIRD SURVEYS 2022

INTRODUCTION

1. This report presents the results of bird survey work for a wind farm at Balgray, Dumfries and Galloway, undertaken during a second breeding season to provide ornithological baseline data for the proposed wind farm development. It provides baseline data on the breeding bird populations, activity and flight paths within the vicinity of the proposed development site to inform subsequent ornithological impact assessment. All surveys followed the same methodology as those carried out previously in 2021.
2. The specific objectives of this work were to:
 - Undertake breeding bird surveys of the development site, to determine the numbers of birds present, and the flight activity of key target species.
 - Use this information to evaluate the importance of the site's breeding bird populations.
3. The surveys have been designed with reference to current NatureScot survey guidance on bird surveys for wind farms (SNH 2017). The survey design was also informed by the previous desk study undertaken by Arcus (November 2020). The surveys were undertaken by Tom Lowe and Stuart Piner, both highly experienced bird surveyors.

STUDY AREA

4. The site is located about 7km north-east of Lockerbie in Dumfries and Galloway. The breeding bird survey area was chosen to include all areas within the possible zone of ornithological influence of the wind farm. This included the wind farm site, plus a 500 m buffer for the main breeding bird surveys (the core survey area, following NatureScot guidance, SNH 2017) and a 2 km buffer for the key species surveys (the wider survey area), where access was possible and where there was potentially suitable habitat. The extents of these areas are shown in Figure 1. The main core survey area covered a total area of 8.8 km² and the wider survey area 33.1 km² (smaller than in 2021 as the wind farm site has reduced in size). The survey area comprised predominantly upland moorland habitat, currently used mainly for grazing sheep, surrounded by commercial conifer plantation and agriculturally improved grassland.





BREEDING BIRD SURVEY METHODS

Core Breeding Bird Surveys

5. The main breeding bird walkover survey followed the standard moorland survey method (Brown and Shepherd 1993) but with two additional visits as recommended in current NatureScot guidance (SNH 2017), as used for the previous 2021 surveys. They commenced in April and continued through to July and were done between 8:30 and 18:00 hours. The survey dates were 14 April, 4/5 May and 14/15 June and 4/5 July 2022. These surveys covered all of the open (i.e. non-forested) habitat within a buffer zone of 500m around the developable area where access/viewing was possible. Access was not allowed into the buffer to the east of the site, so in that area surveys were restricted to public access. The restricted access area is shown in Figures 2-14.
6. All bird locations and behaviour were mapped to 1:10,000 scale, using the standard BTO Common Birds Census notation. All species were recorded. In addition, the survey effort per unit area was standardised to make the surveys as repeatable as possible, recording systematically for approximately 2 hours per km². A route was chosen to ensure that all parts of the study area were covered within about 100 m of the observer, where access was possible. The survey route was plotted on the survey map as it was carried out.
7. The surveys avoided strong winds, heavy rain, fog and low cloud. Birds were located by walking, listening and scanning by eye and with binoculars. Standard BTO notation will be used to record the birds' activities; singing, calling, carrying nest material, nests or young found, repetitively alarmed adults, disturbance displaying, carrying food or in territorial dispute.
8. The survey data were analysed to determine spatially distinct clusters of records equivalent to breeding territories (following Brown and Shepherd 1993). The number of such territories was used to calculate the breeding population for each species (Gilbert *et al.* 1998). A record in potentially suitable breeding habitat on a single visit was considered sufficient to indicate a potential breeding attempt.

Raptor and Owl Breeding Surveys

9. As the survey area was considered likely, from the results of the desk study and the previous surveys in 2021, to be used by a range of scarce raptors, raptor surveys of a 2 km buffer zone around the developable area were undertaken during April-August 2022. Raptor surveys comprised walkovers where access was allowed, supplemented by a series of mini-VPs (shorter watches from additional VPs) to cover other areas, to detect displaying or nesting behaviour during the breeding season of raptor species in accordance with methods described in Gilbert *et al.* (1998) and Hardey *et al.* (2013). Surveys recorded all Schedule 1 and Annex I raptor species but with a focus on those species for which evidence of breeding has previously been recorded in the vicinity (including goshawk, red kite, peregrine, barn owl and short-eared owl) and where potentially suitable breeding habitat for these species is present. This included four survey visits, undertaken on 14/15 April, 4/5 May, 16 June and 7/8 July.

Black Grouse Surveys

10. Black grouse surveys were undertaken following the methods outlined in Gilbert *et al.* (1998). All suitable black grouse habitat within the site boundary and a 2 km buffer was surveyed during April - mid-May. Surveys were carried out on 12 April, 5 and 6 May. Areas of suitable habitat outside the site and inaccessible were scanned with binoculars from the site boundary, from publicly accessible





locations and from suitable vantage points within the site. A three-visit survey was undertaken as follows:

- Visit 1: site visit to assess habitat for black grouse suitability;
- Visit 2: areas of suitable habitat with the potential to support lekking black grouse were visited twice on different mornings to establish presence/absence; and
- Visit 3: any locations where black grouse were recorded as present during the second visit were revisited in order to provide an accurate count of the number of lekking birds present. The survey was undertaken one hour prior to dawn until one hour after dawn.

Vantage Point Surveys

11. Vantage Point surveys were carried out to determine bird flight activity within the wind farm site to assess collision risk. The surveys quantified the bird numbers that could potentially be at risk of collision (including roost flight observations at dawn/dusk). All flight lines of target species were mapped, and the flight height of each flock recorded. Target species included all EU Birds Directive Annex 1 species, Wildlife & Countryside Act (1981) Schedule 1 species and Red-listed birds of Conservation Concern (Stanbury *et al.* 2021), as per NatureScot (SNH 2017).
12. The specific aim of the VP surveys was to collect data on key target species flight activity to enable estimates to be made of:
 - The time spent flying over the survey area
 - The relative use made of different parts of the survey area
 - The proportion of flying time spent at different elevations above the ground.
13. Two vantage points were used to cover the wind farm site. The computer-generated viewsheds (using Global Mapper v21) are shown in Figure 1. For each VP, a basic 36 hours' VP surveys during the breeding season from each VP were carried out (as set out in NatureScot guidance), spread evenly across the breeding season. As the site lies within the potential SPA connectivity distance from the Castle Loch SPA (for which pink-footed geese are a qualifying feature) and within a known goose feeding area (SNH 2013, Mitchell 2012), an additional six hours' VP for each VP was carried out in April to provide extra survey effort in the main goose migration season.
14. All key target species flights (and any other species of specific nature conservation interest) were recorded, irrespective of their distance from the vantage point. Observations were carried out throughout daylight hours but not in periods of severely reduced visibility (<3 km).
15. During the VP surveys, all key target species flights were mapped and cross-referenced to a standard recording form using a numbering system, and the flight height of each recorded. Heights were estimated as accurately as possible using available reference structures and recorded as a raw estimate rather than being summarised to height classes. Below 10 m estimates were made to 1 m, between 10 and 20 m to 2 m, between 20 m and 50 m to 5 m, and above 50 m to 10 m. When birds were observed over an extended period, estimates of flight height were recorded every 30 seconds. The activity during each flight was also recorded. Particular attention was paid to any observations of birds at rotor height.



BREEDING BIRD SURVEYS 2022: RESULTS

16. The breeding bird populations recorded in the survey area on each visit are summarised in Table 1, which gives the estimated number of breeding pairs recorded during each survey visit and the overall breeding population estimate for each species. A single record in potentially suitable breeding habitat on a single visit was considered sufficient to indicate a potential breeding attempt.

TABLE 1. Breeding bird numbers in the core Balgray survey area recorded during April-July 2022. Numbers given are the number of breeding pairs recorded on each survey visit, the overall number of breeding pairs and the number of pairs within the proposed development.

Species	14 April	4/5 May	14/15 June	4/5 July	Estimated number of breeding pairs
Mute Swan	2	2	2	1	2
Greylag Goose	1	1	0	0	1
Canada Goose	0	2	1	1	2
Teal	3	2	0	0	3
Mallard	3	1	4	0	6
Tufted Duck	3	4	5	2	5
Red-legged Partridge	1	1	3	0	3
Pheasant	49	23	11	4	50
Little Grebe	1	2	1	1	2
Goshawk	0	1	0	0	1
Sparrowhawk	1	1	1	0	3
Buzzard	7	5	5	8	10
Moorhen	2	2	3	1	4
Coot	1	0	0	1	1
Lapwing	2	7	3	2	7
Snipe	12	5	2	4	12
Curlew	5	0	3	0	5
Feral Pigeon	0	0	1	1	2
Stock Dove	0	0	1	1	1
Woodpigeon	16	18	26	12	55
Collared Dove	0	0	1	0	1
Cuckoo	0	4	5	0	7
Barn Owl	0	1	0	0	1
Great Spotted Woodpecker	1	0	2	0	3
Skylark	115	108	107	74	161
Swallow	0	8	5	9	13
Meadow Pipit	245	200	234	202	340
Grey Wagtail	0	1	1	0	1
Pied Wagtail	11	4	7	10	24
Wren	37	34	45	37	69
Dunnock	5	6	1	3	8

Species	14 April	4/5 May	14/15 June	4/5 July	Estimated number of breeding pairs
Robin	28	15	28	12	40
Redstart	0	3	5	2	6
Stonechat	1	3	5	6	8
Wheatear	3	11	1	0	12
Blackbird	13	19	16	4	29
Song Thrush	18	6	6	4	23
Mistle Thrush	4	0	3	0	4
Sedge Warbler	0	1	2	0	3
Blackcap	1	1	3	0	3
Whitethroat	0	0	0	2	2
Chiffchaff	2	1	1	1	4
Willow Warbler	11	24	21	4	37
Goldcrest	7	5	7	5	17
Spotted Flycatcher	0	0	1	1	2
Blue Tit	8	7	8	4	15
Great Tit	3	5	7	4	12
Coal Tit	10	9	8	5	17
Nuthatch	1	0	0	0	1
Treecreeper	3	2	5	0	7
Jay	2	1	1	1	4
Magpie	1	0	0	0	1
Jackdaw	2	4	7	2	13
Carrion Crow	23	18	29	21	40
Raven	1	2	0	1	2
Starling	4	2	2	0	5
House Sparrow	5	2	3	3	8
Chaffinch	81	55	98	18	126
Goldfinch	2	4	5	6	15
Siskin	2	8	15	3	21
Linnet	2	3	1	3	10
Lesser Redpoll	1	1	10	0	11
Bullfinch	0	2	0	0	2
Reed Bunting	4	6	11	19	28

17. The distributions of the breeding birds of conservation importance within the survey area in 2022 are shown in Figures 2 to 14. The more abundant species (i.e. 10 or more breeding pairs) of conservation interest have been presented separately for clarity.

- **Breeding waders** (Figure 2) - three species of waders were recorded breeding within the core breeding bird survey area in 2022: lapwing, snipe and curlew. They were widely scattered across the open ground within the survey area with no notable concentrations, though both snipe and curlew were more abundant in the central part of the survey area, and lapwing on the southern edge.

- **Woodpigeon** (Figure 3) were widely distributed around the survey area, with most birds associated with the woodland habitat in the buffer rather than within the wind farm site itself.
 - **Skylark** (Figure 4) and **Meadow Pipit** (Figure 5) were both abundant over all the open moorland habitat within the survey area, though with less on the lower areas of more agriculturally-improved grassland.
 - **Wren** (Figure 6) were abundant throughout the woodland habitat surrounding the site.
 - **Wheatear** (Figure 7) were widely scattered across the open upland habitats.
 - **Song Thrush** (Figure 8) were common but largely restricted to the woodland habitats within the survey area.
 - **Willow Warblers** (Figure 9) were common within the wooded habitat on the edges of the survey area.
 - **Siskin** (Figure 10) were another woodland species found mainly on the edges of the survey area.
 - **Linnet** (Figure 11) were widely scattered over the more open/scrubby parts of the survey area, though outside the wind farm site.
 - **Lesser Redpoll** (Figure 12) were another widely distributed mainly forest species.
 - **Reed Bunting** (Figure 13) were another common open ground species, associated mainly with wetter habitats across the survey area.
18. Other less abundant species of conservation importance (Figure 14) were found mainly in the fringes of the survey area, with no important concentrations noted and few within the wind farm site itself.
19. Additional species seen during the 2022 breeding bird surveys but not showing any evidence of breeding within the survey area included (peak counts): whooper swan (10), pink-footed goose (190), grey heron (1), cormorant (1), lesser black-backed gull (20), herring gull (25), great black-backed gull (2), swift (26), fieldfare (10) and rook (296).

Raptor Survey Results

20. **Red Kite** - a pair of red kites were nesting within the survey area in 2022, as it had done in 2021. It was again more than 1 km from the site boundary, though in 2022 at a different location further from the site. Further details are given in the Confidential Appendix TA 7.9. Flight activity was widespread over the site.
21. **Goshawk** - this species was seen during the VP and the raptor surveys and was likely to have bred in the woodland to the east of the site boundary. Further details are given in the Confidential Appendix 7.9.
22. **Osprey** - this species was occasionally seen fishing on Hallhills Loch within the core survey area (Figure 16) but there was no evidence found of breeding within the core or the wider survey area.
23. **Merlin** - there was a single record of this species overflying during the VP surveys (Figure 16) and during the core breeding bird surveys, but no evidence of breeding within the core or the wider survey area.
24. **Peregrine** - there was a single record of this species overflying during the VP surveys (Figure 16) and during the raptor surveys, but no evidence of breeding within the core or the wider survey area.
25. **Barn Owl** - this species was seen on the western edge of the survey area and is likely to have been breeding. Further details are given in the Confidential Appendix (TA 7.9).

Black Grouse Survey Results

26. There were no records of black grouse during the 2022 surveys. None were seen either during the 2021 surveys.

Vantage Point Survey Results

27. The rates of bird flight movement observed across the survey area during the vantage point surveys from the two VPs are summarised in Table 2. This gives the monthly mean flight rates observed, and the total number of flights recorded during the survey period. Key species flight lines are shown in Figures 15-20. Flight lines for red kite and goshawk are included in the Confidential Appendix (TA 7.9) as they indicate breeding locations.

TABLE 2. Bird flight rates recorded over the Balgray breeding bird survey area during April – August 2022 vantage point surveys. N = 42 hours total observation.

Species	Flight rate (birds/hour)					Total number of flights	% flights at rotor height
	Apr	May	Jun	Jul	Aug		
Mute Swan	0.23	-	-	-	-	6	0%
Whooper Swan	0.58	-	-	-	-	15	100%
Pink-footed Goose	17.23	-	-	-	-	448	80%
Greylag Goose	0.27	-	0.63	-	-	17	50%
Canada Goose	0.08	0.14	0.31	-	-	9	25%
Mallard	0.15	0.21	-	-	0.36	12	25%
Tufted Duck	-	-	0.19	-	-	3	0%
Goosander	0.08	-	-	-	-	2	0%
Cormorant	-	-	0.06	-	-	1	100%
Grey Heron	0.12	0.07	0.06	0.07	-	6	33%
Red Kite	0.50	0.93	0.38	0.07	1.64	56	73%
Goshawk	0.19	-	-	0.21	0.07	9	75%
Sparrowhawk	0.04	-	-	-	0.07	2	50%
Buzzard	1.96	1.29	2.06	2.50	3.21	182	80%
Osprey	0.04	-	-	-	-	1	100%
Kestrel	0.54	0.50	0.38	0.43	2.43	67	21%
Merlin	0.04	-	-	-	-	1	0%
Peregrine	-	-	-	0.07	-	1	100%
Oystercatcher	0.04	-	-	-	-	1	0%
Golden Plover	8.92	-	-	-	-	232	100%
Lapwing	0.88	0.36	0.56	4.57	-	101	22%
Snipe	0.62	0.71	0.25	0.14	-	32	68%
Curlew	0.54	-	1.25	-	0.07	35	55%
Common Gull	0.04	-	-	-	3.36	48	100%
Lesser Black-backed Gull	6.15	0.50	0.81	1.21	1.00	211	94%
Herring Gull	0.58	0.14	0.19	-	-	20	100%

Species	Flight rate (birds/hour)					Total number of flights	% flights at rotor height
	Apr	May	Jun	Jul	Aug		
Great Black-backed Gull	0.19	0.29	0.06	0.21	-	13	90%
Black-headed Gull	-	0.14	0.44	-	-	9	75%
Kittiwake	0.04	-	-	-	-	1	100%

Conservation Evaluation of Breeding Bird Populations

28. The conservation value of the breeding bird populations was determined using the criteria specified in Table 3 (from Percival 2007). This includes the criteria adopted by Natural England in Guidelines for Selection of Biological SSSIs (Drewitt *et al.* 2020), using 1% of the resource to define international and national importance (Frost *et al.* 2021). An additional category of regional importance was assigned for species approaching the threshold for national importance and those for which the survey area held a notable concentration in a county context. A further category of 'local importance' was used for species that did not reach regional importance but were still of some ecological value. This included all species on the red or amber lists of the 'Birds of Conservation Concern v.5' (Stanbury *et al.* 2021) that did not reach national or regional importance at the development site. National (GB) and International wintering waterfowl baseline populations have been taken from the most recently published population figures (Frost *et al.* 2021) from the national Wetland Birds Survey and other species from Woodward *et al.* (2020). In addition, listing on Annex 1 of the EU Birds Directive, Schedule 1 of the Wildlife and Countryside and UK/Scottish BAP priority species were all considered in the evaluation process.

TABLE 3. Definition of terms relating to the conservation value of the ornithological receptors at the site.

Sensitivity	Definition
VERY HIGH	Cited interest of SPAs, SACs and SSSIs. Cited means mentioned in the citation text for the site as a species for which the site is designated (SPAs/SACs) or notified (SSSIs).
HIGH	Other species that contribute to the integrity of an SPA or SSSI. A local population of more than 1% of the national population of a species. EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or W&C Act Schedule 1 species. Ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK).
MEDIUM	Regionally important population of a species, either because of population size or distributional context. NERC Act Section 41 priority species (if not covered above), red-listed species of conservation concern.
LOW	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above. Scottish BAP species (if not covered above).
NEGLECTIBLE	Green-listed species (Stanbury <i>et al.</i> 2021) of favourable conservation status

TABLE 4. Conservation evaluation of the breeding bird populations in the Balgray survey area, 2021 and 2022.

Species	Breeding pairs 2021	Breeding pairs 2022	EU Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
Mute Swan	3	2						Negligible
Greylag Goose ²	0	1			A			Low
Canada Goose	4	2						Negligible
Teal ³	0	3			A			Low
Mallard	9	6			A			Low
Tufted Duck	7	5						Negligible
Red-legged Partridge	1	3						Negligible
Pheasant	65	50						Negligible
Little Grebe ³	2	2						Negligible
Red Kite	1	1	✓	✓			✓	High
Goshawk	0	1		✓				High
Sparrowhawk	0	3			A			Low
Buzzard ²	10	10						Negligible
Kestrel	1	0			A		✓	Low
Moorhen	4	4			A			Low
Coot	2	1						Negligible
Oystercatcher ²	2	0			A			Low
Lapwing	5	7			R	✓	✓	Medium
Snipe ²	9	12			A			Low
Curlew ²	5	5			R	✓	✓	Medium
Common Sandpiper ²	1	0			A			Low
Feral Pigeon	1	2						Negligible
Stock Dove	5	1			A			Low
Woodpigeon	70	55			A			Low
Collared Dove	1	1						Negligible
Cuckoo ^{2,5}	2	7			R	✓	✓	Medium
Barn Owl	0	1		✓			✓	High
Great Spotted Woodpecker	5	3						Negligible
Skylark	124	161			R	✓	✓	Medium
Sand Martin	3	0						Negligible
Swallow	34	13						Negligible

Species	Breeding pairs 2021	Breeding pairs 2022	EU Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
House Martin	8	0			R			Low
Tree Pipit	3	0			R	✓	✓	Medium
Meadow Pipit	327	340			A			Low
Grey Wagtail ²	4	1			A			Low
Pied Wagtail	25	24						Negligible
Dipper ^{2,5}	2	0			A			Low
Wren	68	69			A			Low
Dunnock	12	8			A	✓		Medium
Robin	55	40						Negligible
Redstart	7	6						Negligible
Whinchat ²	1	0			R			Low
Stonechat ²	11	8						Negligible
Wheatear ¹	13	12			A			Low
Blackbird	52	29						Negligible
Song Thrush	41	23			A	✓	✓	Medium
Mistle Thrush	16	4			R			Low
Sedge Warbler	7	3			A			Low
Blackcap	5	3						Negligible
Whitethroat	3	2						Negligible
Chiffchaff	4	4						Negligible
Willow Warbler	64	37			A			Low
Goldcrest	24	17						Negligible
Spotted Flycatcher	2	2			R	✓	✓	Medium
Long-tailed Tit	2	0						Negligible
Blue Tit	26	15						Negligible
Great Tit	24	12						Negligible
Coal Tit	32	17						Negligible
Nuthatch	1	1						Negligible
Treecreeper	4	7						Negligible
Jay	4	4						Negligible
Magpie	1	1						Negligible
Jackdaw	24	13						Negligible
Carrion Crow	40	40						Negligible
Raven ³	6	2						Negligible
Starling	11	5			R	✓		Medium
House Sparrow	7	8			R	✓	✓	Medium

Species	Breeding pairs 2021	Breeding pairs 2022	EU Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
Chaffinch	145	126						Negligible
Goldfinch	34	15						Negligible
Siskin	34	21					✓	Low
Linnet	12	10			R	✓	✓	Medium
Lesser Redpoll	16	11				✓	✓	Medium
Common Crossbill	4	0		✓				High
Bullfinch	2	2			A	✓	✓	Medium
Reed Bunting	28	28			A	✓	✓	Medium

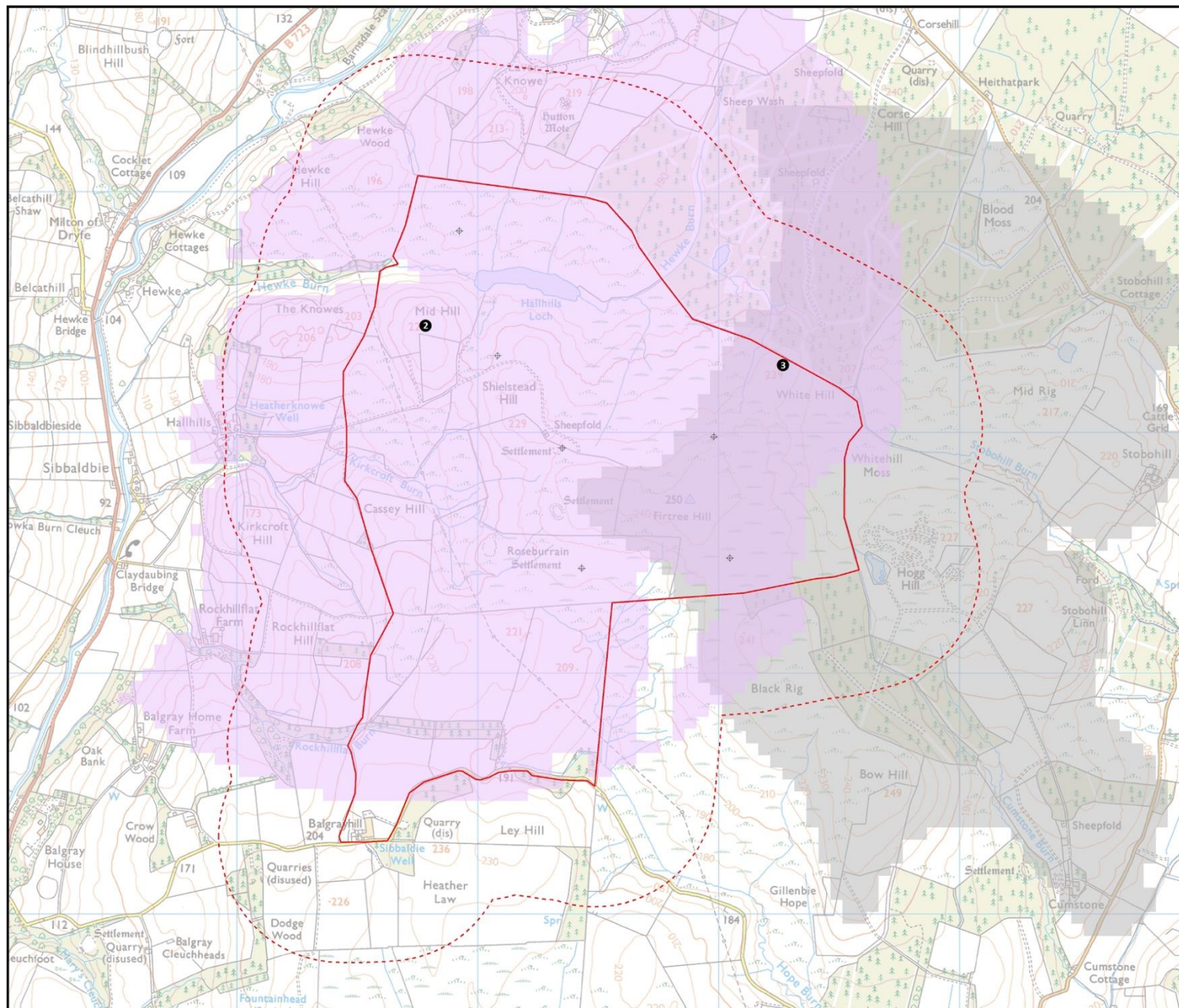
Note: superscripts indicate contribution to the JNCC breeding bird assemblage score for the main habitat within the survey area, 'Upland moorland and grassland with waterbodies'.

29. Four high value species were recorded breeding within the core breeding bird survey area during 2021 and 2022: red kite, goshawk, barn owl and common crossbill (though all were breeding outside the site boundary, and outside the area where they would be likely to be affected by the wind farm).
30. Fourteen breeding species were classed as medium conservation value: lapwing, curlew, cuckoo, skylark, tree pipit, dunnoek, song thrush, spotted flycatcher, starling, house sparrow, linnet, lesser redpoll, bullfinch and reed bunting. All were classed as medium value because of their listing on the UK Biodiversity Action Plan list of priority species. They are mostly farmland species that have declined widely across Britain but are still common and widespread.
31. A further 22 breeding species were classed as low sensitivity, through their listing on RSPB *et al.*'s (Stanbury *et al.* 2021) amber lists of birds of conservation concern and/or the Scottish Biodiversity List.
32. The overall conservation value of the breeding bird community in 2021 and 2022, measured from the core survey data as the breeding bird assemblage score, was 33. This is below the threshold for national importance (40) but above the threshold for regional importance (20) for the main habitat within the survey area, 'Upland moorland and grassland with water bodies' (Drewitt *et al.* 2020). The core survey area therefore supports a regionally important breeding bird community.
33. The evaluation of the conservation importance of the non-breeding species observed during these surveys is given in Table 5. This included one very high value species (pink-footed goose), five high value species (whooper swan, osprey, merlin, peregrine and golden plover, all EU Annex 1/Wildlife and Countryside Act Schedule 1 species), one medium value (herring gull, a UK BAP priority species), present in regionally important numbers), and ten additional low value species (through their red/amber listing). All these species were seen only infrequently in generally low numbers during the breeding bird surveys.

TABLE 5. Conservation evaluation of the non-breeding bird populations in the Balgray survey area, 2021 and 2022.

Species	Peak count 2021	Peak count 2022	EU Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
Whooper Swan	0	10	✓		A		✓	High

Species	Peak count 2021	Peak count 2022	EU Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
Pink-footed Goose	0	190			A			Very high
Goosander	0	1						Negligible
Cormorant	0	1						Negligible
Grey Heron	1	1						Negligible
Osprey	1	1	✓	✓	A		✓	High
Merlin	1	1	✓	✓	R		✓	High
Peregrine	1	1	✓	✓			✓	High
Golden Plover	0	140	✓				✓	High
Green Sandpiper	1	0			A		✓	Low
Common Gull	0	32			A			Low
Lesser Black-backed Gull	48	20			A			Low
Herring Gull	25	25			R	✓	✓	Medium
Great Black-backed Gull	1	2			A			Low
Black-headed Gull	0	4			A			Low
Kittiwake	0	1			R			Low
Swift	38	26			A		✓	Low
Fieldfare	343	10			R			Low
Redwing	1	0			R		✓	Low
Rook	154	296			A			Low



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FIGURE 1

Core Breeding and VP Survey Areas

KEY:

- VP locations
- ⊕ Initial turbine locations
- Core breeding bird survey area
- Site Boundary
- VP2 viewshed
- VP3 viewshed



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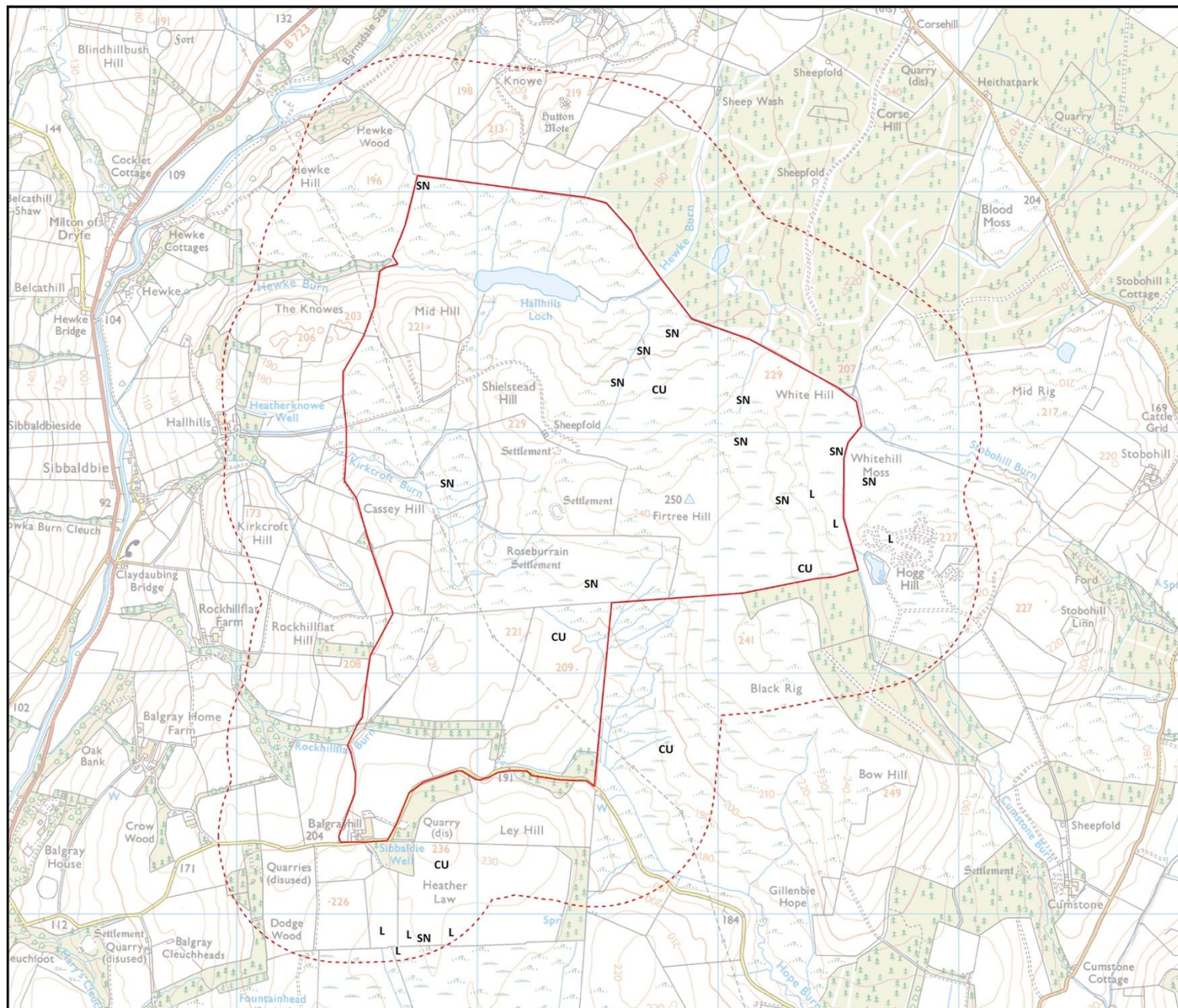
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FIGURE 2

Distribution of Breeding Waders

KEY:

- Core breeding bird survey area
- Site Boundary

Approximate breeding locations:

- CU - Curlew
- L - Lapwing
- SN - Snipe



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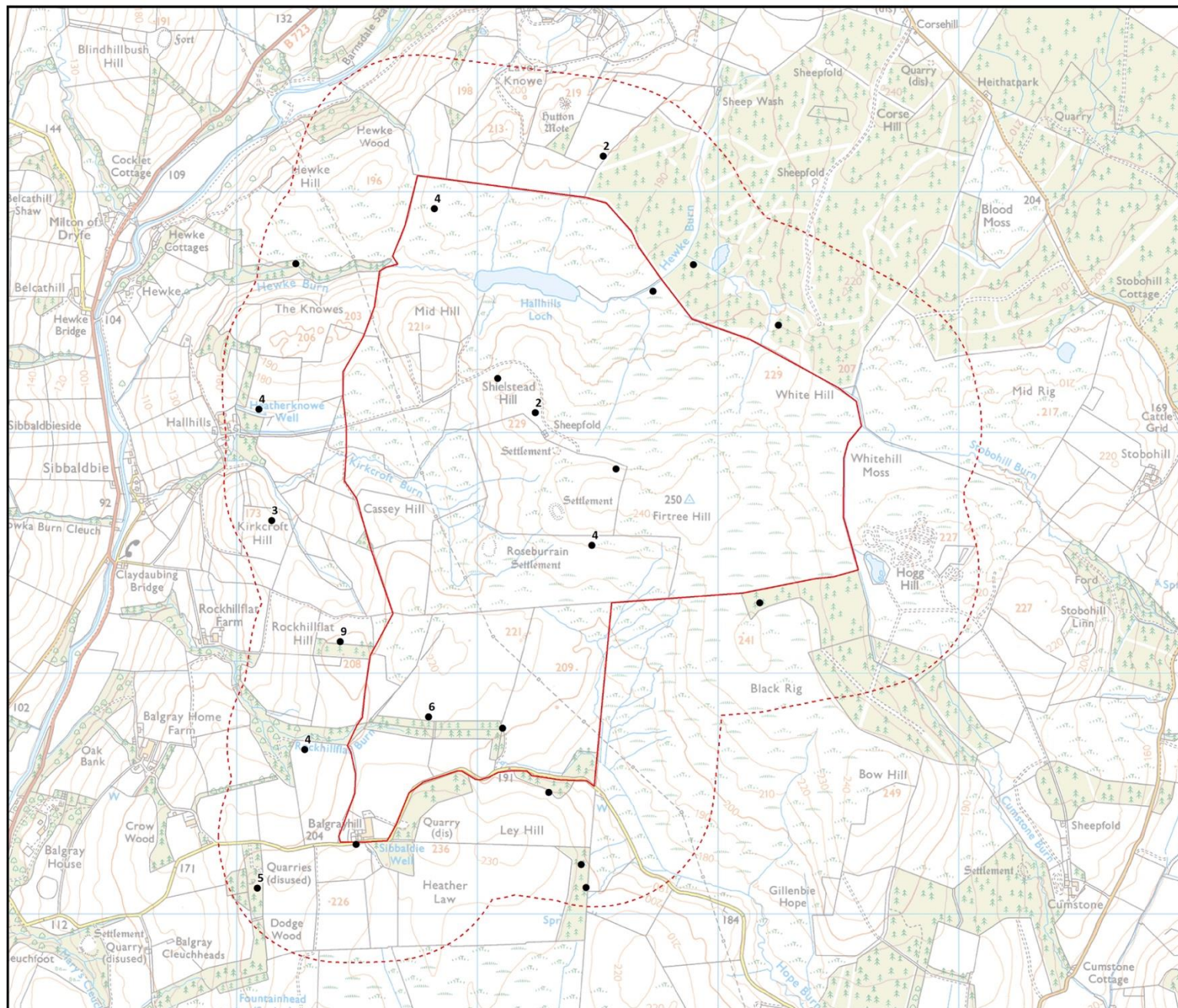
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FIGURE 3

Distribution of Breeding Woodpigeon

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations

Numbers = multiple pairs at single location



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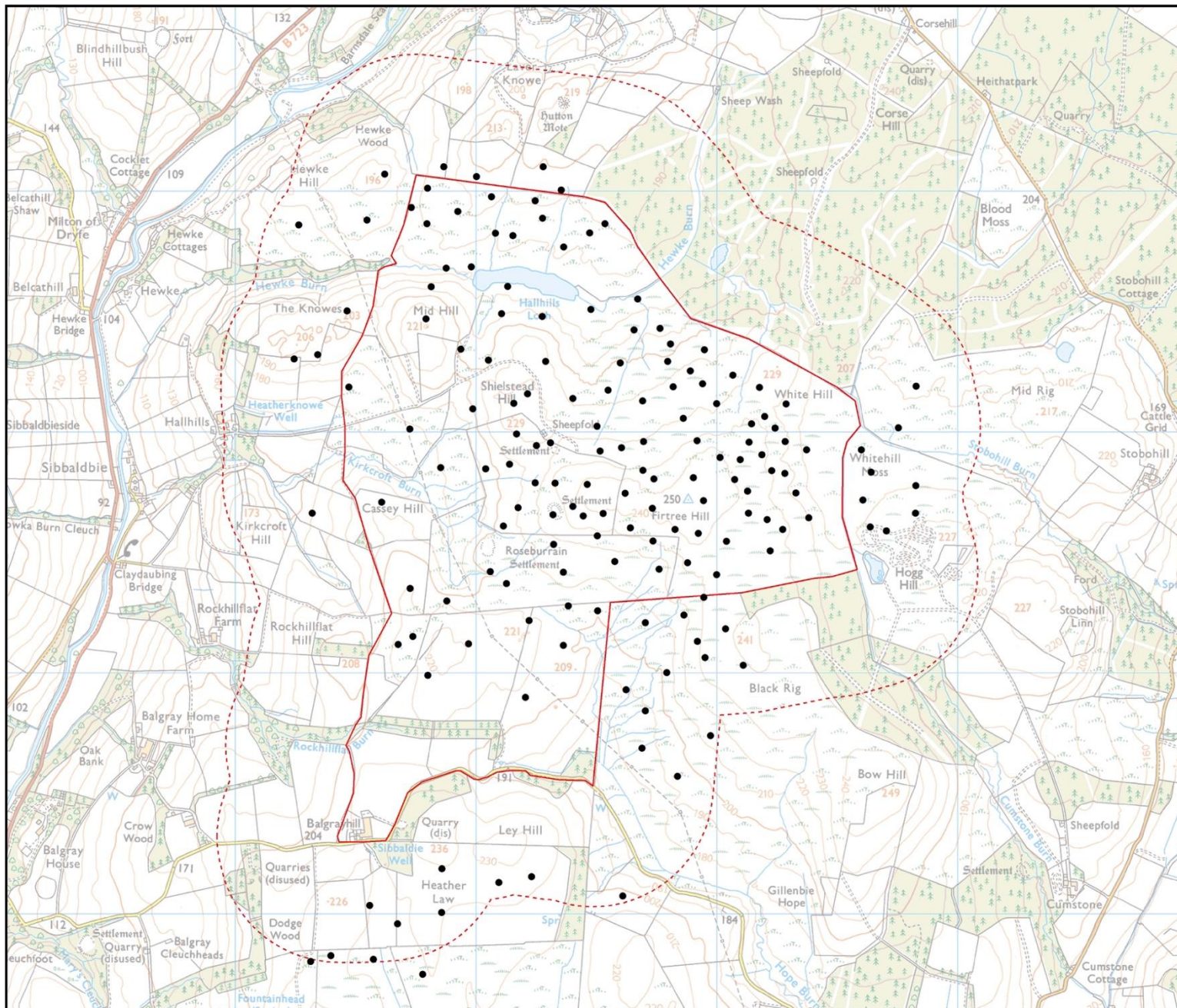
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FIGURE 4

Distribution of Breeding Skylark

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations



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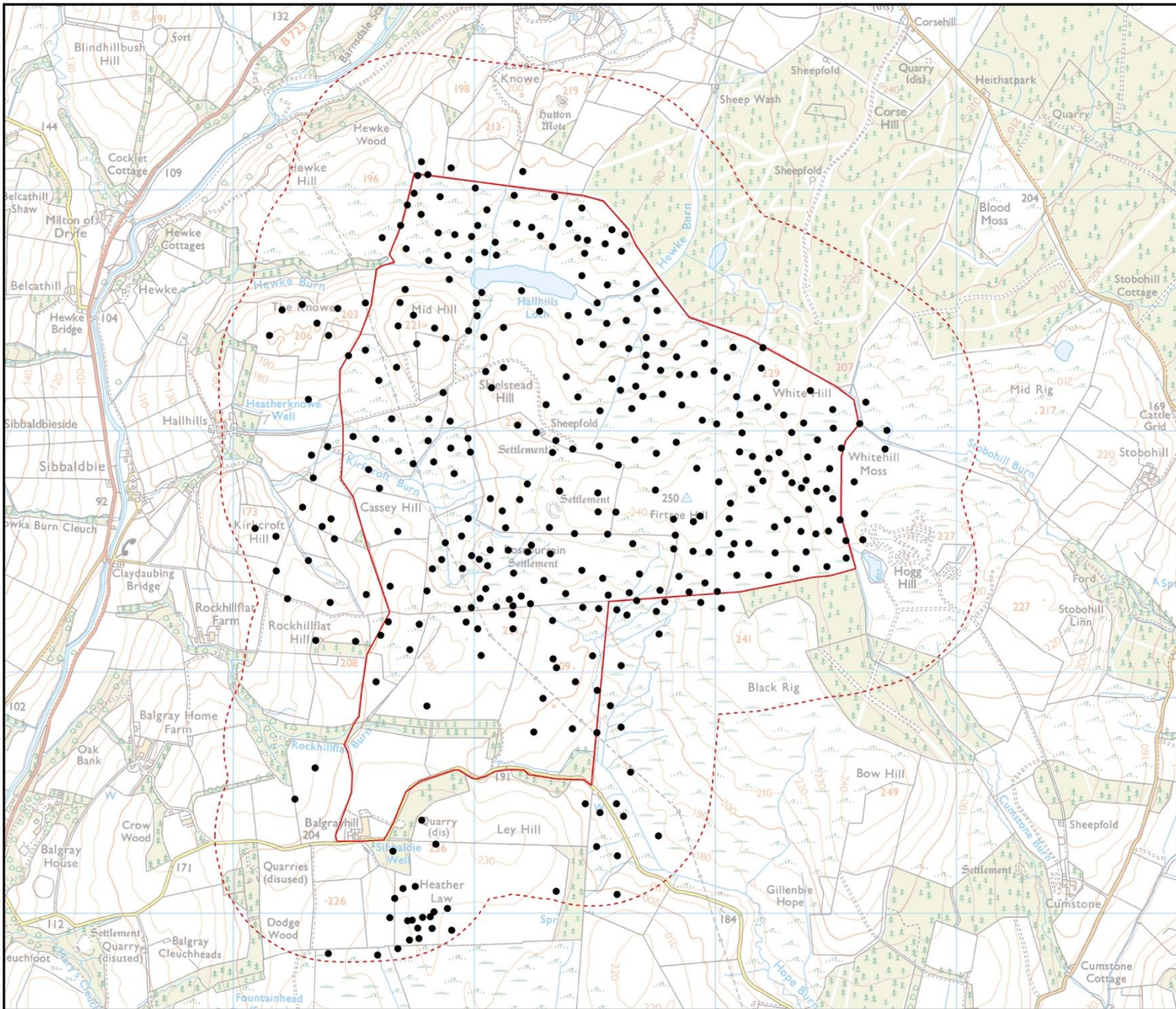
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FIGURE 5

Distribution of Breeding Meadow Pipit

KEY:

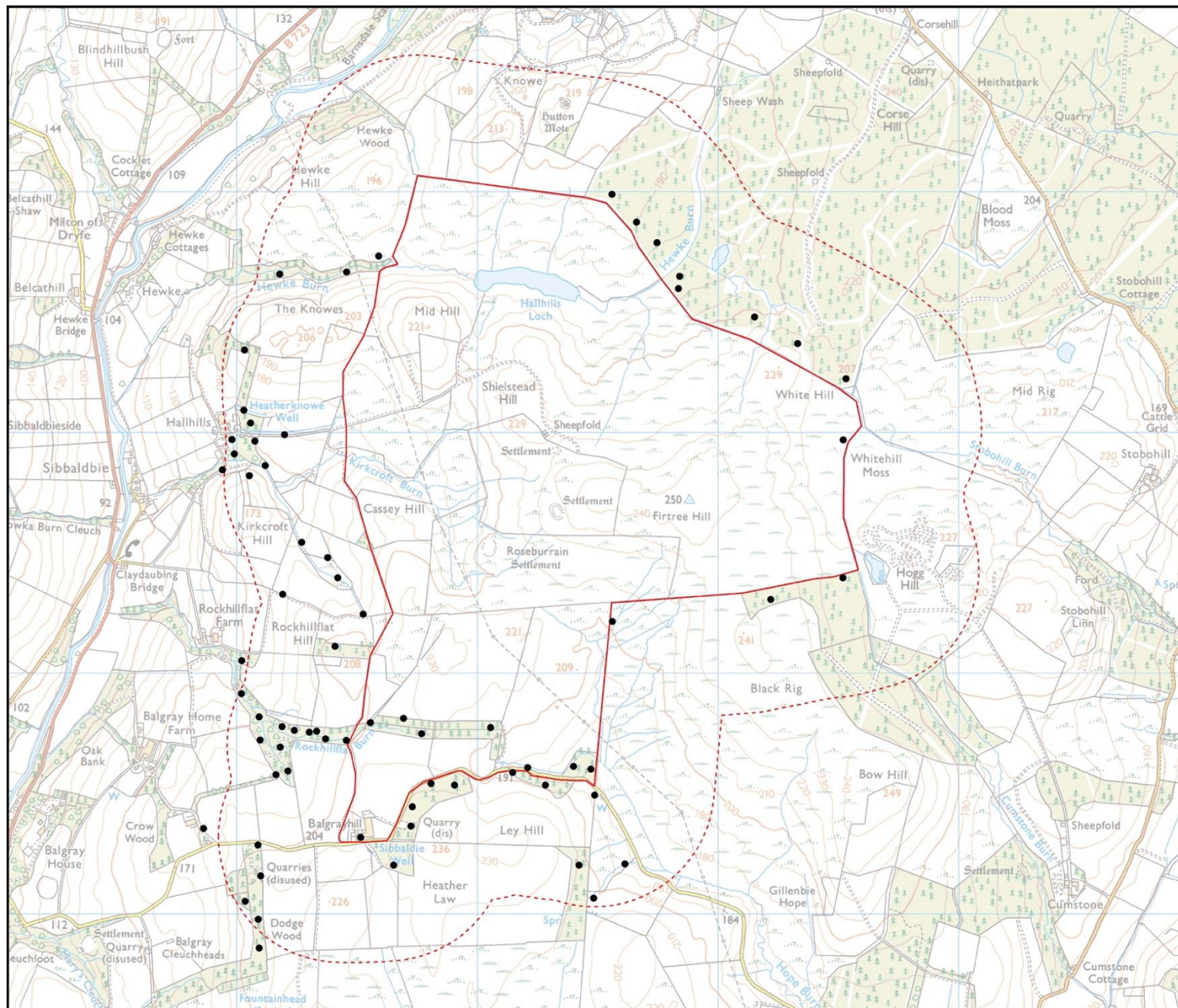
- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations



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FIGURE 6

Distribution of Breeding Wren

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations



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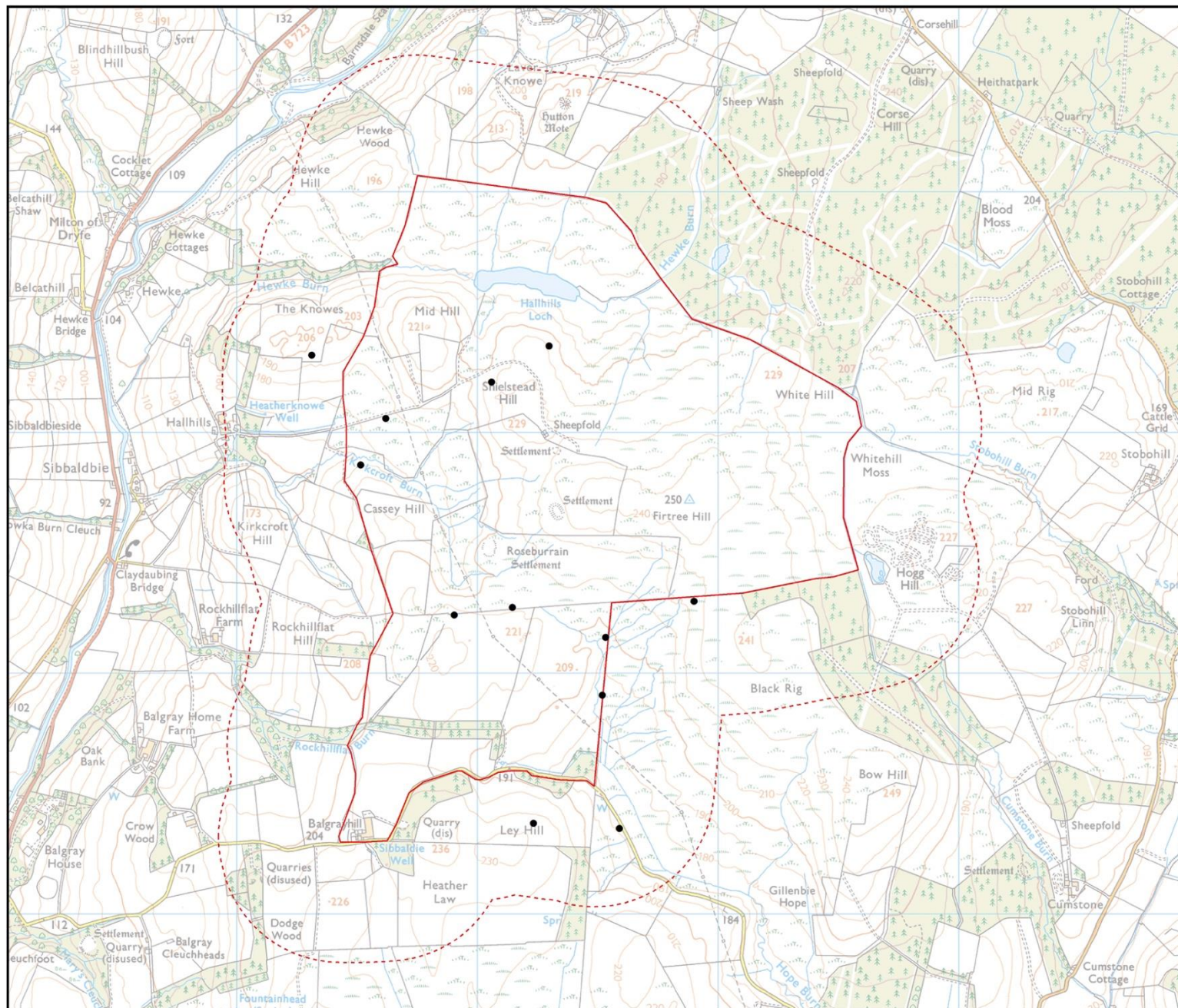
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FIGURE 7

Distribution of Breeding
Wheatear

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations



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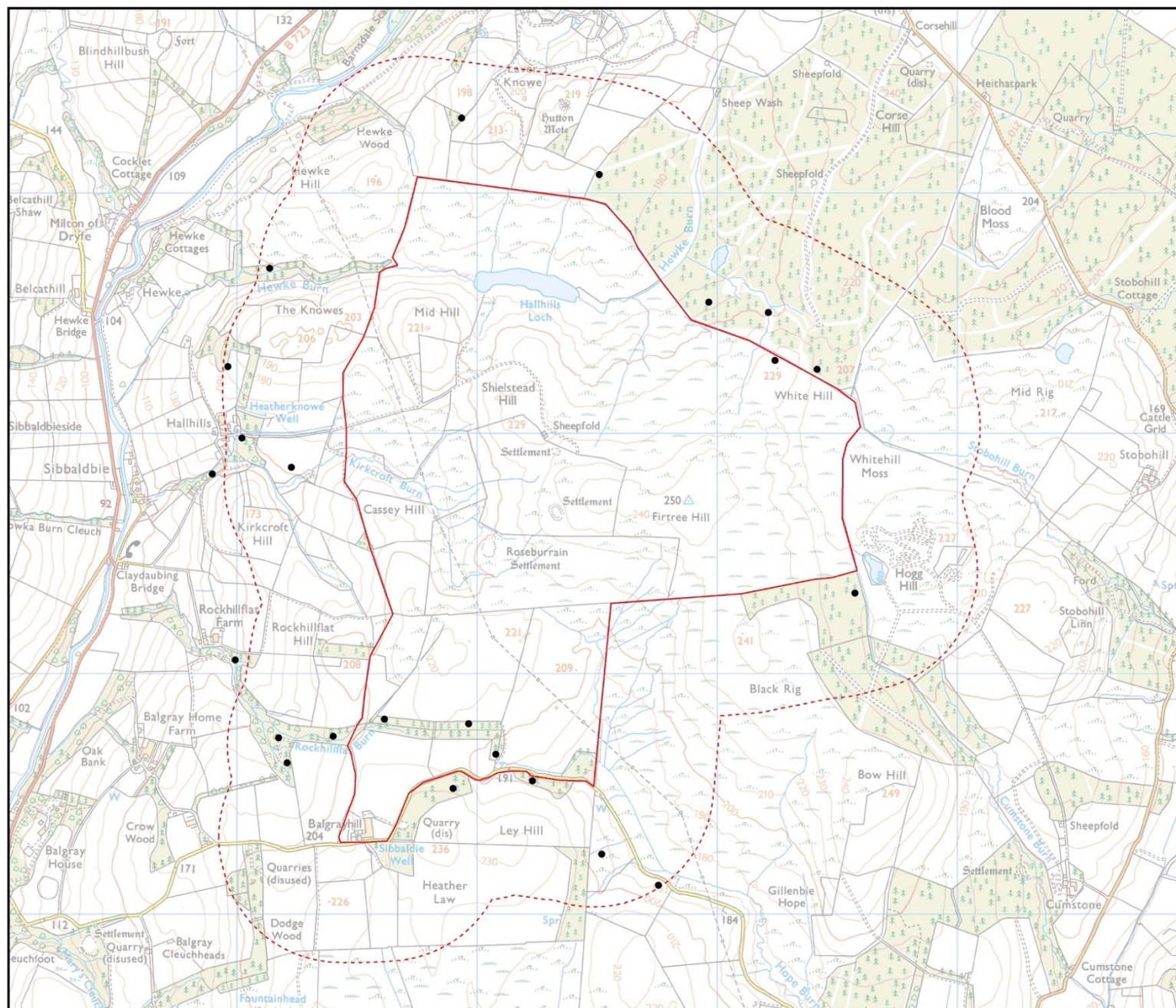
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FIGURE 8

Distribution of Breeding Song Thrush

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations



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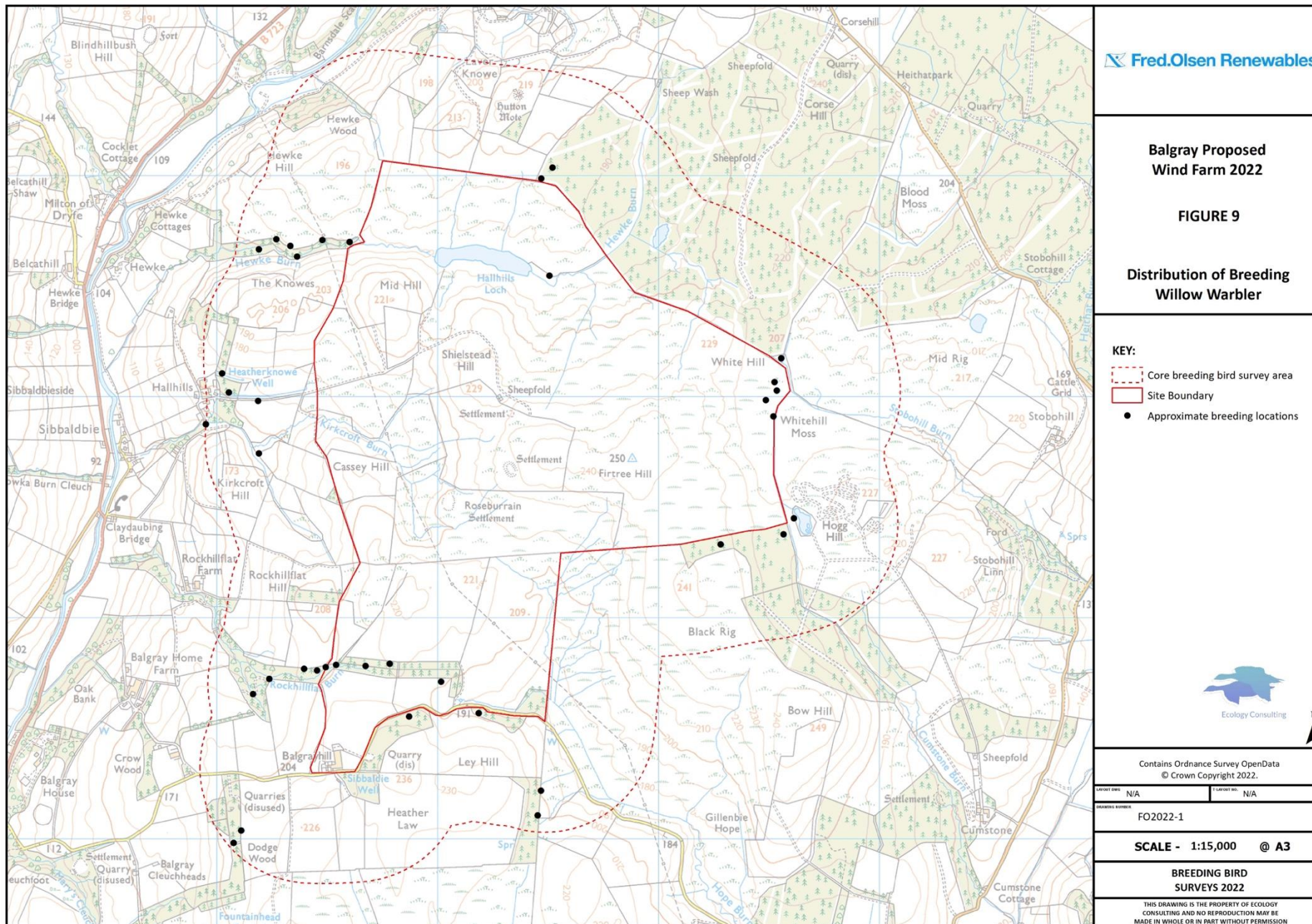
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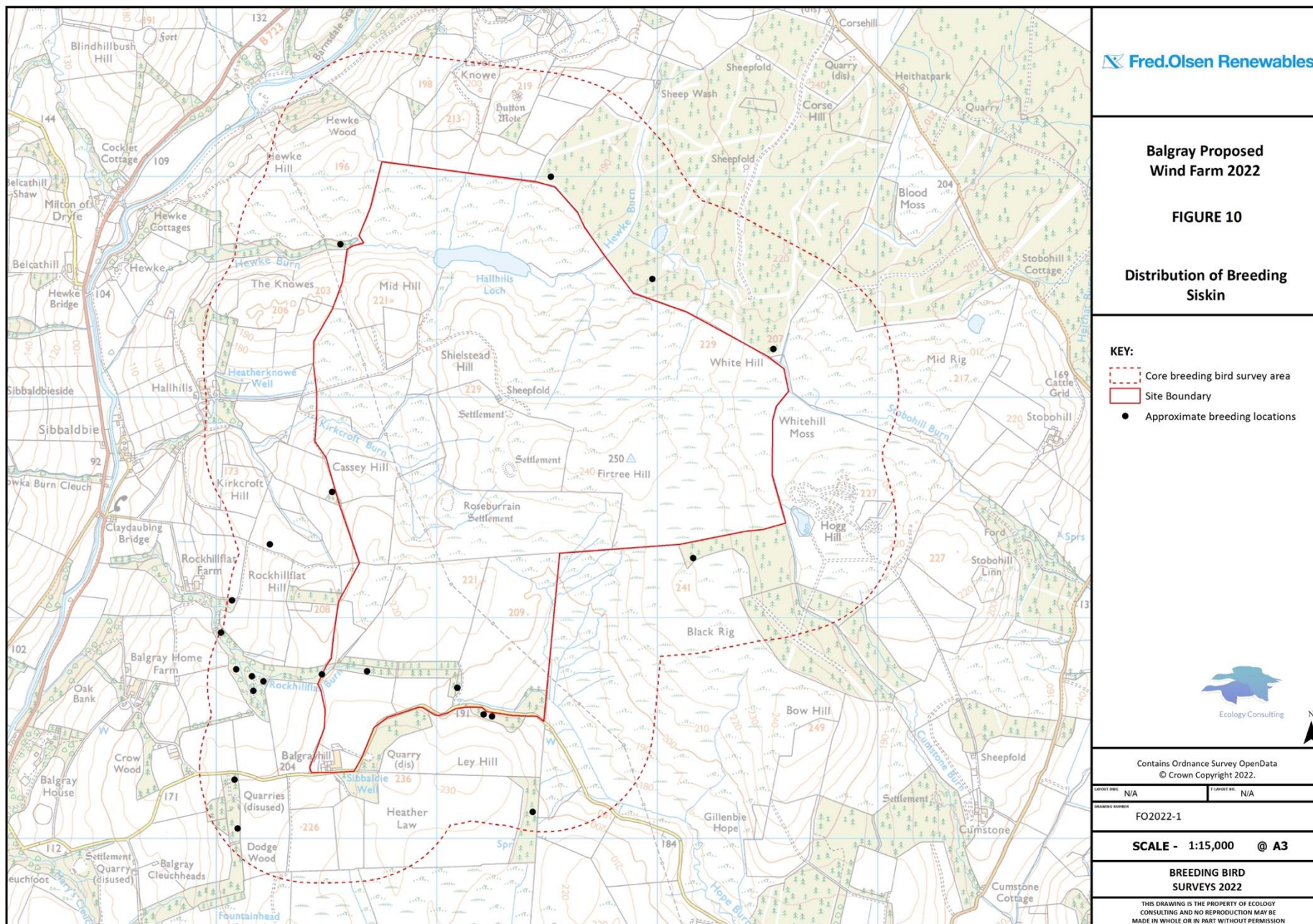
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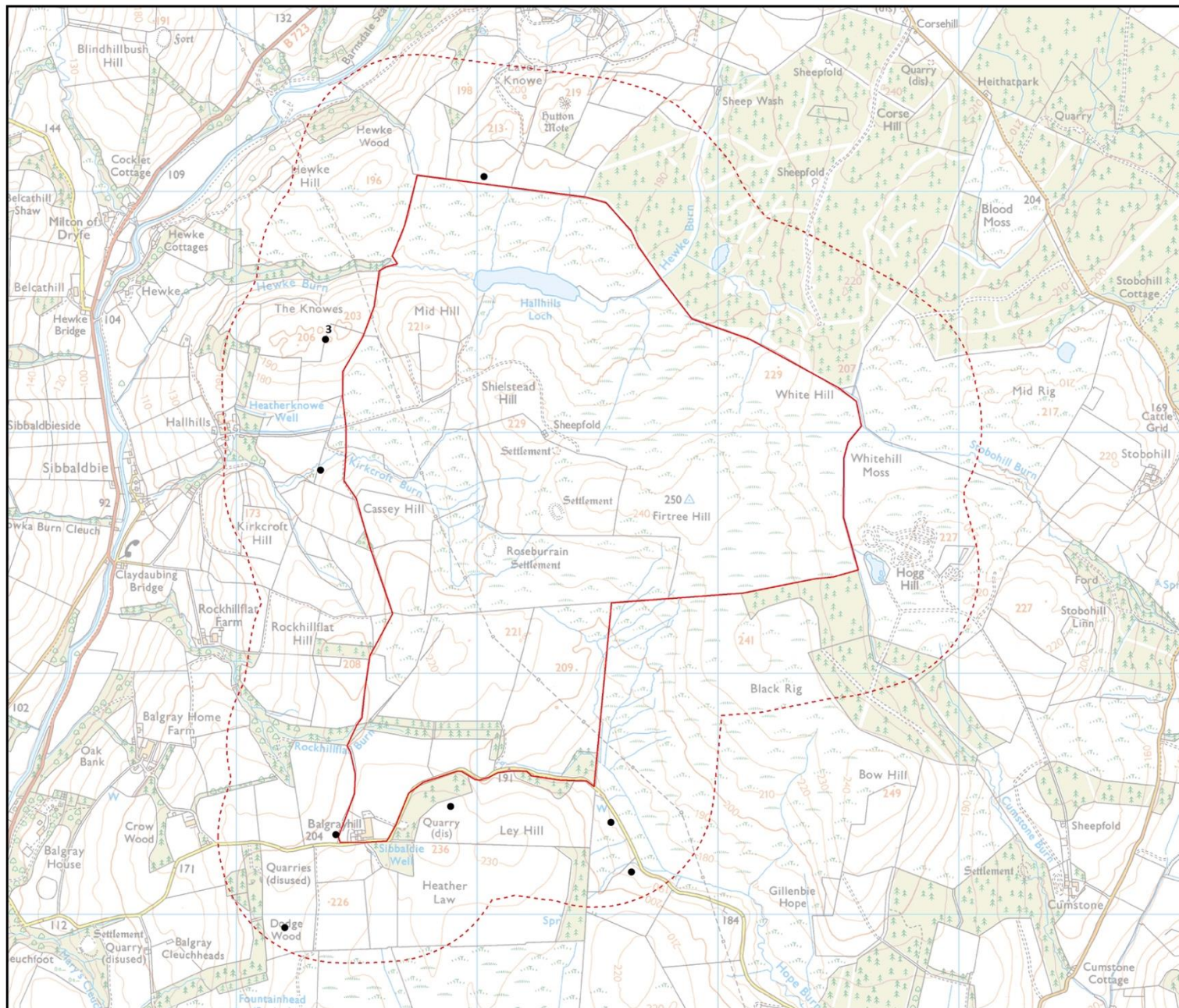
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FIGURE 11

Distribution of Breeding Linnet

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations
Numbers = multiple pairs
at single location



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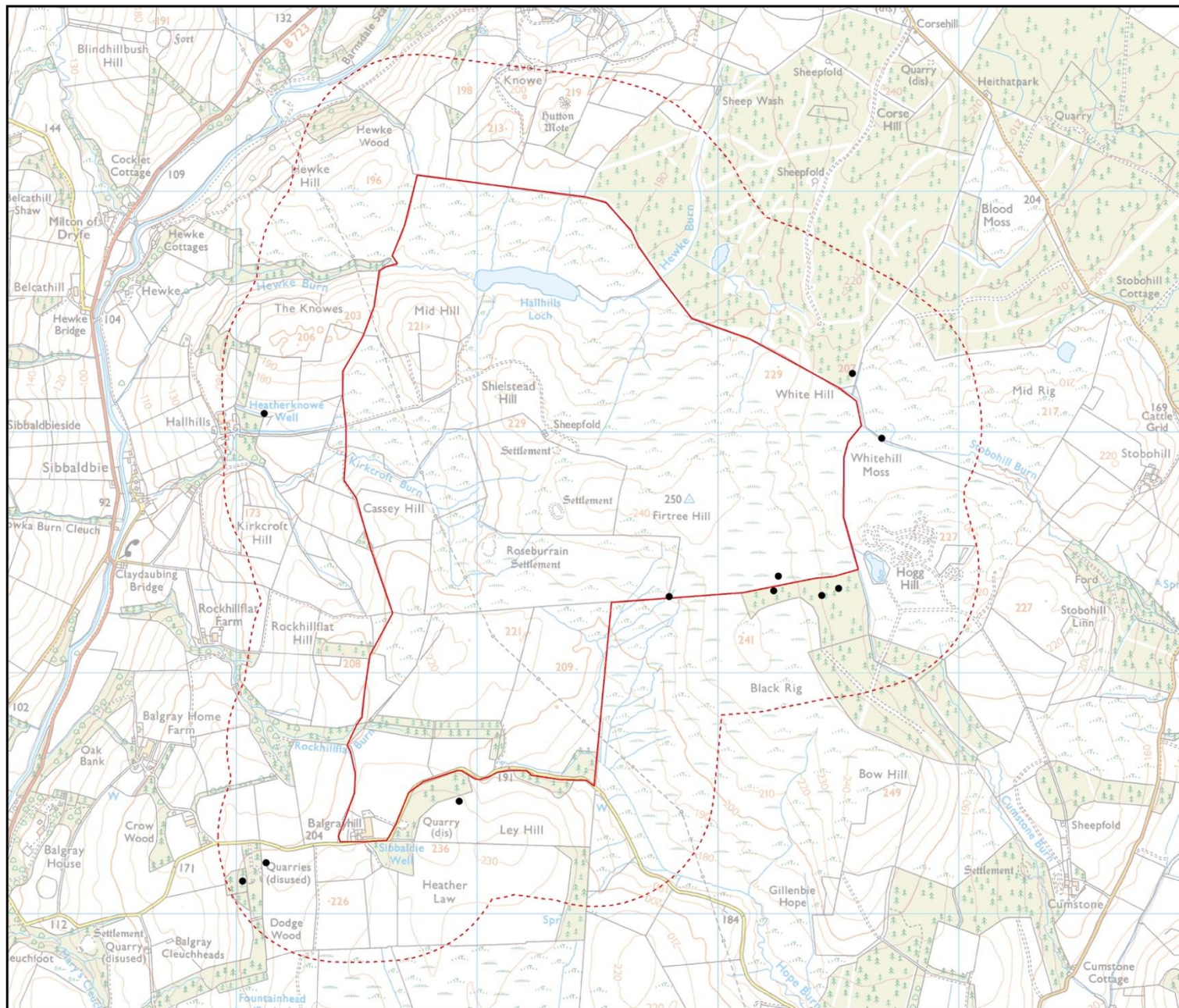
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FIGURE 12

Distribution of Breeding
Lesser Redpoll

KEY:

- Core breeding bird survey area
- Site Boundary
- Approximate breeding locations



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LAYOUT DATE: N/A

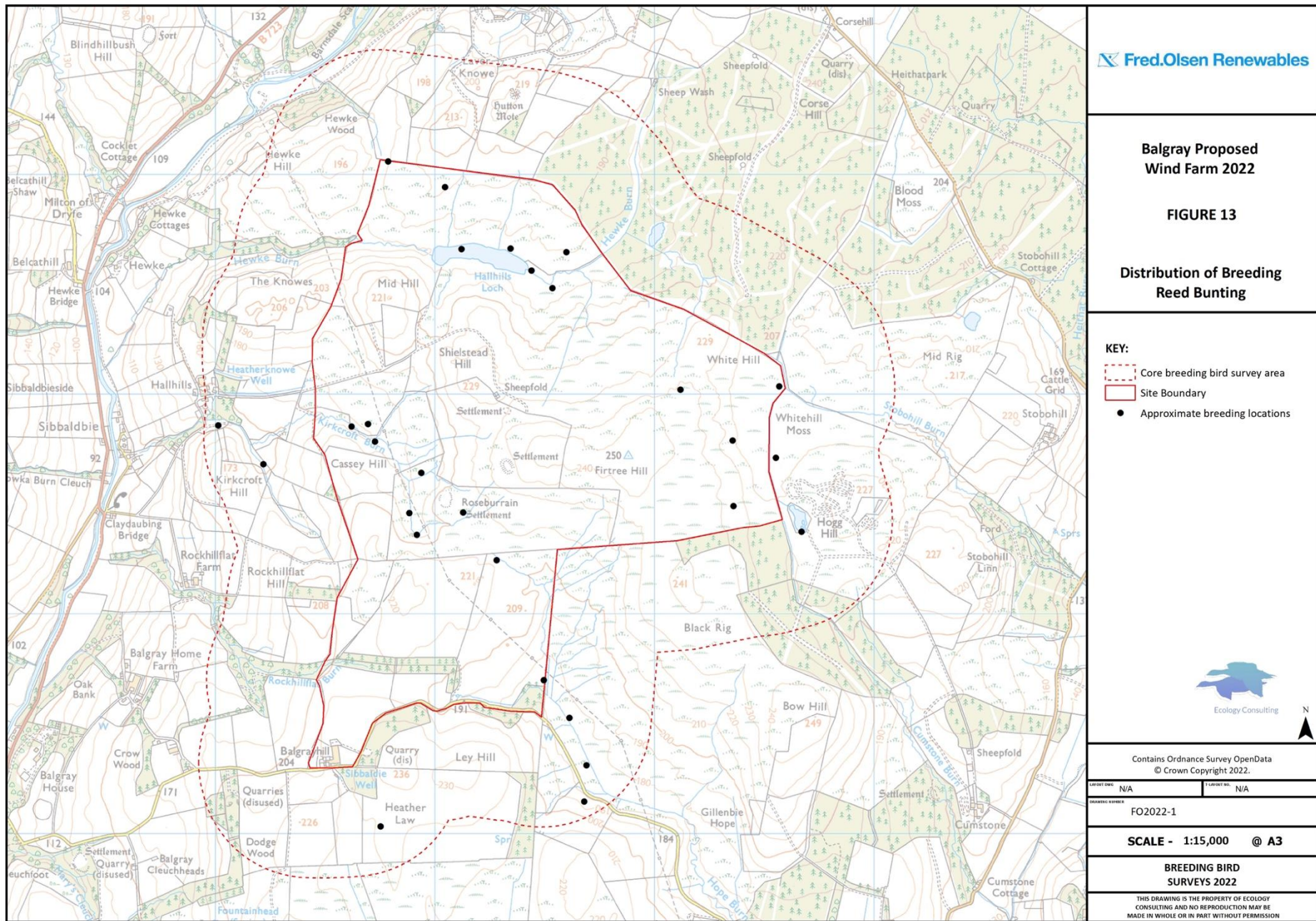
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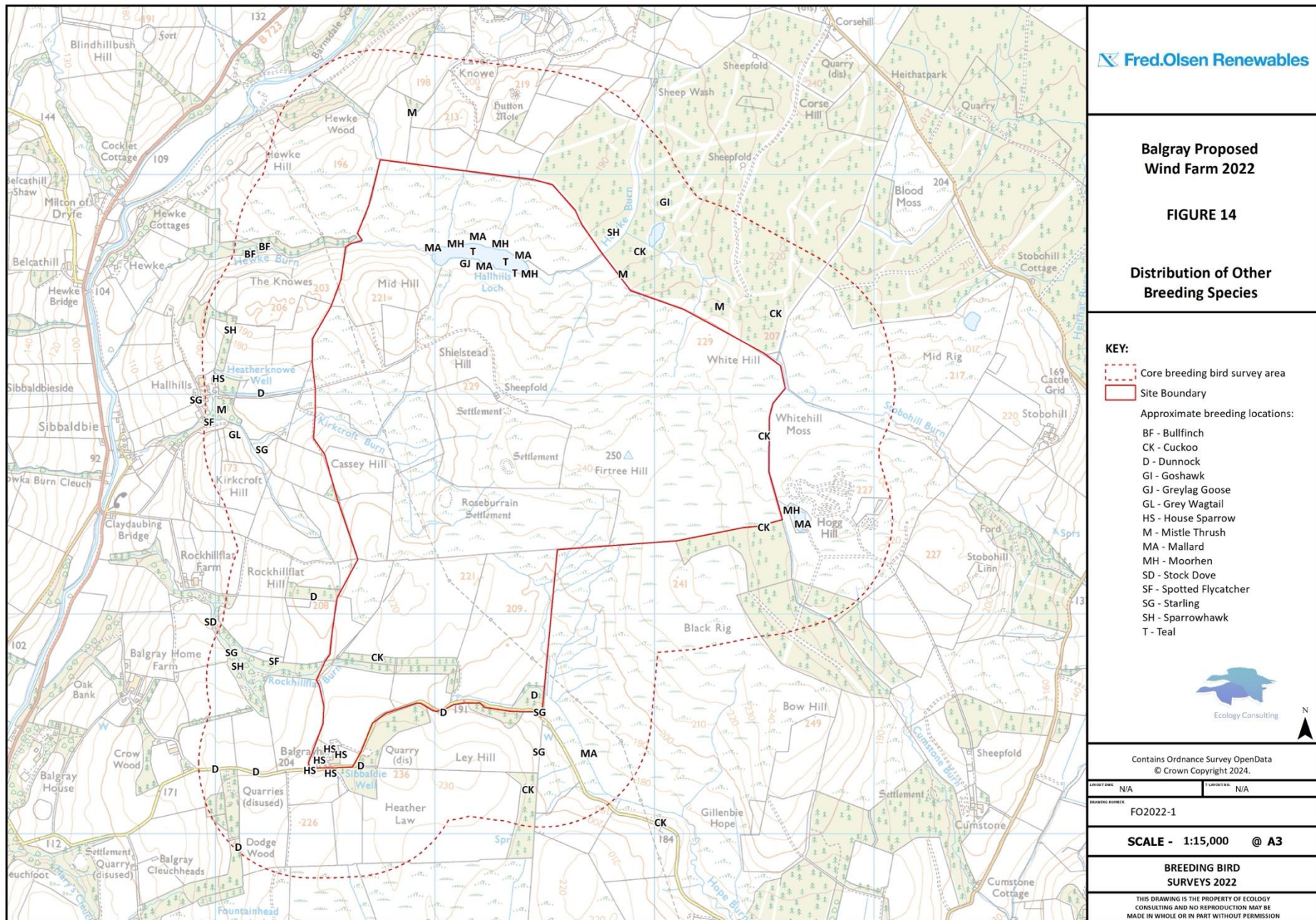
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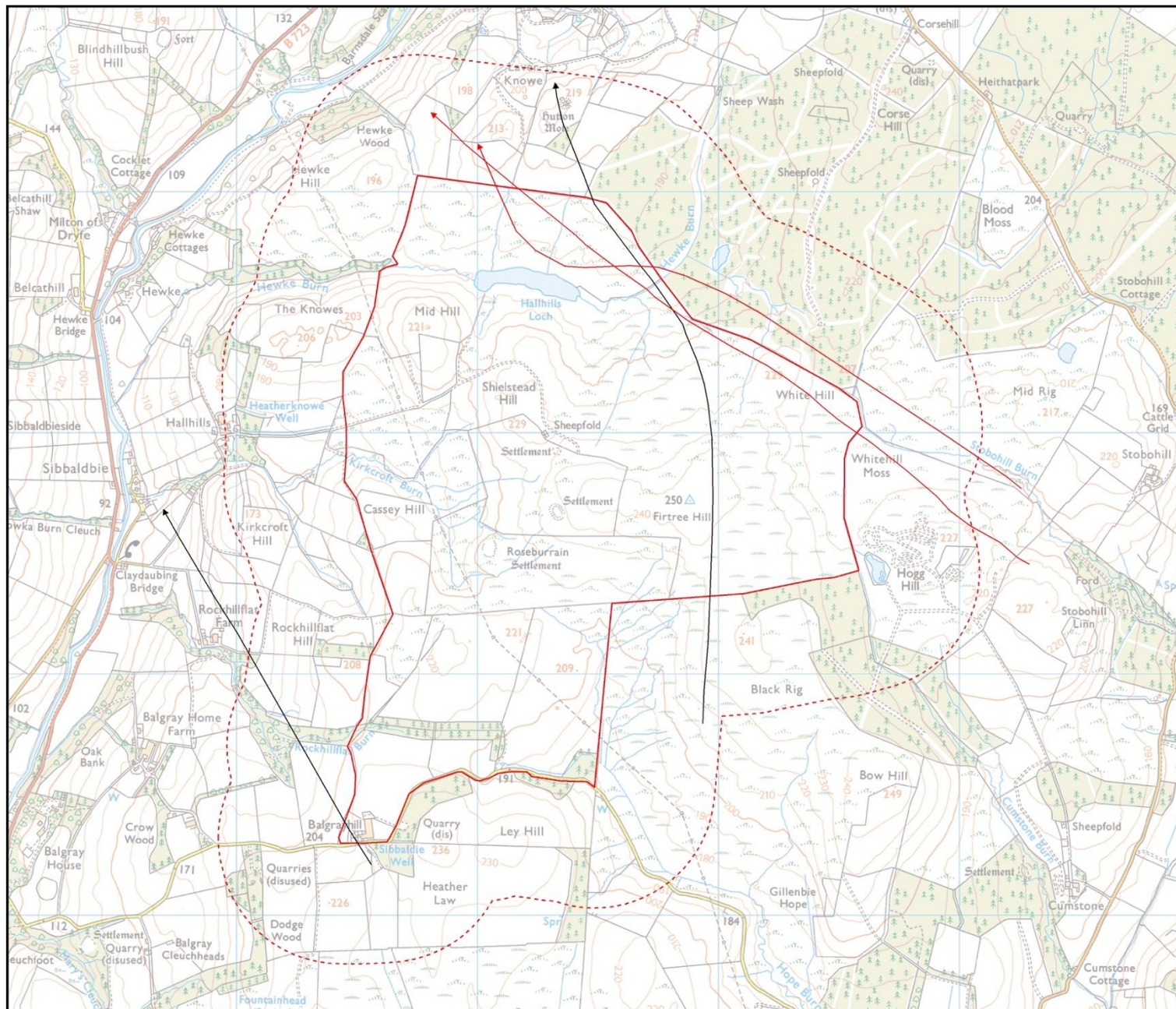
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FIGURE 15
**Migrant Whooper Swan
and Pink-footed Goose
Flight Lines**

KEY:

- Core breeding bird survey area
- Site Boundary

Flight lines:

- Pink-footed Goose
- Whooper Swan



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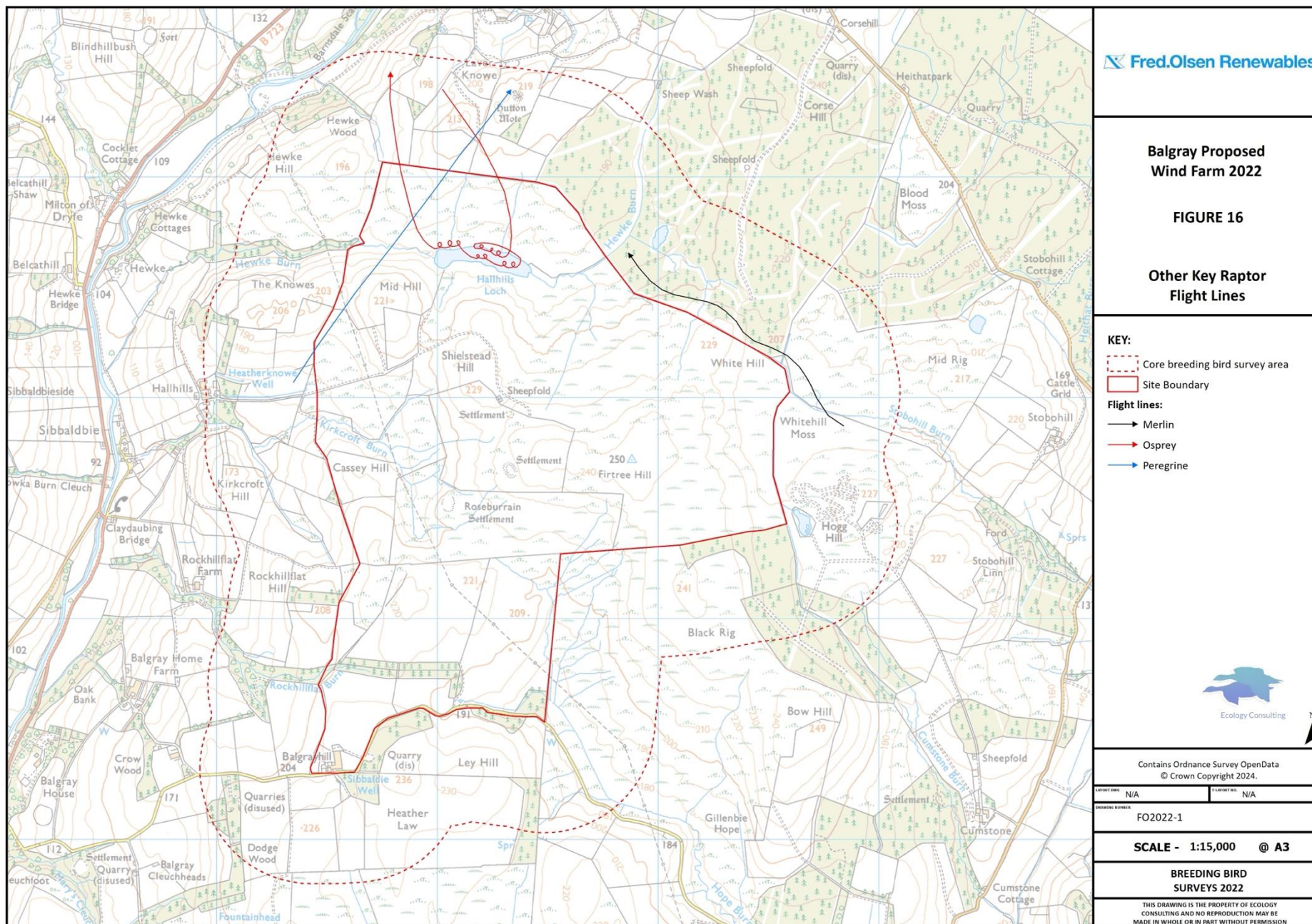
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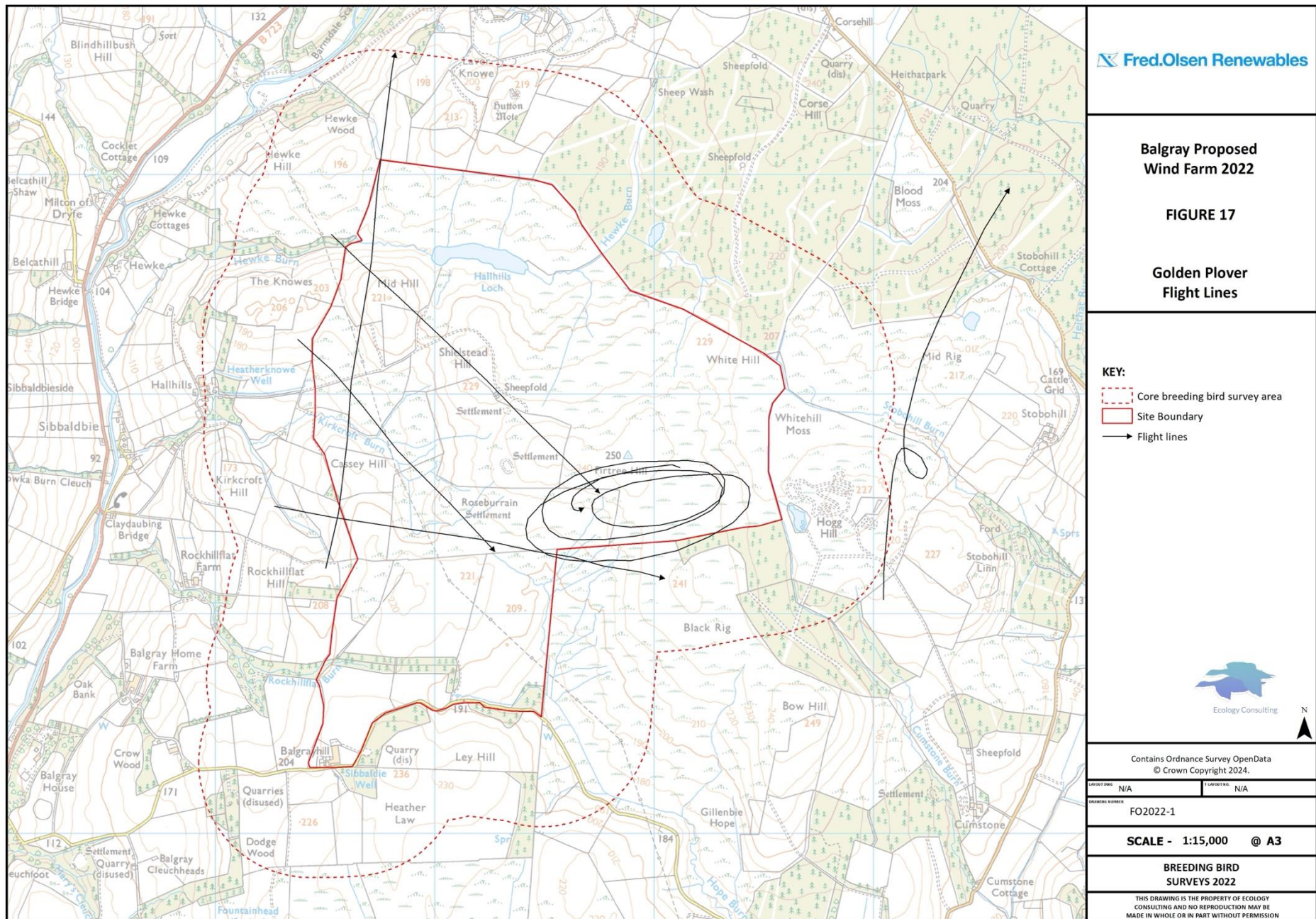
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FIGURE 17

Golden Plover
Flight Lines

- KEY:
- Core breeding bird survey area
 - Site Boundary
 - Flight lines



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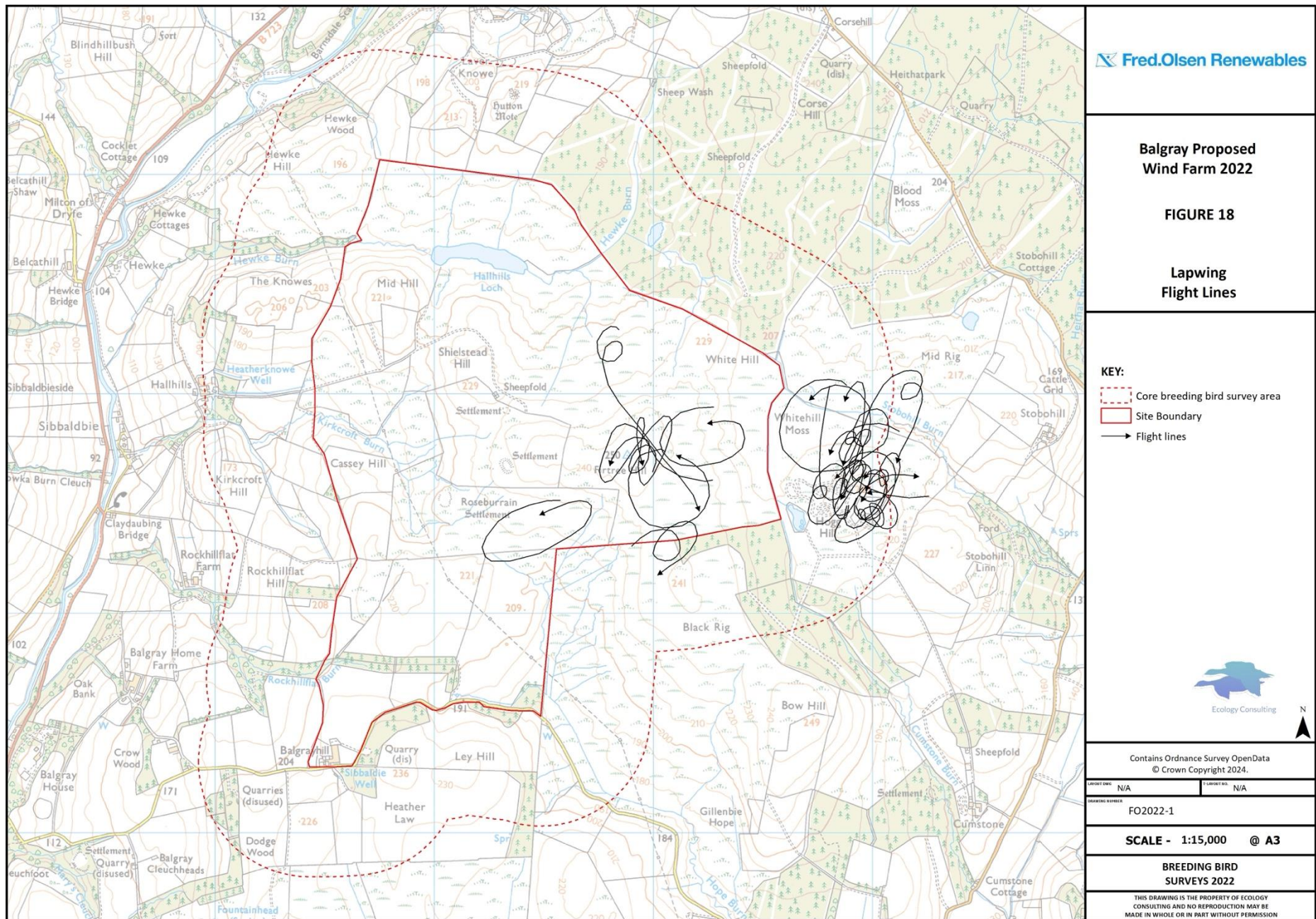
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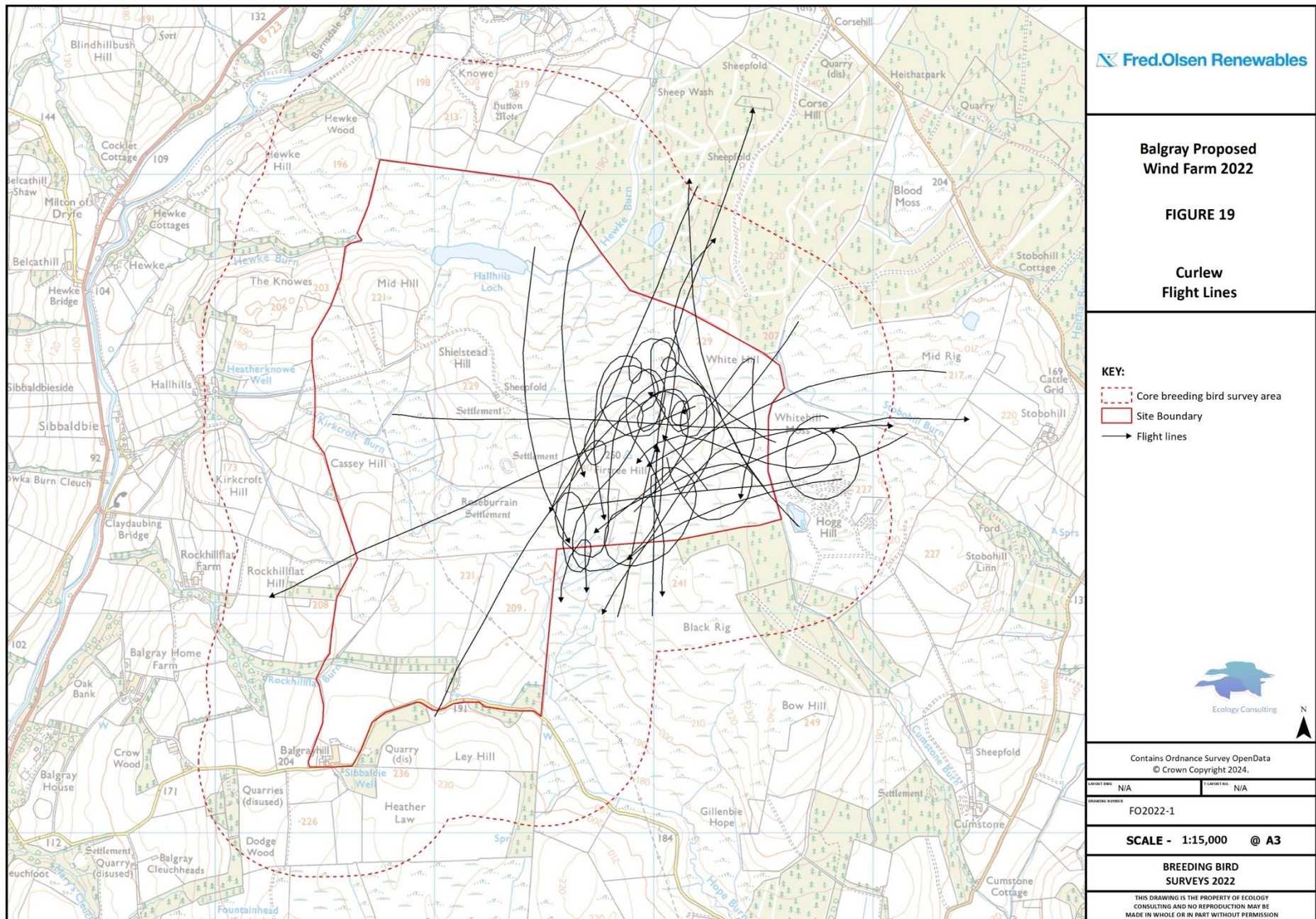
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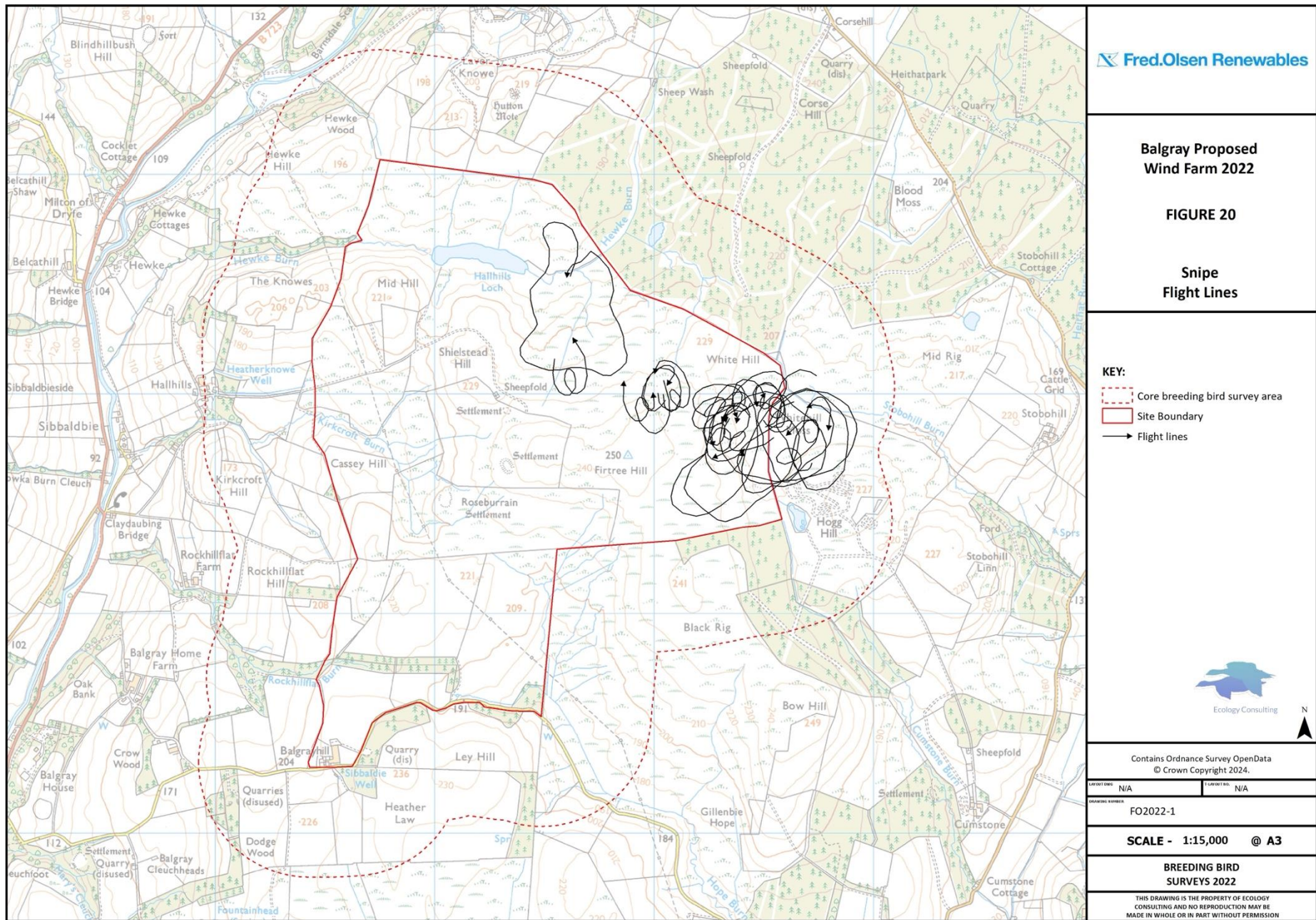
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CONCLUSIONS

34. The results of the 2022 breeding bird surveys gave similar results to those from the previous year. The survey area supported a range of upland breeding species of regional importance. This included five pairs of curlew, a species that could be vulnerable to displacement. Like 2021, no evidence was found of any lekking black grouse within the core area (or the surrounding 2km buffer).
35. Four species specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act were found breeding in the survey area: red kite, goshawk, barn owl and common crossbill. All though were outside the wind farm site boundary (and outside the area where they would be likely to be affected by the wind farm). Further details are given in the Confidential Appendix (TA 7.9).
36. Several additional high-value Schedule 1 species were seen during the surveys, though the survey data did not indicate any evidence of nesting by any of them within the core or wider survey areas. Osprey was an occasional visitor to Hallhills Loch for fishing, and there were a small number of sightings of peregrine and merlin.
37. In contrast to 2021, several migrant flocks of pink-footed geese and whooper swans were noted (see Figure 15). Numbers recorded overall, however, were low in the context of the regional populations, adding further evidence that the site does not lie on any important spring migration route for these species.

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