

Environmental Statement: Technical Appendix 8.2 – Bird Survey Report

ES TA 8.2

Development of National Significance

Alaw Môn Solar Farm

Land west of the B5112, 415m south of Llyn Alaw, 500m east of Llantrisant and 1.5km west of Llannerch-y-Medd, Anglesey

February 2024



**Alaw Môn Solar Farm Ecology
Technical Appendix 2**

Bird Survey Report

February 2021

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1 Introduction

Background

1.1 BSG Ecology was commissioned by Wylfa Green to undertake ornithological survey work at Alaw Môn a proposed Solar Farm development in the centre of Anglesey located to the west of the B5112 located to the south of Llyn Alaw 500m to the east of the small hamlet of Llantrisant and 1.5km to the west of the village of Llannerchymedd. The Site is centred on Ordnance Survey OS Grid Reference SH 0000 0000. The Site location¹ is presented in Figure 1, and this area is referred to as “the Site” within this report.

Purpose of this Document

- 1.2 This report describes the methods and results of ornithological desk study and survey work undertaken at the Site in 2020 and 2021 and updated survey work carried out in 2022.
- 1.3 The aim of the work was to a) characterise the breeding and wintering bird assemblage using the Site and b) to identify whether there is evidence to suggest wildfowl species for which the nearby Llyn Alaw SSSI is notified use the Site.
- 1.4 The report is intended to:
- provide details of desk study and survey methods including timings, dates, survey personnel and any associated limitations
 - present the results of the desk study and survey work
 - provide interpretation of the results.

¹ NB For the purposes of this report, the ‘Site’ relates to the proposed solar farm area and excludes the grid connection cable route this be provided by underground cabling located within the adopted highway and will not affect vegetated areas.

2 Methods

Desk study

- 2.1 The Site location is shown in Figure 1.
- 2.2 A data search was requested from Cofnod² the North Wales Environmental Information Service for a 2 km search area around the Site boundary in April 2020 which was updated in July 2021. This search included records of bird species within this search area.
- 2.3 The British Trust for Ornithology (BTO) Echoes Project was consulted with respect to Greenland white-fronted goose *Anser albifrons flavirostris*. This species is of high conservation concern². A local population of Greenland white-fronted goose is subject to ongoing research through the Echoes Project <https://echoes.bto.org.uk>. A detailed consultation with the BTO was carried out on 1 July 2021 a follow up consultation was carried out on 1 March 2022 to obtain an update from winter 2021/22. A further consultation was carried out on 1 June 2022.
- 2.4 Adrienne Stratford of the Welsh Chough Project was consulted on 1 July 2021 with respect to any known chough *Pyrrhocorax pyrrhocorax* records for the Site. Chough is a rare species which nests on sea cliffs Anglesey for which Holy Island Coast Special Protection Area (SPA) is classified but ranges more widely in winter. The database of records was searched for all the 1 km grid squares which are intersected by the Site boundary.
- 2.5 Whooper swan is referred to in the Llyn Alaw SSSI citation. This species winters in the UK and Ireland between October and March/April. In addition to wetland habitats this species forages in farmland habitats including stubbles, winter cereals and improved pasture (Robinson *et al.*, 2000). BTO Wetland Bird Survey (WeBS) data for whooper swan was reviewed for Llyn Alaw <https://data.bto.org/webs-reporting-numbers.socid.LOC> for the period between 2000 and 2017 where count data is available across five winters and also for the preceding years as far back as 1997 where summary sea count data is available.
- 2.6 Brenchley *et al.* (2010) and Ritchard *et al.* (2021) were also reviewed to help provide local/regional contextual information in relation to the status of birds recorded.

Breeding Bird Survey 2020

- 2.7 Survey visits were carried out in each of April, May and June 2020. Due to the size of Site each survey visit was split over two days.
- 2.8 The survey area for the breeding bird survey was the land with the Site boundary with any notable records of birds in immediately adjacent habitat also recorded up to c. 50m from the Site boundary.
- 2.9 Each visit involved slowly walking the boundaries of the fields and taking a transect through any areas of marshy grassland within the Site. Such that all areas of structured habitat with the potential for ground nesting birds were approached to within 50 m. The direction of travel was varied between survey visits to ensure different parts of the Site were sampled at different times in the morning. All bird species recorded within or close to the Site boundary were noted on field maps using standard two-letter British Trust for Ornithology (BTO) species codes. BTO activity symbols were used to indicate the behaviour of birds recorded e.g. carrying food, singing, alarm calling. Buildings within the Site boundary were visited to check for any evidence of nesting barn owl *Tyto alba*.

² Due to its limited geographic range and relatively small population size Greenland white-fronted goose is listed on Annex 1 of the EU Birds Directive (2001/7/EEC) and assessed as Endangered (risk of global extinction) on the IUCN Red List. It is a conservation priority in the UK and Wales, listed on the UK and Welsh Red list of Birds of Conservation Concern (Eaton *et al.* (2015) and Johnstone *et al.* (2022)) and in Section 7 of the Environment Act (Wales) (2010) it is endemic in winter to Britain and Ireland (Stroud *et al.* (2012)).

2.10 Table 1 below provides details of survey dates, timings, and weather conditions.

Table 1: Dates of survey visits and weather conditions

Visit	Date	Time of survey	Cloud (Oktas)	Rain	Wind (Beaufort scale)	Temperature (Degrees Celsius)	Visibility (km)
BBS1	15/01/20	08:25 – 12:05	100 – 000	Dry	1	0010	Excellent
	22/01/20	08:00 – 10:15	100	Dry	2-3	510	Excellent
BBS2	10/05/20	05:55 – 11:00	000 – 000	Dry	2-3	5-11	Excellent
	10/05/20	05:50 – 11:00	000-500	Dry	2-3	7-10	Excellent
BBS3	12/01/20	05:50 – 11:25	000 – 000	Dry	2-3	10-17	Excellent
	10/01/20	05:15 – 10:00	000	Dry Drizzle	2-3	0015	Excellent

2.11 Birds exhibiting breeding behaviour were assigned one of two categories: a) confirmed or probable breeding or b) non-breeding. These are defined below:

- a. **Probable breeding:** birds heard singing, alarm calling, displaying courtship behaviour in suitable breeding habitat, or evidence of nest building (including excavation of a hole) on one or more of the survey visits

Confirmed breeding: one or more adults undertaking a distraction display, the presence of a used nest or eggshells, the presence of recently fledged or downy young (that are clearly of local origin), apparently incubating adults or adults commuting to and from a nest (hole), adult birds carrying faecal sacs or food for young, or a nest with eggs or young present.

- b. **Non-breeding:** although birds were observed, behaviour recorded or known habitat preferences suggests that breeding is unlikely.

2.12 The maps were analysed to derive an estimate of the number of territories of each species present within the survey area.

Breeding Bird Survey 2023

2.10 The breeding bird survey work was updated in April, May and June 2023. Table 2 below provides details of survey dates, timings and weather conditions.

Table 2: Dates of survey visits and weather conditions

Visit	Date	Time of survey	Cloud (Oktas)	Rain	Wind (Beaufort scale)	Temperature (Degrees Celsius)	Visibility (km)
BBS1	25/04/23	05:55 – 11:00	0 – 7	Dry	1	10	Excellent
	26/04/23	08:00 – 12:20	7 – 1	Dry	1 – 1	– 17	Excellent
BBS2	17/05/23	08:05 – 11:55	1 – 0	Dry	0 – 0	– 1	Excellent
	18/05/23	08:15 – 11:15	0 – 0	Dry	1 – 2	11 – 1	Excellent
BBS3	15/04/23	08:00 – 11:10	1 – 0	Dry	0 – 0	1 – 2	Excellent
	16/04/23	08:05 – 11:15	0 – 0	Dry	0 – 0	1 – 0	Excellent

Wintering Bird Survey

2.14 The wintering bird surveys included nine visits between mid-October 2020 and mid-March 2021.

- 2.15 Table 2.1 below provides details of survey dates, timings, and weather conditions.
- 2.16 The aim of the survey work was to look at bird distribution at the local landscape scale and to consider whether species associated with Llyn Alaw SSSI use the site or are reliant on it. The survey area was therefore larger than the Site including adjacent fields and the southern part of Llyn Alaw.
- 2.17 Each visit included a full day on site scanning and recording birds in fields and on waterbodies within the Site and a 500 m perimeter around it using binoculars and telescope. Local vantage points, gateways and tracks were used to obtain views across the area. The survey work included a count of waterfowl on the southern part of Llyn Alaw SSSI from a minor road at the southern end of the reservoir either at the beginning or end of each survey visit.

Table 3: Dates of survey visits and weather conditions

Visit	Date	Time of survey	Sunrise/Sunset	Cloud (Oktas)	Rain	Wind (Beaufort scale)	Temp (°C)	Visibility
1	22/10/2020	07:50-11:05	07:50-17:05	4-7	No	2	11	Excellent
2	01/11/2020	08:00-11:05	07:20-11:00	4-7	No	1	11	Excellent
3	21/11/2020	08:50-11:10	07:50-11:10	4-6	No	0	12	Excellent
4	07/12/2020	08:05-11:05	08:10-11:00	4-6	Yes	1-2	0	Excellent
5	01/01/2021	08:25-15:57	08:00-11:10	4-6	No	0-0	0	Excellent
6	21/01/2021	08:15-11:00	08:07-11:50	4-6	No	1-2	0	Excellent
7	17/02/2021	08:00-11:00	07:01-17:00	4-6	No	5	0	Excellent
8	21/02/2021	08:10-11:35	07:10-17:00	4-6	Showers	0-0	0	Excellent
9	01/03/2020	08:50-11:50	08:00-11:00	4-1	Showers	2	0	Excellent

2.1 The species were recorded based on a field numbering system plus notable waterbodies – the of the survey area and field numbering are presented in Figure 1.

Barn owl survey 2021

2.1 A barn owl survey was carried out in December 2021. All accessible buildings within 100m of the Site which were considered to have potential to support nesting barn owl and be potential to be affected by disturbance from the Development were visited and assessed. The approach to scoring this survey work is set out in detail in Annex B.

2.20 The work focussed on the completion of farm buildings around Pantanog (SH 11111) an old barn to the west of Pantanog at SH 7727 005 and a derelict buildings at Ffridd (SH 110 002).

2.21 The exterior and interior of buildings were accessed and searches for evidence of barn owl pellets, feathers, droppings were undertaken by a licenced surveyor (see Personnel below). The building at Ffridd could not be accessed but was viewed from adjacent land – this enabled an assessment of its condition and suitability for barn owl.

Table 4: Barn owl survey date and weather conditions 2020

Visit	Date	Time of survey	Sunrise/Sunset	Cloud (Oktas)	Rain	Wind (Beaufort scale)	Temp (°C)	Visibility
1	2/12/2021	09:00-16:00	08:33-16:10	4/8 – 6/8	No	1 - 2	10	Excellent

Barn owl survey 2023

2.22 The survey described above was repeated on 2 August 2023.

Table 5: Barn owl survey date and weather conditions 2023

Visit	Date	Time of survey	Sunrise/Sunset	Cloud (Oktas)	Rain	Wind (Beaufort scale)	Temp (°C)	Visibility
2	2/08/2023	09:00-16:00	05:15 21:00	8/8 – 7/8	Occasional showers	2	19	Excellent

Personnel

- 2.23 The majority of the survey work (breeding bird survey 2020, wintering bird survey 2020-21, barn owl survey) was carried out by consultant ornithologist Stuart Thomas MCIEEM. Stuart has over 20 years of professional ornithological experience including managing sites of European importance for birds, marine bird surveys for UKCC (he is European Seabirds at Sea ESAS trained) and a qualified ESAS trainer, and a wide range of work as a consultant ornithologist for projects throughout the UK, particularly in relation to renewable energy. He is based near the Welsh border in Shropshire and has a range of project experience in Wales. Stuart has experience of all regularly used ornithological survey techniques and holds several Schedule 1 bird survey licences.
- 2.24 The breeding bird survey work in April, May and June 2023 was carried out by consultant ornithologist Mire Read who has over 17 years' experience of bird survey including wetland bird surveys (WeBS) and Bird Atlas Surveys for the BTO, and farmland bird surveys for the RSPB and Natural England.
- 2.25 The data analysis and reporting has been carried out by Senior Ecologist Emily McKeon MCIEEM, Principal Ecologist Guy Miller CEcol MCIEEM, and Director, Ornithologist Owain Gabb MCIEEM.

Consideration of Limitations

- 2.26 No significant limitations have been identified in relation to the survey work carried out.

3 Results and Interpretation

Desk study

- 1 The data search returned numerous records for birds within 2 km of the Site. Many of the records particularly records of wildfowl relate to Llyn Alaw.
- 2 Records recorded from within the Site boundary include:
- barn owl *Tyto alba* two records from the farmland between Llantantog and Chwaen-gôch dating from 2005
 - curlew *Numenius arquata* a single bird in the north part of the Site in 2005
 - grey partridge *Perdix perdix* two records from the farmland between Llantantog and Chwaen-gôch dating from 2005
 - lapwing *Vanellus vanellus* two records from the farmland between Llantantog and Cors-y-bol dating from 2005
 - skylark *Alauda arvensis* a single record from the farmland between Llantantog and Chwaen-gôch dating from 2005
 - hen harrier *Circus cyaneus* a single record of a hen harrier was recorded from farmland just to the north of Llantantog in July 2012
- 3 Records were also recorded from Cors-y-bol Local Wildlife Site which is an area of wetland immediately adjacent to the west Site boundary. Records from this area included lapwing breeding record from 1999, mallard *Anas platyrhynchos*, teal *Anas crecca* breeding record from 1999, reed bunting *Emberiza schoeniclus*, tree sparrow *Passer montanus*, and grasshopper warbler *Locustella naevia*.
- 4 Numerous records of wildfowl were recorded from Llyn Alaw which is between 0.00m and 0.5km from the Site including records of teal flocks in winter of occasionally up to c. 100 birds, shoveler *Anas clypeata* flocks in winter of occasionally up to c. 10 birds, whooper swan *Cygnus cygnus* (including a flock of 15 in 2000 and 2 in 2007), wigeon *Anas Penelope* (including flocks numbering in the hundreds and occasionally up to c. 1000 birds), mallard, goldeneye *Bucephala clangula*, tufted duck *Aythya fuligula*, pochard *Aythya ferina*, golden plover *Pluvialis apricaria* and curlew.
- 5 Various raptors have been occasionally recorded from Llyn Alaw including osprey *Pandion haliaetus*, marsh harrier *Circus aeruginosus*, peregrine *Falco peregrinus* and merlin *Falco columbarius*.
- 6 A wide range of records of other bird species were recorded from the 2 km search area including bullfinch *Pyrrhula pyrrhula*, cuckoo *Cuculus canorus*, linnet *Linaria cannabina*, song thrush *Turdus philomelos*, spotted flycatcher *Muscicapa striata*, willow warbler *Phylloscopus trochilus* and yellowhammer *Emberiza citrinella*.

Greenland white-fronted goose

- 7 Few records of this species were obtained from Cofnod: fewer than 10 records were recorded, these date from between 1995 and 2007, typically one or two birds from Llyn Alaw.
- 8 A recently discovered flock of 10 birds has been monitored since January 2021 using GPS tags by Dr Rachel Taylor pers. comm.
- 9 It is considered likely that this flock has been present at Llyn Alaw but previously unrecorded (Rachel Taylor pers. comm.). The results of the research project obtained to date show that the Anglesey population moves between two areas: the northern part of Llyn Alaw and two areas of farmland close to the north end of Llyn Alaw where birds feed on improved pasture and an area in the vicinity of Afon

Three of the birds have been tagged field observations suggest that the flock tends to commute and forage together.

Cefni arōmately 15m to the south east. From the data gathered by the Echoes project to date there is no indication that the Site is being used by this species although data points from the tagged geese indicate that birds do sometimes fly over the Site when commuting between the two alternative roost sites Llyn Alaw and Afon Cefni the areas from which birds have been detected to the north of Llyn Alaw appear to be used with some consistency.

- 10 The monitoring data from winter 2021/22 is understood to be limited and therefore does not add significantly to the results from the previous year (Rachel Taylor pers. comm.) In 2021/2022 of the three birds that were previously radio-tagged one bird remained in Scotland one arrived in Wales briefly at the beginning of the winter but no further data were obtained no data were obtained for the third bird. No further data was obtained by the project in 2022/2023.

Whooper swan

- 11 From a review of online WeBS data at Llyn Alaw in recent years very few whooper swans have been recorded on the WeBS counts at Llyn Alaw: two birds were recorded in 2011 and in 2011 none were recorded in 2017 and 2012 no birds were recorded in 20010.
- 12 During the period 2007 to 2007 to 2007 three and six birds were recorded respectively. One were recorded in 2005.
- 1 Higher numbers were sometimes recorded during the WeBS counts in preceding years: in 20012 and 2002 a maximum count of 12 birds was recorded in 107 a maximum of 1 birds and in 1007 a maximum of 2 birds although whooper swan was not recorded in either 1000 or 2000.
- 1 The number of survey visits to conduct counts each year during the WeBS surveys is variable so some caution needs to be applied when comparing numbers but the data does provide contextual information. This trend i.e. greater numbers in 170s00s and 00s with fewer birds in recent years is also shown in Ritchard *et al.* (2021)

Chough

- 15 Data from Cofnod includes seven chough records these are from between 00200 and 2005/2010 and related to small groups of birds from a 1m grid square SH000 which at its closest point is c. 1.5m to the south of the Site the precise location of the records is not specified.
- 1 The Welsh Chough project holds no records of choughs feeding the Site or immediately surrounding areas. There are generally very few records from the "interior" of Anglesey, away from Parys Mountain and Llyn Traffwll (Adrienne Stratford pers. comm.)

Barn owl

- 17 The tenant farmer at Pantanog was contacted in December 2021 to ask whether he was aware of any current use of the buildings at Pantanog by barn owl he was not.

The number of BTO WeBS counts made each year were variable. In 2009/10 six counts were made; in 2012/13 one count; in 2013/14 three counts; in 2017/18 five counts; in 2018/19 three counts. No counts were made in 2010/11, 2011/12, 2014/15, 2015/16, or 2019/20. More recent data is not available. Prior to 2009 the number of counts is not detailed. Source: <https://app.bto.org/webs-reporting/numbers.jsp?locid=LOC649898>

Breeding Bird Survey Results 2020

1.1 The survey results from the 2020 surveys are shown in Figures 2 – 4 and summarised in Table 1 below.

Schedule 1 Species

1.1 Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) receive additional protection from disturbance while nesting.

1.20 Brambling *Fringilla montifringilla* was recorded in mid-April 2020 from a hedgerow in the centre of the Site. It is considered likely to be late wintering bird and is not likely to have bred on Site.

1.21 No evidence of barn owl was recorded either from birds in flight or from derelict buildings within the Survey area. This species has previously been recorded from the local area: nine records were obtained during the desktop study including those described above within the Site (see Section 1.2) a nest site dating from 2012 from a building c. 100m to the south and a roost on the north side of Llyn Alaw dating from 2015. The majority of records date from 2005 and 2007. Habitat suitability for barn owl within the Site is limited by the lack of rough grassland habitat.

1.22 No other Schedule 1 species were recorded.

Section 7 Species / Red and amber list species

1.2 This section describes the Section 7 species and Red and Amber list species recorded during the breeding bird surveys.

1.2 The Environment (Wales) Act 2016 (Section 100) places a duty on public authorities to seek to maintain and enhance biodiversity so far as it is consistent with the proper exercise of those functions. Section 7 includes a list of species that are of principal importance for the purpose of maintaining and enhancing biodiversity in Wales. The species on this list (Section 7 species) need to be considered in relation to this duty.

1.25 The Welsh Red List (Johnstone *et al.*, 2022) uses standardised criteria to assign bird species to the Red/Amber or Green lists of conservation concern. Red list species are of high conservation concern, Amber list species are of medium concern, Green list species are not of conservation concern. There is overlap between Section 7 species and the Red and Amber lists.

1.2 Six Section 7 species were recorded, four are considered to be breeding within the Site: linnet, skylark, song thrush, reed bunting within the Site boundary, two others (house sparrow *Passer domesticus* and grasshopper warbler *Locustella naevia*) have territories in adjacent land (see Table 4).

1.27 Thirteen red list species were recorded, of which five (linnet, willow warbler, goldcrest *Regulus regulus*, whitethroat *Sylvia communis*, meadow pipit *Anthus pratensis*) were considered to be breeding within the Site boundary (see Table 1 and Figure 2).

3.28 Fourteen amber list bird species were recorded during the surveys of which three (skylark *Alauda arvensis*, chaffinch *Fringilla coelebs*, dunnock *Prunella modularis*) were considered to be breeding within the Site (see Table 1 and Figure 3) with others having territories in adjacent land.

Table 4: Red/Amber List Birds and Section 7 Species 2020 survey results

Species	Description*	Estimated territories: Site	Status
Grasshopper warbler <i>Locustella naevia</i>	Recorded just outside the Site boundary, in the wetland habitat (Cors-y-bol Local Wildlife Site) to the northwest of the Site.	0	S7, Red list

Species	Description*	Estimated territories: Site	Status
House sparrow <i>Passer domesticus</i>	None within Site but associated with off-site buildings (c. 4 pairs) just outside Site boundary.	0	S7, Amber list
Linnet <i>Linaria cannabina</i>	The survey identified four likely breeding territories, all within the scrubby hedges. The presence of juveniles confirmed breeding in at least one territory.	3	S7, Red list
Skylark <i>Alauda arvensis</i>	Two skylark territories were identified in the Site. These were in the north-eastern part of the Site, one in an arable field and the other in improved pasture.	2	S7, Amber list
Song thrush <i>Turdus philomelos</i>	Three to four territories in field boundaries, mainly around periphery	3-4	S7
Reed bunting <i>Emberiza schoeniclus</i>	A probable breeding territory was identified within marshy grassland in the central part of the Site. Another probable breeding territory was identified (off-site) in the wetland habitat to the north.	1	S7
Bullfinch <i>Pyrrhula pyrrhula</i>	One probable breeding territory was identified in a belt of trees outside the Site boundary.	0	Amber list
Chaffinch <i>Fringilla coelebs</i>	Numerous territories were identified during the survey, c. 10 within the Site boundary.	10	Amber list
Willow warbler <i>Phylloscopus trochilus</i>	Nine territories within the Site boundary. Numerous territories outside the Site boundary.	16	Red list
Whitethroat <i>Sylvia communis</i>	One territory within the Site and two on Site boundaries in the east part of the Site. Further territories outside of the Site.	3	Red list
Goldcrest <i>Regulus regulus</i>	Two territories in plantation woodland and on the edge of Cors-y-Bol.	2	Red list
Dunnock <i>Prunella modularis</i>	Breeding territories within the Site boundary, on boundary features	10-12	Amber list
Meadow pipit <i>Anthus pratensis</i>	Two likely breeding territories were identified within the Site boundary.	2	Red list

Green status species

□2□ In addition to the species described above, numerous green list bird species were recorded, as shown on Figure □.

□0□ Canada goose *Branta canadensis* was recorded from pond 5 at Pantanog, just outside the Site boundary. A flock of between of 12 to 15 birds was present between April and June. Moorhen *Gallinula chloropus* was present in off-site ponds at Parc Llewysddu. Tufted duck, three individuals, was recorded in pond 5 off-site in June 2020.

- 1.1 Foraging buzzard *Buteo buteo* was noted occasionally from various parts of the Site. Sparrowhawk *Accipiter nisus* was recorded twice. No other raptors or owls were recorded. Game species were limited to pheasant *Phasianus colchicus* and red-legged partridge *Alectoris rufa*.
- 1.2 A range of other common and widespread passerine species were recorded particularly from hedgerows and site boundaries, scrub and woodland habitats including blackbird *Turdus merula*, blackcap *Sylvia atricapilla*, blue tit *Cyanistes caeruleus*, chiffchaff *Phylloscopus collybita*, robin *Erithacus rubecula*, woodpigeon *Columba palumbus*, and wren *Troglodytes troglodytes*.
- 1.3 Corvid species recorded were carrion crow *Corvus corone*, magdaw *Corvus monedula* and raven *Corvus corax*. Chough was not recorded.

Breeding Bird Survey Results 2023

- 1.4 The survey results from the 2023 surveys are shown in Figures 7 – 9 and summarised in Table 5 below.
- 1.5 An arable field that was in the north part of the Site in 2020 was sown with an improved grass ley which is considered likely to account for slightly fewer numbers of skylark and meadow pipit. A small colony of house sparrow was recorded from the farm buildings at Pantanog in 2023. Yellowhammer which was not recorded in 2020 was recorded singing just outside the site.

Table 5: Red/Amber List Birds and Section 7 Species 2023 survey results

Species	Description*	Estimated territories on the Site	Status
House sparrow <i>Passer domesticus</i>	Small colonies were noted outside but adjacent to the Site associated with off site buildings (c. 5 pairs)	0	S7 Amber list
Skylark <i>Alauda arvensis</i>	Two skylark territories were identified: one in the northern most field onsite and one on adjacent offsite land in improved pasture.	1	S7 Amber list
Song thrush <i>Turdus philomelos</i>	One territory was identified on the edge of the Site another one outside the Site boundary.	1	S7
Willow warbler <i>Phylloscopus trochilus</i>	One probable willow warbler breeding territories were identified during the survey within the Site or on or close to the Site boundary.	0	Red list
Whitethroat <i>Sylvia communis</i>	Four probable territories were identified but only one from the Site the others in adjacent habitat.	1	Red list
Yellowhammer <i>Emberiza citrinella</i>	No breeding territories noted but single bird singing just outside site	0	S7 Red list
Chaffinch <i>Fringilla coelebs</i>	Numerous territories were identified during the survey.	0	Amber list

- 1.6 Four Section 7 species were recorded in 2023 one skylark territory was recorded within the site one song thrush was on the edge of the Site. Other Section 7 species were considered to be breeding in adjacent land (house sparrow and yellowhammer *Emberiza citrinella*) (see Table 5)
- 1.7 Three red list species were recorded of which two willow warbler and whitethroat are considered to be breeding within the Site boundary. Shelduck was also recorded once from Pond 11 but is not considered likely to breed within the Site (see Figure 7)

- 1.11 Territories of two amber list bird species were recorded from the Site during in 2020 (chaffinch and skylark) and house sparrow was recorded holding territories in adjacent land (see Figure 11). Green list species are shown in Figure 11.

Evaluation of breeding assemblage

- 1.12 The site is dominated by open grassed pasture farmland that supports very few ground-nesting birds.
- 1.13 There are localised areas of habitat within the Site which are of greater value for birds including hedgerows scrub, small patches of woodland, pools and wetland habitats on the margins of the Site.
- 1.14 The assemblage includes species which are listed on Section 7 and on the red and amber lists, the number of territories appears to vary between years. These can be broadly assigned to four categories: those species that require scrub/hedgerows and small patches of woodland (such as linnet, chaffinch, dunnock, willow warbler); those that occur in wetland habitat and scrub (such as mallard, willow warbler); those species that are associated with ponds and waterbodies (wildfowl); and those that use open fields for nesting (skylark, meadow pipit).
- 1.15 With respect to the last category, few birds are breeding within the open fields: meadow pipit and skylark were recorded occasionally and low numbers and were found absent from the majority of the Site.

Other non-breeding summer species records

- 1.16 This section describes species which were recorded but unlikely to be breeding within the Site. The records include individuals in flight, species for which no suitable nesting habitat occurs within the Site or species that were recorded on one survey visit only and therefore are considered unlikely to be holding territories. The results are summarised in Table 6 below:

Table 6: Other non-breeding species

Common name	Notes	Status
Curlew <i>Numenius arquata</i>	Curlew occurred on spring passage (one bird in April, two in May and one in June 2020), but there no evidence of was breeding was recorded.	Red list, S7
Herring gull <i>Larus argentatus</i>	Herring gull was observed loafing and flying over the Site. Possible nest location in Nantanog Farm buildings (off-site)	Red list, S7
Black-headed gull <i>Chroicocephalus ridibundus</i>	Black-headed gulls were observed as individuals only.	Red list, S7
Lesser black-backed gull <i>Larus fuscus</i>	Registrations at Pond 11 and of birds flying over the Site.	Red list
Rook <i>Corvus frugilegus</i>	Occasional sightings of individual birds, no evidence of breeding.	Red list
Shelduck <i>Tadorna tadorna</i>	Shelduck (an adult male and four juveniles) was recorded from Pond 11 in June 2020. Due to the lack of cover, considered unlikely to have bred at Pond 11. A bird was	Red List

Common name	Notes	Status
	recorded from this area again in 2023.	
Shoveler <i>Anas clypeata</i>	Two birds were recorded once from a pond (Pond 8, SH39098539) c. 150m to the north-west of the Site in April 2020. Not considered likely to breed within the Site.	Amber list

Wintering Birds

Survey data is provided in Annex A and Figure 1. Results are summarised below.

Species recorded from survey area

The flashpool at Pantanog referred to as Pond 11 is regularly used by birds in winter. It is a shallow pool in open fields. Few birds were recorded from other parts of the Site.

Pond 11 used by wildfowl typically in low numbers (teal *Anas crecca*, mallard *Anas platyrhynchos*, and tufted duck *Aythya fuligula*; see Table 7 below) but regularly supporting greater numbers of wigeon *Anas penelope* (a 100-bird flock was present on four of the nine visits; this species was not present during either January visit).

Greylag goose *Anser anser* was occasionally recorded feeding around Pond 11 and in fields from other parts of the Site. In October 2020, 152 birds were recorded from the field to the east of Pond 11. A flock of 10 was recorded in December 2020 from the field to the north of Pond 11; smaller flocks were recorded February and March 2021 from fields to the north and north-west of Pond 11; the largest (55 birds) was recorded from the field to north of Pond 11 in February 2021.

Greenland white-fronted goose *Anser albifrons flavirostris* was not recorded during the survey work either from the Site or from adjacent fields or from Llyn Alaw.

The following waders were recorded from the margins of Pond 11 (unless stated otherwise): laughing gull *Vanellus vanellus* and golden plover *Pluvialis apricaria* (see details in Table 7 below); greenshank *Tringa nebularia* (one bird in January 2021); oystercatcher *Haematopus ostralegus* (two birds in March 2021); snipe *Gallinago gallinago* (typically around 10 birds) although they were recorded on one visit; also occasionally recorded from other areas of the Site (typically in wetter areas).

Gulls were frequently observed; herring gull *Larus argentatus* was most frequently recorded. Black-headed gull *Chroicocephalus ridibundus* was also regularly recorded. Most gulls were generally noted as loafing on site rather than feeding.

Few raptors were recorded; peregrine *Falco peregrinus* and buzzard *Buteo buteo* were both recorded once in flight above the Site in December 2020 and February 2021 respectively.

Raven *Corvus corax* was recorded once in December 2020.

Neither chough nor barn owl were recorded during any of the survey work.

Llyn Alaw SSSI

Llyn Alaw SSSI is a large reservoir approximately 100m to the north; is noted for its wintering bird assemblage. The SSSI citation describes Llyn Alaw as follows:

“The largest mesotrophic open water in west Gwynedd. It has considerable ornithological interest especially for overwintering wildfowl; numbers of teal *Anas crecca*, shoveler *Anas clypeata* and whooper swans *Cygnus cygnus* can be around 1% of the British population.

Other species supported include mallard *Anas platyrhynchos*, wigeon *Anas penelope*, goldeneye *Bucephala clangula*, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, ruddy duck *Oxyura jamaicensis*, in-footed geese *Anser brachyrhynchus*, common tern *Sterna hirundo*, black-headed gull *Chroicocephalus ridibundus*, great crested grebe *Podiceps cristatus*, coot *Fulica atra*, curlew *Numenius arquata*, laughing gull *Vanellus vanellus* and golden plover *Pluvialis apricaria*.”

Goldeneye, tufted duck, wigeon and mallard were present in the southern part of the SSSI during the surveys; with wigeon, mallard and teal also making use of the fields directly adjacent to the SSSI (outside the Site). Whooper swan was not recorded from Llyn Alaw during any of the survey visits.

- 150 Greenland white-fronted goose was not recorded during the survey visits and has not been recorded from the southern part of Llyn Alaw by the Echoes Project with the exception of a small number of registrations that from analysis of the data are considered to be birds in flight moving between Afon Cefni and the northern part of Llyn Alaw.

Relationship between the Site and Llyn Alaw SSSI

- 157 No movements of birds between Llyn Alaw and the Site were recorded.
- 150 Birds listed within the SSSI citation that were observed using the Site during wintering bird survey are shown in Table 7 below.
- 150 Of these whooper swan was not recorded from the Site flying over the Site or from the part of Llyn Alaw that was viewed during the surveys. This species occurs on Llyn Alaw WeBS data both online and in Ritchard *et al.* 2021 as described above suggests that numbers on Llyn Alaw have been relatively low in recent years.
- 100 Whooper swan is not a habitat specialist in winter (Ritchard *et al.*, 2021) in addition to wetland aquatic vegetation this species also forages on stubbles, waste root vegetable crops, winter cereals and improved pasture (Robinson *et al.* 2000). Of these habitat types improved pasture is frequent within the Site one arable field is present. It is noted however that there is also an extensive local resource of suitable foraging habitat particularly improved pasture and also cultivated fields including plentiful suitable habitat adjacent to Llyn Alaw. Taking into account the survey results and given the very wide local habitat availability and the low population present the Site is considered unlikely to be of importance for whooper swan although it is not possible rule out occasional use.
- 101 Counts made for pond 11 included the margins and immediately adjacent areas of the two adjacent fields. Species referred to in the SSSI citation were not observed within the Site boundary at any other location.

Table 7 Species referred to in the Llyn Alaw SSSI citation that were recorded on the Site during the wintering bird survey

Species	Area of Site	Count
Key SSSI Species (around 1% of the British population)		
Teal	Within the Site birds were recorded from pond 11 (Antanog Pool) flash and the immediately adjacent fields. Teal was also recorded from a pool within Corsybol Local Wildlife Site (pond 1) just to the north of the Site up to six birds.	Present on seven of nine visits typically fewer than six birds maximum count of 15 from pond 11 (7 December 2020).
Shoeler	Recorded just to the north of pond 11.	One bird was recorded on 20 October 2020.
Whooper swan	Not recorded from Site or Survey area including Llyn Alaw.	n/a.
Other Species mentioned on SSSI Citation		
Mallard	Within the Site birds were recorded from pond 11 (Antanog Pool) flash and the immediately adjacent fields.	Typically fewer than seven birds were present ten were recorded on 20 October 2020
Wigeon	Within the Site birds were recorded from pond 11 (Antanog Pool) flash and the immediately adjacent fields.	Pond 11 was found to regularly support flocks of wigeon <i>Anas penelope</i> . On four of the nine visits flocks exceeded 100 maximum

		<p>daily count was 100 birds on 17 February 2021</p> <p>no birds were recorded in January: smaller numbers (c. 1000 birds) were present in late February/March.</p> <p>not recorded from the southern part of Llyn Alaw.</p>
Goldeneye	<p>not recorded from the Site.</p> <p>Birds were recorded from Llyn Alaw only.</p>	Llyn Alaw only 200 birds were recorded
Goosander	<p>not recorded from the Site.</p> <p>Birds were recorded from Llyn Alaw only.</p>	Llyn Alaw only 1 bird was recorded
Tufted duck	<p>Within the Site birds were recorded from pond 11, Llanantnog pool/flash and the immediately adjacent fields.</p>	<p>Tufted ducks between four and 100 birds were recorded from the Site.</p> <p>70 birds were recorded from Llyn Alaw on 22 October 2020.</p>
Ruddy duck	not recorded	na
Wingfooted goose	not recorded	na
Common tern	not recorded	na
Black-headed gull	<p>Recorded loafing, foraging and flying across the Site, larger flocks recorded from fields in the central area of Site.</p>	<p>Generally small numbers, typically fewer than 11 on most visits.</p> <p>On 20 January 2021, 100 birds were recorded in a field to the south of Llanantnog Farm and 110 birds in the field adjacent to pond 11.</p>
Great crested grebe	not recorded	na
Coot	not recorded	na
Curlew	not recorded	na
Loon	<p>Within the Site birds were mainly recorded in the fields immediately adjacent to pond 11, Llanantnog pool/flash</p> <p>A small flock (100) was also recorded feeding in an arable field (Field 1) in the north part of the Site during one visit (20 November 2020)</p>	<p>Recorded on five visits: a flock of 100 birds was recorded on one visit (10 January 2021) otherwise smaller flocks were recorded (100 birds) (17 February 2021) 25 birds (20 November 2020) 10 birds (20 February) individuals were recorded on other visits.</p>
Golden Plover	<p>Within the Site birds were recorded in the fields immediately adjacent to pond 11, Llanantnog flash</p>	<p>10 birds were recorded on 10 January 2020, two separate individuals were also recorded later on the same visit.</p>

Barn owl survey

- 1.2 No evidence of barn owl was found during either survey. A summary of the results is provided below. Survey data and photographs are provided in Annex B.

Nantanog Farm Buildings (Building 1)

- 1.1 The farmhouse is uninhabited. The windows on the ground and first floors are glazed preventing access by birds. The attic/loft is potentially suitable for use by barn owl for nesting and roosting. There are two apertures that lead into the roof: an east-facing window now unglazed covered by encroaching vegetation and missing slates in the roof on the northern pitch the gap is however not sufficiently large enough to provide a barn owl access point. No droppings or pellets were observed.

Nantanog Farm Buildings (Building 2)

- 1.1 A large steel-framed modern barn. No signs of use by barn owl.

Nantanog Farm Buildings (Building 3)

- 1.5 A stone built 'T' shaped barn that adjoins the rear of the steel barn (Building 2). The barn is in poor condition with areas of roof missing. Parts of the first floor were not accessed due to the hazardous condition of the building. The building offers potential for nesting and roosting in the locations where the roofs are still intact. No evidence of use by barn owl was located.

Nantanog Farm Buildings (Building 4)

- 1.1 A detached stone barn in good condition used for housing cattle and farm operations. There is a hayloft/first floor which is potentially accessible for barn owl through an old doorway to the south-east gable. This building has potential for use roosting and nesting although disturbance by farming operations may reduce suitability. No evidence of use by barn owl was located.

Barn to the west of Nantanog (Building 5)

- 1.7 An isolated barn in a field in a deteriorating condition. The building has some potential for roosting barn owl. No evidence of use by barn owl was located.

Barn/outhouse at Fridd (Building 6)

- 1.1 The stone barn/outhouse at Fridd is in poor condition the roof has collapsed at one end and it is very open. No evidence of use by barn owl was located. The condition of the building means that it has very limited roosting or nesting potential.

4 Conclusions

- 1.1 The habitats used by the majority of breeding birds are at the field edges—these include hedgerows—scrub—small patches of woodland—shelterbelt trees—and wetland areas on the Site—particularly. It is recommended that these features are retained with an appropriate buffer.
- 1.2 Due to the close-grained nature of the grasslands there are very few ground nesting birds within the Site: based on the survey results—at most—an estimated two skylark territories and four meadow pipit territories could be displaced by the Development—although their presence does depend on the land management in place at any time—an arable field was present in 2020—provided the most suitable habitat—this was a grass ley in 2020—providing less suitable habitat. The breeding bird community in the other habitats is unlikely to be affected by the Development.
- 1.3 The wintering bird surveys were undertaken to gain a greater understanding of whether the Site provides a supporting function to Llyn Alaw SSSI.
- 1.4 Of the three key species referred to in the SSSI citation—teal was recorded—in small numbers—and a single shoemaker was recorded once—whoofer swan was not recorded from the Site. Other bird species mentioned on the SSSI citation—as part of the wider assemblage—make some use of a pool—pond 11—in the centre of the Site—but they were not recorded from other locations within the Site. Relatively small numbers of other wildfowl species were present in this area—apart from wigeon where 100 plus individuals were recorded on four visits.
- 1.5 No observable movements of these birds to or from the Site from Llyn Alaw were recorded.
- 1.6 Greenland white-fronted geese has not been recorded from the Site during the survey work—the Echoes Project data indicates that birds occasionally fly over the Site when moving between the north part of Llyn Alaw and adjacent farmland—and the other regularly used site at Afon Cefni.
- 1.7 It is recommended that pond 11 is incorporated into the Development's design with a 50m-wide buffer sufficient to incorporate marginal habitat and adjacent grassland.

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6 Figures

Figure 1: Site location

Figure 2: Breeding Bird Survey 2020 (red list species)

Figure 3: Breeding Bird Survey 2020 (amber list species)

Figure 4: Breeding Bird Survey 2020 (green list species)

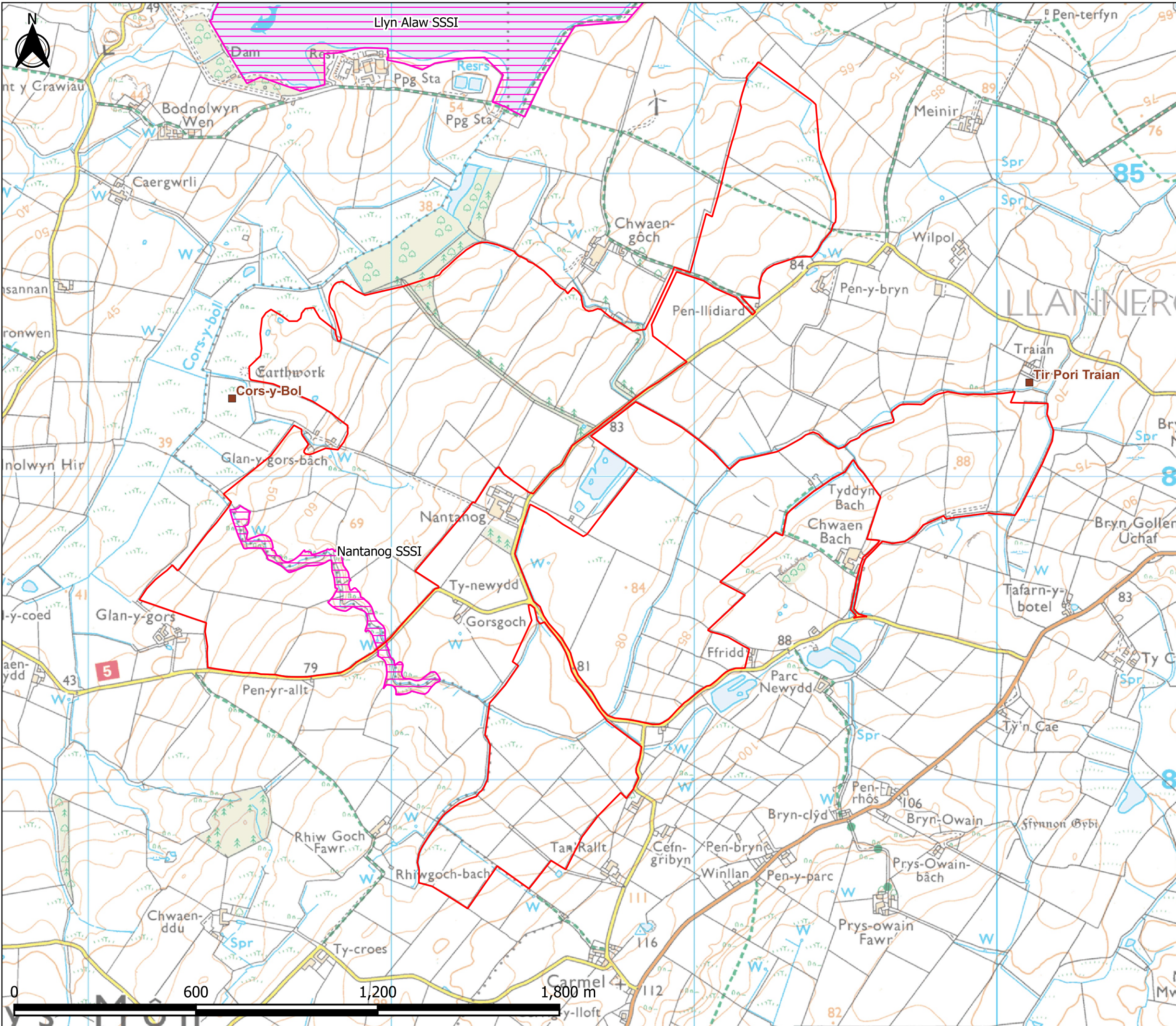
Figure 5: Field numbering

Figure 6: Wintering Bird Survey 2020/21

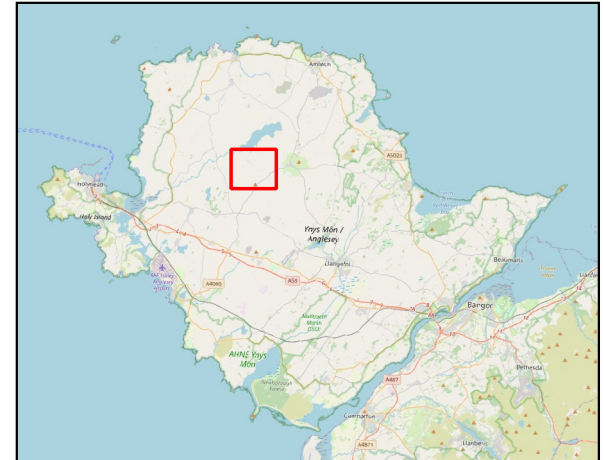
Figure 7: Breeding Bird Survey 2023 (red list species)

Figure 8: Breeding Bird Survey 2023 (amber list species)

Figure 9: Breeding Bird Survey 2023 (green list species)



- Legend
- Local Wildlife Site (indicative)
 - Sites of Special Scientific Interest
 - Site boundary



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PROJECT TITLE
ALAW MON SOLAR FARM

DRAWING TITLE
Figure 1: Site Location and Statutory Designations

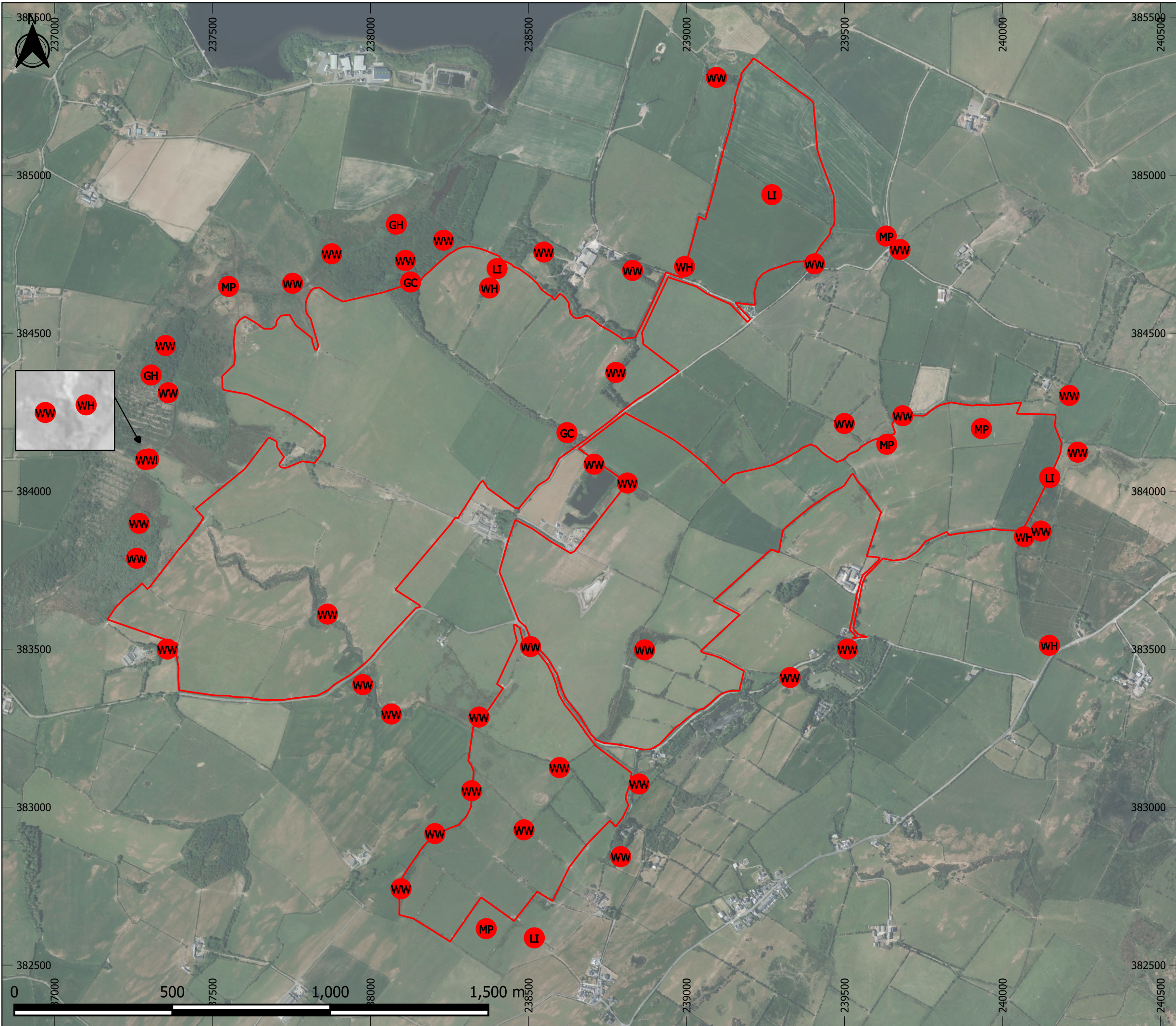
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0 600 1,200 1,800 m

Graphics Ref. No.: 04001



Legend

- Red List Bird
- Site boundary

Species	Common Name
GC	Goldcrest
GH	Grasshopper Warbler
LI	Linnet
MP	Meadow Pipit
WH	Whitethroat
WW	Willow Warbler



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 Figure 2: Breeding Bird Survey Territories 2020
 (Red list birds)

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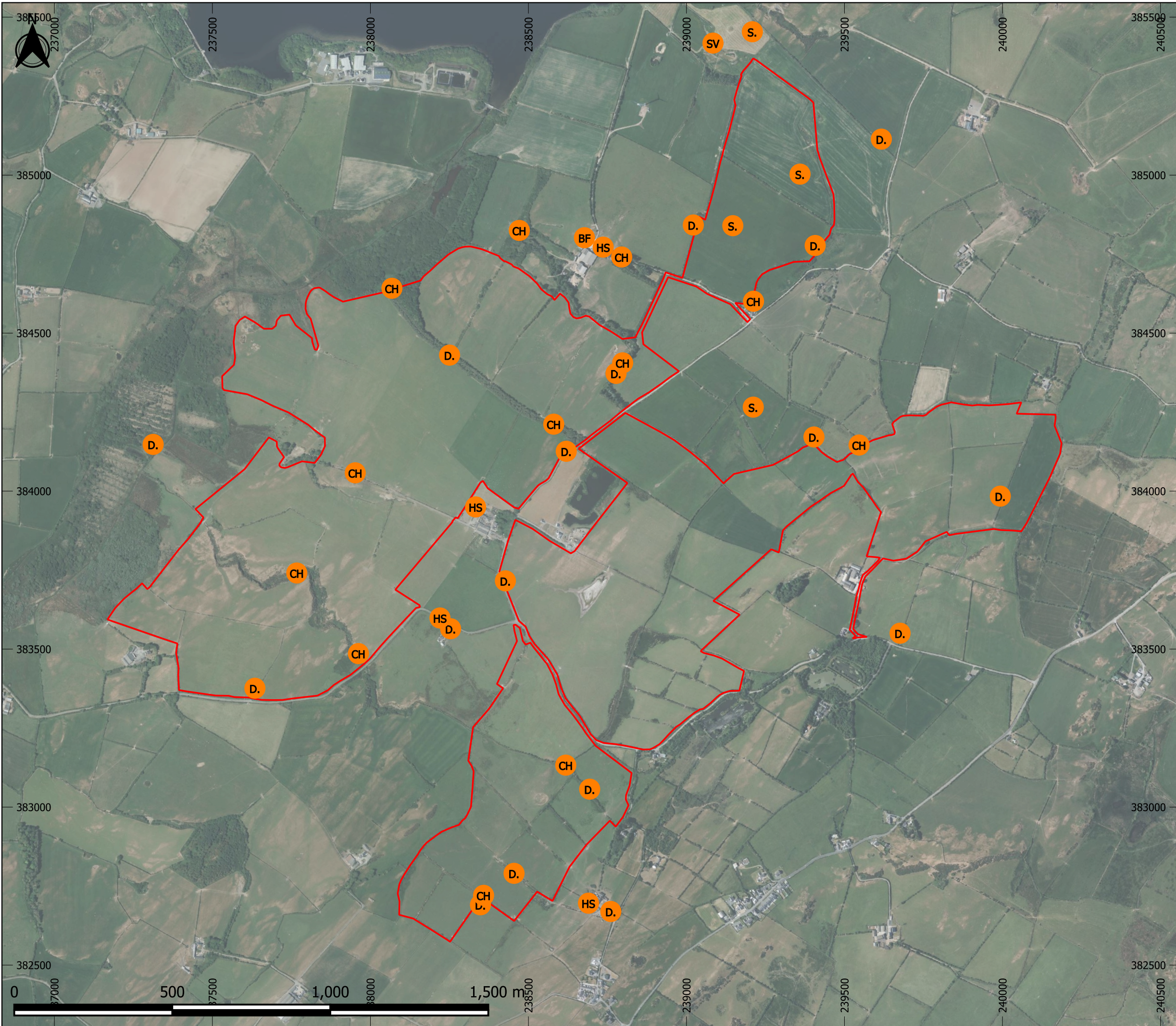
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Legend

- HS Amber List Bird
- Site boundary

Species	Common Name
BF	Bullfinch
CH	Chaffinch
D.	Dunnock
HS	House Sparrow
S.	Skylark
SV	Shoveler



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 Figure 3: Breeding Bird Survey Territories 2020
 (Amber list birds)

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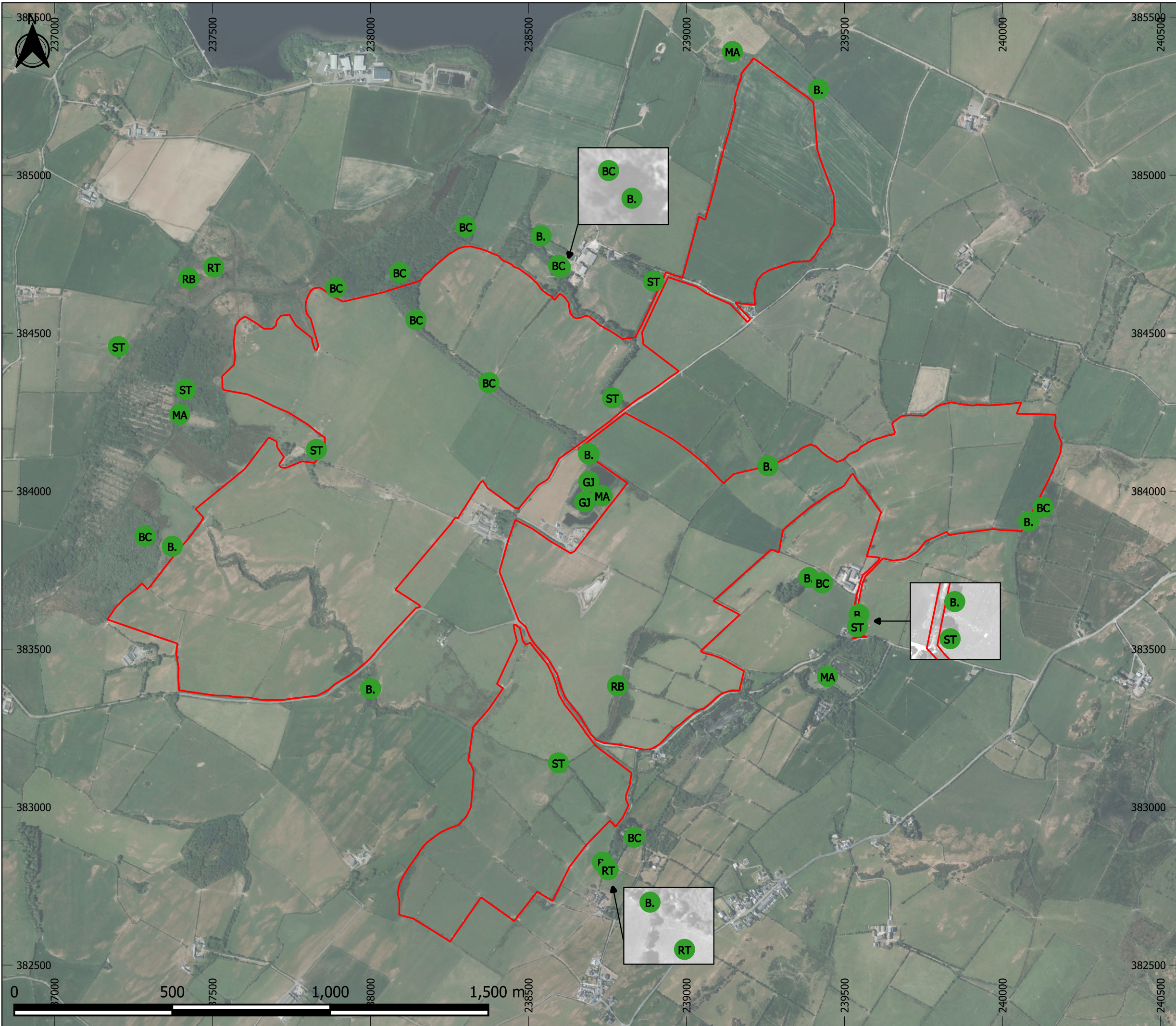
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Legend

- B. Green List Bird
- Site boundary

Species	Common Name
B.	Blackbird
BC	Blackcap
GJ	Greylag Goose
MA	Mallard
RB	Reed Bunting
RT	Common Redstart
ST	Song Thrush



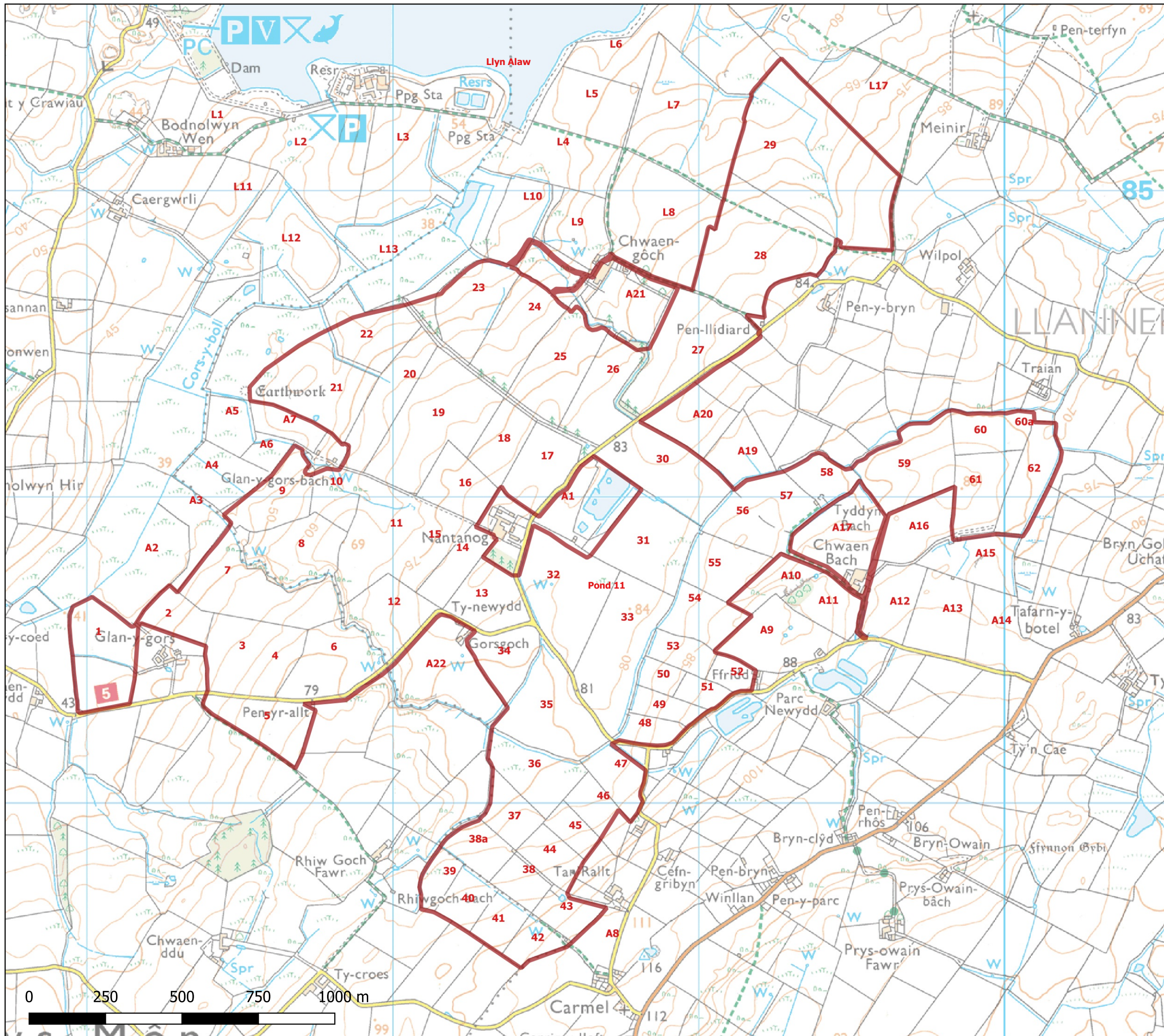
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 Figure 4: Breeding Bird Survey Territories 2020
 (Green list birds)

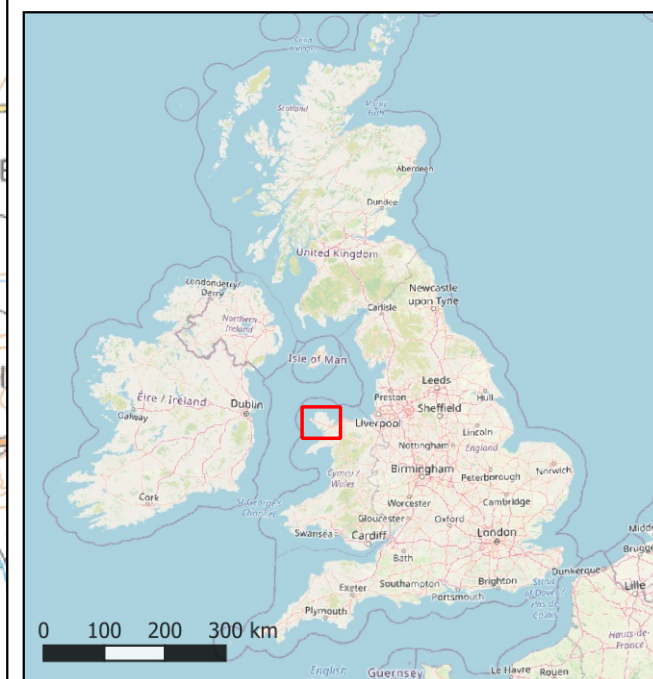
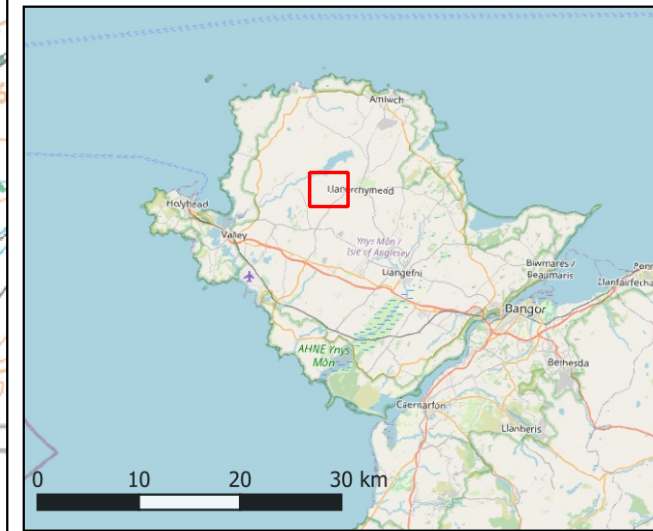
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Legend

 Site boundary



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Figure 5: Wintering Bird Survey Field Numbering

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Red listed species

PO Pochard

Amber listed species

T. Teal

GN Goldeneye

Other Species associated with Llyn Alaw SSSI

WN Wigeon

TU Tufted Duck



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Figure 6: Wintering Bird Survey 2020 (Pochard, Teal, Goldeneye, Wigeon, Tufted Duck)

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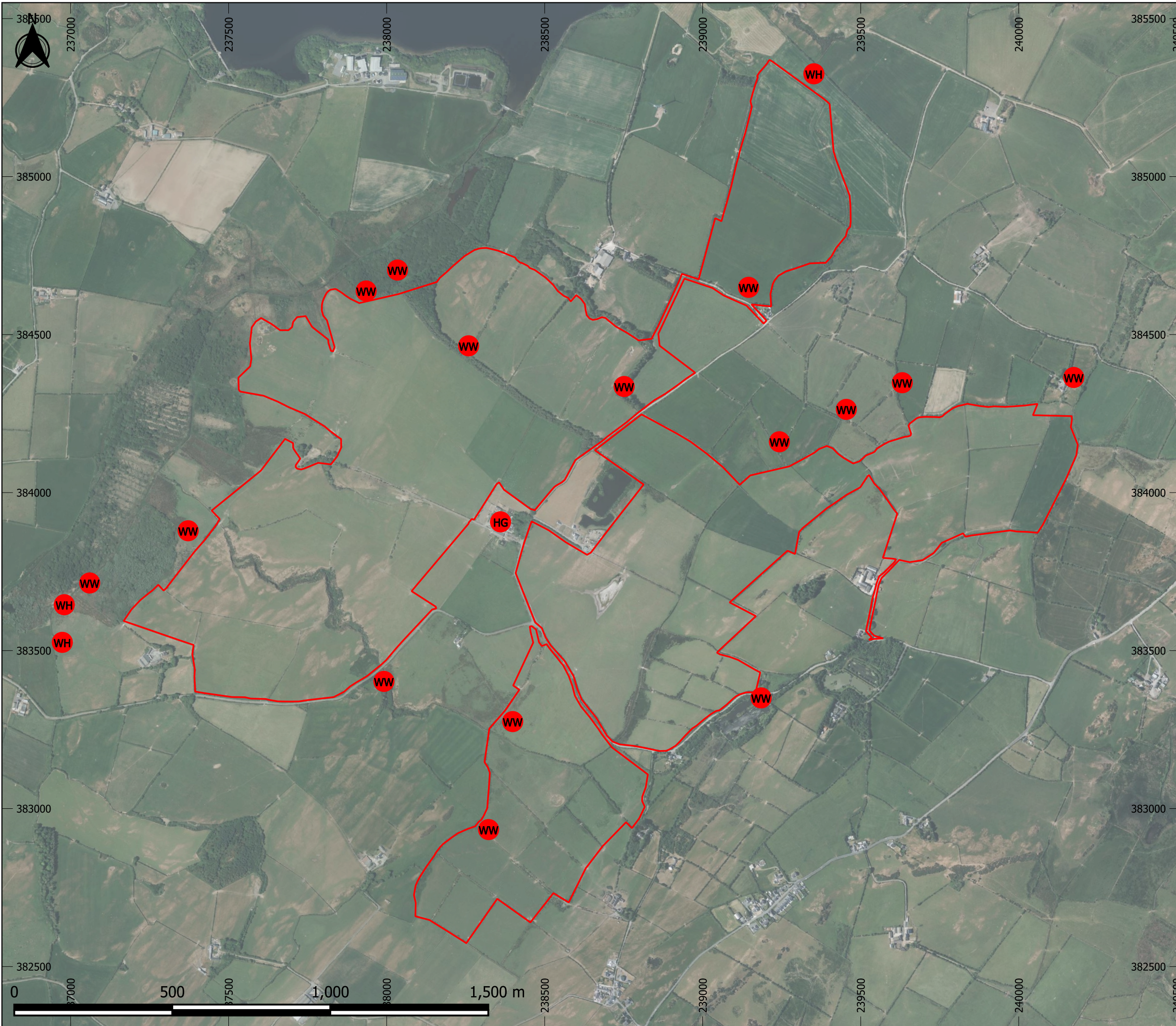
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Legend

- Red List Bird
- Site boundary

Species	Common Name
HG	Herring Gull
WH	Whitethroat
WW	Willow Warbler



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 Figure 7: Breeding Bird Survey Territories 2023
 (Red list birds)

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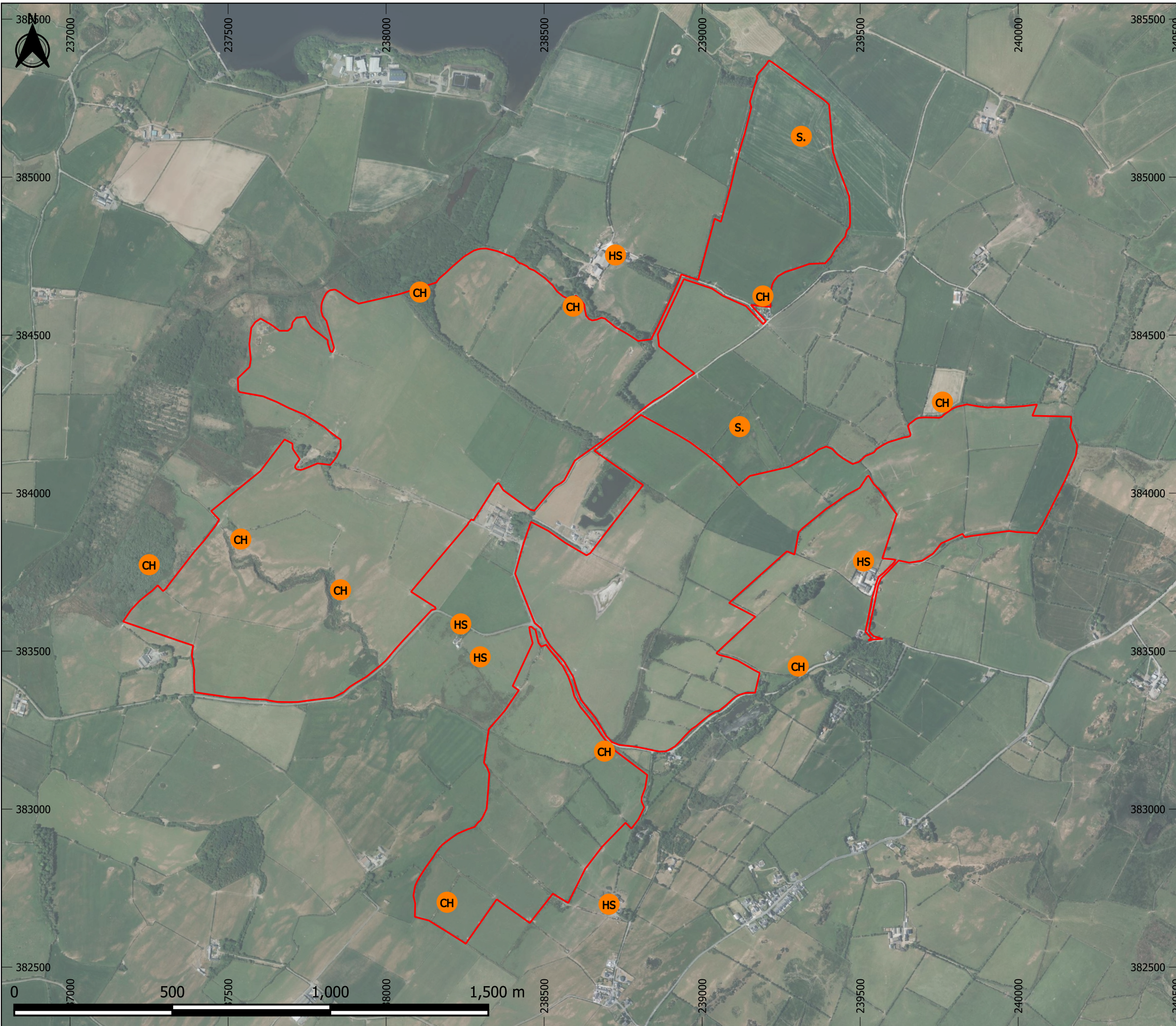
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Legend

- HS Amber List Bird
- Site boundary

Species	Common Name
CH	Chaffinch
HS	House Sparrow
S.	Skylark



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PROJECT TITLE
 ALAW MON SOLAR FARM

DRAWING TITLE
 Figure 8: Breeding Bird Survey Territories 2023
 (Amber list birds)

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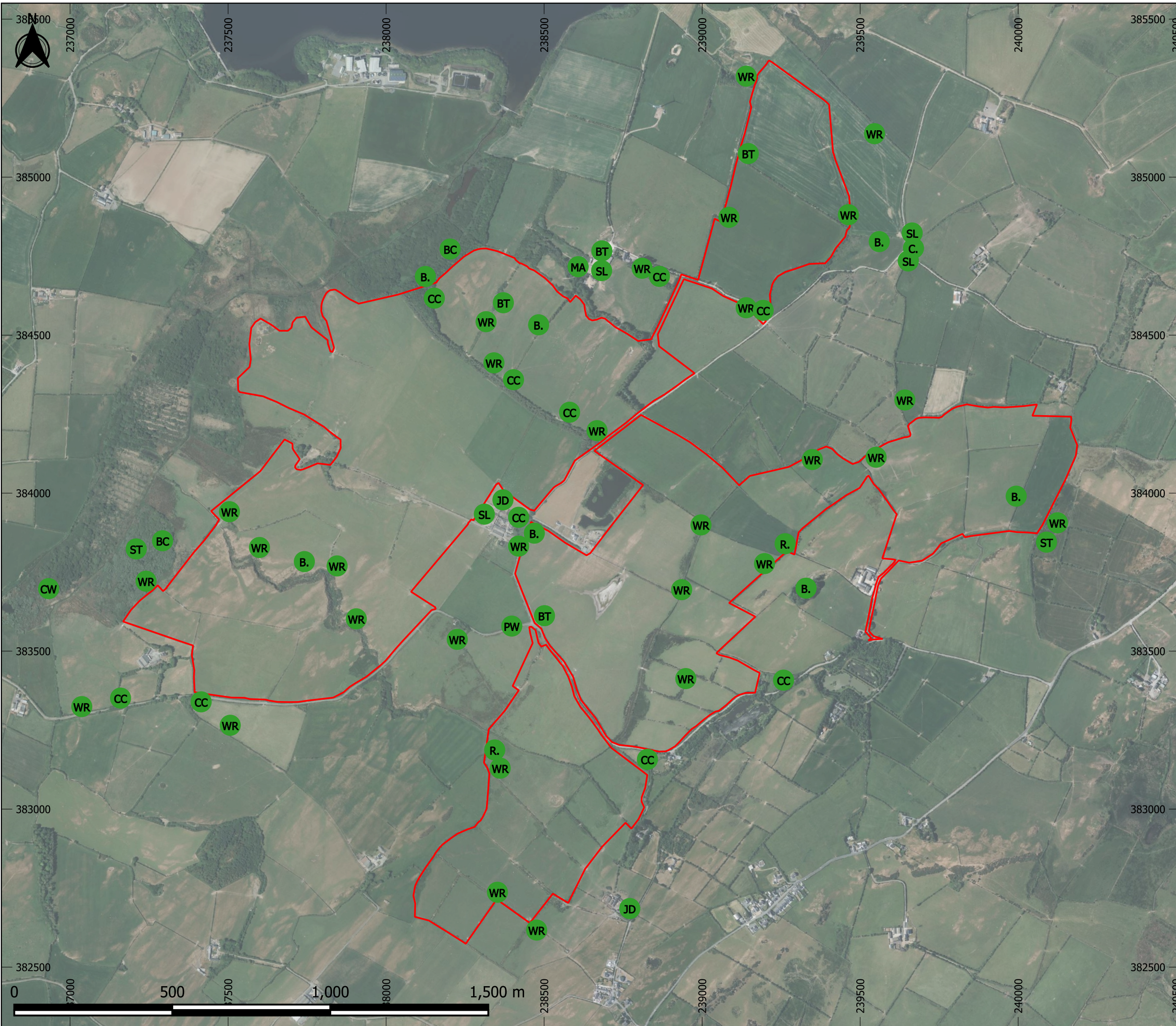
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Legend

- Green List Bird
- Site boundary

Species	Common Name
B.	Blackbird
BC	Blackcap
BT	Blue Tit
C.	Carrion Crow
CC	Chiffchaff
CW	Cetti's Warbler
JD	Jackdaw
MA	Mallard
PW	Pied Wagtail
R.	Robin
SL	Barn Swallow
ST	Song Thrush
WR	Wren



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PROJECT TITLE
ALAW MON SOLAR FARM

DRAWING TITLE
Figure 9: Breeding Bird Survey Territories 2023 (Green list birds)

DATE: 31/01/2024 CHECKED: GM SCALE: 1:11,500
 DRAWN: CS APPROVED: GM VERSION: 1.1

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 Projection: OSGB 1936/British National Grid - EPSG 27700
 Sources: BSG Ecology survey data

7 Annexes

Annex A: Wintering Bird Survey Counts

Table A.1: Total counts of birds throughout the survey area (NB: this includes counts of birds outside the Site boundary).

Maximum count from any one observation (i.e. biggest assemblage)		Visit 1 (22/12/2020)		Visit 2 (09/11/2020)		Visit 3 (23/11/2020)		Visit 4 (07/12/2020)		Visit 5 (08/01/2021)		Visit 6 (29/01/2021)		Visit 7 (17/02/2021)		Visit 8 (24/02/2021)		Visit 9 (08/03/2021)	
		Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the	Llyn Alaw	Within the
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	35		61	4	21	10	140	11		2		130		20	62	3		4
Black-tailed Godwit	<i>Limosa limosa</i>												63						
Buzzard	<i>Buteo buteo</i>													1					
Coal Tit	<i>Periparus ater</i>	5																2	
Common Gull	<i>Larus canus subsp. canus</i>							10			3		23		1		1		
Cormorant	<i>Phalacrocorax carbo</i>	24		4								1		1		1			1
Fieldfare	<i>Turdus pilaris</i>														50				
Gadwall	<i>Anas strepera</i>								6										2
Golden Plover	<i>Pluvialis apricaria</i>										30								
Goldeneye	<i>Bucephala clangula</i>									2		1		2				2	
Goosander	<i>Mergus merganser</i>								7			1		2				2	
Great Black-backed Gull	<i>Larus marinus</i>				2	4	3				1								1
Great Crested Grebe	<i>Podiceps cristatus</i>	2		3		2								2		2			
Greenfinch	<i>Chloris chloris</i>																		
Greenshank	<i>Tringa nebularia</i>										1								
Greylag Goose	<i>Anser anser</i>		152		16										55		16		28
Herring Gull	<i>Larus argentatus</i>	30	37	42	36	30	24	63	15		31		22	19	10	110	75		33
Lapwing	<i>Vanellus vanellus</i>						25		2		60				34		16		
Lesser Black-backed Gull	<i>Larus fuscus</i>	20	2										1		8		2		5
Mallard	<i>Anas platyrhynchos</i>	4	6	11	4	7	10		7							5			2
Mandarin Duck	<i>Aix galericulata</i>																		1
Mute Swan	<i>Cygnus olor</i>						4												
Oystercatcher	<i>Haematopus ostralegus</i>																		2
Peregrine	<i>Falco peregrinus</i>										1								
Pochard	<i>Aythya ferina</i>	1																	
Raven	<i>Corvus corax</i>							1											
Shelduck	<i>Tadorna tadorna</i>																		2
Shoveler	<i>Anas clypeata</i>						1												2
Snipe	<i>Gallinago gallinago</i>		16		24		21		33		13				1			1	1
Starling	<i>Sturnus vulgaris</i>														110				
Teal	<i>Anas crecca</i>		1		4				15		2				4				10
Tufted Duck	<i>Aythya fuligula</i>	70	6	16	5	11	7	19	4	10	5	13		26		32	14	18	
Wigeon	<i>Anas penelope</i>		95		110		107		130						140		41	42	30

Annex B: Barn owl survey scope and survey data

The survey scope considered the likelihood of disturbance impacts, taking into account the nature of the proposed work, the proximity of nearby buildings, and published information on the sensitivity of barn owl to disturbance.

With respect to disturbance, a SNH study (Ruddock & Whitfield, 2007)⁵ states that barn owl is ... “*tolerant of human activity, due to their selection of man-made structures for nesting ... disturbance detection ranges before flushing are likely to be at low distances ... [and that barn owl] can be conditioned over time (sometimes just a few days) to accept quite high levels of close human activity (e.g. 5-10 m, even at the egg stage)... [noting that] individual pairs are likely to vary in their response to disturbance.*”

Barn Owl Trust (2012)⁶ goes into further detail: “*disturbance while nesting is typically considered to be within a building, or within 30m of a nest tree*”; noting that “*the extent of the potential for disturbance depends largely on the extent of deviation from the norm; a major building project with large number of workmen, vehicles and machinery generating a great deal of noise 100m from a previously isolated nest site might be disturbing, whereas a similar development the same distance from a barn owl nest in a busy farm complex might not be*”.

The proposed site layout, proximity of potentially suitable buildings, and factors likely to increase the risk of disturbance (such as baseline disturbance levels, screening provided by existing features, and distance) were considered in devising the survey scope. This has involved desk-based assessment of all buildings within 100m of the Site, including a review of aerial photos/street view photos, supplemented by field observations where these have been visited/viewed during the previous ecological baseline survey work. The results of this review are as follows:

- No buildings which could be used by roosting or nesting barn owls are to be directly affected. No trees suitable for nesting barn owl have been identified during the baseline survey.
- Buildings within proximity to the Site include occupied farms and residential properties. The former generally experience a baseline level of disturbance from regular farming-related activity (tractors/quad bikes/people/stock etc); occupied residential properties also experience regular human disturbance.
- There are 13 buildings/groups of buildings within 100m of the Site boundary/development areas within the Site boundary.
- Seven are assessed to have low suitability: these are generally occupied residential properties without barns/outbuildings, and the occupied engineering buildings at Hen Nantanog. These have been scoped out.
- One is assessed to have low/moderate suitability: this is a residential property/farmhouse (Glan-y-gors) with a fairly modern agricultural barn. The buildings are fairly distant (60m+) and separated from the Site by a field and a hedgerow with some large trees in it. Given the suitability assessment (moderate, on account of the buildings’ character), distance and screening effects from the hedgerow/trees, it is considered unlikely to be affected by disturbance from construction work within the Site, and this has therefore also been scoped out.
- Five are assessed to have high suitability: these are farm buildings (Nantanog SH 38318 83911 and Chwaen Bach SH 39519 83726); derelict/partially derelict buildings (Pen y Bryn SH 39425 84652 and Ffridd (SH 39190 83402); and an old barn (to the west of Nantanog at SH 37727 84095).

⁵ Ruddock M. & Whitfield D. (2007) *A Review of Disturbance Distances in Selected Bird Species*, Report from Natural Research Projects Ltd to Scottish Natural Heritage.

⁶ Barn Owl Trust (2012) *Barn owl conservation handbook*. Pelagic Publishing, Exeter.

- Of these, three (Nantanog, Fridd, and the old barn west of Nantanog) are located in close proximity (i.e. within 50m), currently experience relatively low levels of baseline disturbance, and/or are in relatively open locations without much in the way of screening from existing trees or vegetation between construction areas. Due to this combination of factors they are considered to be potentially at risk from disturbance from nearby construction activities, were they to be used by nesting barn owl. These buildings were therefore scoped into the survey.

The two other high potential buildings/building groups (Chwaen Bach and Pen y Bryn) are more distant (c.60-130m and c.100m, respectively); they are also separated by fields, and are well-screened by hedgerows, field boundaries or and other buildings. Since the risk of disturbance to these buildings is considered to be low and they were scoped out of further survey.

Barn owl survey data and photographs

Nantanog Farm Buildings (Building 1)

The farmhouse is uninhabited. The windows on the ground and first floors are glazed preventing access by birds. The attic/loft is potentially suitable for use by barn owl for nesting and roosting. There are two apertures that lead into the roof: an east-facing window now unglazed covered by encroaching vegetation and missing slates in the roof on the northern pitch the gap is however not sufficiently large enough to provide a barn owl access point. No droppings or pellets were observed.

OS Grid reference: SH 0002 0000



Nantanog Farm Buildings (Building 2)

A large steel-framed modern barn. All potential perches were checked. There were no signs of use by barn owl.

OS Grid reference: SH 00050 0000



Nantanog Farm Buildings (Building 3)

A stone built 'T' shaped barn, that adjoins the rear of the steel barn (Building 2). The barn has fallen into disrepair with areas of roof missing (see photos). Parts of the first floor were not accessed due to the hazardous condition of the building. The building offers potential for nesting and roosting in the locations where the roofs are still intact. No evidence of use by barn owl was located.

OS Grid reference: SH 0005 0002

**Nantanog Farm Buildings (Building 4)**

Detached stone barn in good condition used for housing cattle and farm operations. There is a hayloft (first floor) which is potentially accessible for barn owl through an old doorway to the south-east gable (see photo). This building has potential for use roosting and nesting although disturbance by farming operations may reduce suitability. No evidence of use by barn owl was located.

OS Grid reference: SH 00050 00052



Barn to the west of Nantanog (Building 5)

An isolated barn in a field in a deteriorating condition. The building has some potential for roosting barn owl. No evidence of use by barn owl was located.

OS Grid reference: SH 7727 0005

**Barn/outhouse at Fridd (Building 6)**

The stone barn/outhouse at Fridd is in poor condition the roof has collapsed at one end (see photo) and it is very open. The building has limited roosting or nesting potential. No evidence of use by barn owl was visible.

OS Grid reference: SH 1100 0002

