Bute Energy
Aberedw Energy Park

Appendix 8.1a:

Ornithology Technical Report 2019 -2021

ABEREDW WIND FARM

Ornithology Year 2 Report: September 2019 – August 2021

Client:	Bute Energy Ltd.
Project No:	2730
Version:	1.0
Date:	2021-11-02

PLEASE NOTE – This report contains data of a sensitive nature relating to the locations of specially protected species of birds (i.e. those afforded the highest level of protection within the UK and listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)) that are potentially subject to illegal persecution. As such, it is considered confidential information and should not be disclosed to anyone outside the developer and their representatives, the Local Authority, NRW and the RSPB

Document Information

Project Name:	ABEREDW WIND FARM
Document Title:	Ornithology Year 2 Report: September 2019 – August 2021
Client Name:	Bute Energy Ltd.
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Client Address:	39 George Street, Edinburgh, EH2 3HN
Document Status:	Final for Issue
Author:	[redacted]
Reviewed:	[redacted]
Approved:	[redacted]
Date:	2021-11-02
Version:	1.0
Project/Proposal Number:	2730
ITPEnergised Office:	4th Floor, Centrum House, 108-114 Dundas Street, Edinburgh, EH3 5DQ

Revision History

Version	Date	Authored	Reviewed	Approved	Notes
1.0	2021-12-04	[redacted]	[redacted]	[redacted]	Final for issue

Contents

1. Introduction

1.1 Overview

ITPEnergised was appointed by Bute Energy to undertake a series of ornithological surveys in support of a proposed wind farm development ('the Proposed Development') in an area of land east of Builth Wells, Powys (hereafter referred to as the 'Site'). The Site has central Ordnance Survey Grid Reference SO 09599 48767.

1.2 Site Description

The Site is approximately 12.3km^2 (1,232ha) and is located 3km east of the town of Builth Wells and 2km north of Aberedw. It is comprised of largely flat-topped hills which drop steeply into deep valleys, three of which cut into the Site from the south. A large proportion of the Site is moorland and areas of rough grazing land, with small sections of forestry in the valleys which cut into the Site from the south and on the lower slopes to the west and east. The Site lies directly east of the River Wye and north of River Edw and a number of small tributaries flow south and west into either of these two catchments.

2. Objectives

This report presents the ornithological survey work undertaken in support of the Proposed Development by ITPEnergised (ITPE) between September 2019 and August 2021, inclusive.

The objectives of this report are to:

- provide a summary of the legislation and policy context relating to birds;
- provide a summary of the avian desk study information obtained for the Site; and
- document the ornithological survey methodologies and avian species recorded during the baseline surveys at the Site.

3. Legislation and Biodiversity

3.1 Legislation

All relevant legislation and guidance documents has been reviewed and taken into account as part of this assessment, as referenced in this report. A description of relevant nature conservation legislation is presented below.

Of particular relevance are:

- Council Directive 2009/147/EC on the Conservation of Wild Birds (i.e. the "Birds Directive");
- The Ramsar Convention 1976;
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (i.e. the "Habitats Regulations");
- The Conservation of Habitats and Species Regulations 2017;
- The Wildlife and Countryside Act 1981 (as amended); and
- The Environment (Wales) Act 2016.

3.1.1 International conventions and directives

Even though the UK has left the European Union (EU), European-level legislation remains relevant as it has been transposed into UK wildlife legislation, which at the time of writing has not changed significantly.

3.1.1.1 The Birds Directive

The EU Directive on the Conservation of Wild Birds (2009/147/EC) was first adopted in 1979 and is the primary mechanism for delivering the EU's obligations under the Convention on Biological Diversity (CBD), and the Ramsar and Bonn Conventions. Collectively, the Birds and Habitats Directives require Member States to take action in order to protect all bird species and their habitats which includes the designation of Special Protection Areas (SPAs) in respect to species listed on Annex I of the Directive.

3.1.1.2 Ramsar Convention

The Convention on Wetlands of International Importance (the Ramsar Convention) was adopted in Iran in February 1971 and came in to force in the UK in May 1976. The Convention considers the subject area of wetland conservation and comprises three elements of activity:

- The designation of wetlands of international importance as Ramsar sites;
- The promotion of the sustainable use of all wetlands in the territory of each country; and
- International co-operation with other countries to further the sustainable use of wetlands and their resource.

3.1.1.3 The Habitats Regulations

The Conservation of Habitats and Species Regulations 2017 consolidates the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. In relation to birds, these Regulations transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations came into force on 30th November 2017 and were most recently amended in 2012.

Under the Regulations, competent authorities i.e. any Minister, government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive and Birds Directive.

In Wales, the Habitats Directive is translated into specific legal obligations by the Conservation (Natural Habitats, &c.) Regulations 1994. This piece of legislation is usually known as the Habitats Regulations.

In relation to ornithological interests, the Habitats Regulations cover the requirements for:

- Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), which are sites that are internationally important for threatened habitats and species; making a network of sites designated as together known as Natura2000 network.

3.1.1.4 The Convention on Biological Diversity (CBD)

The CBD was adopted at the Earth Summit in Rio de Janeiro, Brazil in June 1992, and came into force in December 1993. It was the first global treaty to provide a legal framework for biodiversity conservation. The treaty has three primary goals:

- The conservation of biological diversity;
- The sustainable use of its components; and
- The fair and equitable sharing of the benefits arising from the use of genetic resources.

Signatories are required to create and enforce national strategies and action plans to conserve, protect and enhance biological diversity.

The UK Government ratified the convention and published the UKBAP in 1994 and to compliment the UKBAP, separate biodiversity strategies for each of the devolved governments have been subsequently developed, including the Environment Strategy for Wales, launched in 2006. The 'UK Post-2010 Biodiversity Framework'

now succeeds the UK BAP and 'Conserving Biodiversity – the UK Approach'. The framework takes into account the 'Aichi targets' following a conference in Japan in 2010 and publication of the new EU Biodiversity Strategy (EUBS) in 2011. This complements existing UK biodiversity strategies and targets by identifying activities needed to achieve them. This framework places more weight on national responses such as the Nature Recovery Action Plan (Welsh Government, 2015), in a Welsh context, than on a UK-wide response.

3.1.2 National legislation

3.1.2.1 The Wildlife and Countryside Act

The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principal mechanism for wildlife protection in the UK. Schedule 1 of the Act lists bird species that are afforded special protection. The principal designation established under the Act is the citation of Sites of Special Scientific Interest (SSSI).

The Act also makes it an offence (with exception to species listed in Schedule 2) to intentionally:

- Kill, injure, or take any wild bird;
- Take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- Take or destroy an egg of any wild bird.

3.1.3 Biodiversity

3.1.3.1 The Environment (Wales) Act 2016

The Environment (Wales) Act aims to assist Wales in developing as a low carbon, green economy in response to shifting environmental conditions through climate change. The Act was developed as a response to the negative impacts from climatic change, the effects of which range from socio-economic human disturbances to a reduction of biodiversity. The Environment (Wales) Act 2016 sets out the approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act (Welsh Government, 2016a).

Local authorities are required to take into consideration for the conservation of biodiversity within their area but also places a responsibility to not only protect but to enhance biodiversity. The act also places a need for Welsh Ministers, public bodies and statutory stakeholders to maintain and enhance biodiversity.

The Welsh Government, in conjunction with Natural Resources Wales, has published a list of living organisms and types of habitat which are of principal importance for the purpose of maintaining and enhancing biodiversity, in relation to Wales, in Section 7 of the Act.

At the time of creation, the Welsh Priority List (WPL) outlines the habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales contained 55 priority habitats including hedgerows; arable field margins; improved grassland; and rivers and streams (Welsh Government, 2016b).

At the time of listing, WPL species included 17 species of mammals, 51 species of birds, 10 species of fish, eight species of reptiles or amphibian, 188 invertebrate species, 77 vascular plant species, 67 species of lichens, 52 species of mosses and liverworts, 27 species of fungi, five species of stoneworts and 55 marine species (Welsh Government, 2016c). Of the birds listed, those of relevance to the Site include skylark (*Alauda arvensis*), kestrel (*Falco tinnunculus*), cuckoo (*Cuculus canorus*), curlew (*Numenius arquata*) and lapwing (*Vanellus vanellus*).

3.1.3.2 Nature Recovery Plan

The Nature Recovery Plan was released in December 2015 and refreshed in 2019 and again in 2020 following the coronavirus pandemic and addresses the underlying causes of biodiversity loss. The updated plan outlines five themes for action in how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in biodiversity and then reverse that decline (Welsh Government, 2020).

3.1.3.3 The Powys County Council Local Biodiversity Action Plan

The Powys County Council LBAP was published in 2002 and outlines targets and actions considered necessary to protect the wildlife of Powys in the future (Powys Nature Partnership, 2002). The adopted LBAP outlines 17 habitat action plans and 28 species action plans to target biodiversity conservation at a local level. There are four priority species plans for bird species; curlew, nightjar (*Caprimulgus europaeus*), red kite (*Milvus milvus*) and tree sparrow (*Passer montanus*) as well as further 96 species of conservation concern.

A review of the Powys LBAP began in 2016, the result of this will be included in the Powys Nature Recovery Action Plan (PNRAP.) The PNRAP is to be considered a tool for developing projects and actions to be undertaken by conservation stakeholders and the general public to protect and enhance biodiversity and improve habitat connectivity at a landscape scale. The PNRAP remains to be finalised and come into effect.

3.2 Birds of Conservation Concern

The BoCC, is a collaboration between the Statutory Nature Conservation Bodies (SNCBs), Royal Society for the Protection of Birds (RSPB), British trust for Ornithology (BTO), Wildfowl and Wetlands Trust (WWT), Game and Wildlife Conservation Trust (GWCT) and several other organisations. It uses an approach based on quantitative assessments against standardised criteria, in order to place individual bird species on 'Red', 'Amber' or 'Green' lists to indicate different levels of conservation concern. Red in the context of BoCC is not the same as IUCN's Red List, though IUCN status is one of the criteria used in BoCC assessment. Collectively, the changes in the numbers and proportions of species on Red, Amber or Green lists provide a gauge of the broad direction of status of UK birds and point to the degree of threat they face, as well as the efficacy of conservation measures taken (Eaton *et al*. 2015).

Birds on the Red and Amber lists are subject to at least one of the factors listed below:

- Red - red list species are those that are globally threatened, have had an historical population decline in the UK from 1800 -1995, a rapid (> or = 50%) decline in UK breeding population over the past 25 years, or a rapid (> or = 50%) contraction of UK breeding range over the past 25 years;
- Amber - amber listed species have had a historical population decline from 1800-1995 but are recovering; population size has more than doubled over the past 25 years, a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern (SPEC); and
- Green - green listed species have no identified threat to their population status.

4. Methods

4.1 Overview

This section describes the methods used for the ornithological surveys, which comprised a combination of desk study and field survey.

4.2 Desk Study

An ornithological desk study has been initiated to compile existing baseline data for the Site and local area.

In terms of nature conservation designations of relevance to birds, the desk study aimed to identify international designations, such as SPAs and Ramsar wetlands, within 20km of the Site boundary for all SPAs. This search area is increased to 40km for SPAs designated for or in part for chough (*Pyrrhocorax pyrrhocorax*). National statutory designations, such as SSSIs and National Nature Reserves (NNRs) were identified to within 10km of the Site boundary. Only ornithological features were considered relevant to the study. Local Nature

Conservation Sites (LNCSs) or non-statutory designations, such as Local Biodiversity Sites, were identified within a 2km distance of the Site boundary.

In terms of species records, data was obtained from Biodiversity Information Service for Powys & Brecon Beacons National Park. This included all species of conservation significance within 5km of the Site boundary. In addition, any existing records that are freely available for commercial use of protected or otherwise notable species of bird (e.g. Environment (Wales) Act 2016/LBAP priority species) were identified with a 5km distance of the Site boundary. Only records from the last 10 years were considered relevant to the study. The data search was conducted using the following sources:

- Biodiversity Information Service for Powys & Brecon Beacons National Park;
- National Biodiversity Network (NBN) Atlas;
- Natural Resources Wales: Designated Sites Search (Natural Resources Wales, 2018a); and
- MAGIC: Nature on the Map (MAGIC, 2020).

4.3 Field Surveys

4.3.1 Target Species

Target species of birds were identified as those that are provided specific protection through legislation (i.e. those species of high conservation interest) or those that represent qualifying interests in designated sites in the wider area. Target species at the Site are considered to be those species:

- Identified as potentially at risk from impacts of onshore wind farms (SNH, 2006);
- Species listed in Annex 1 of the Birds Directive;
- Non-passerines listed in Schedule 1 of the WCA; and
- Species considered to be of principal importance in Wales (i.e. those listed on the WPL).

4.3.2 Vantage Point Scoping

In line with the key guidance and methods described by NatureScot (formerly Scottish Natural Heritage, SNH) in their wind farm bird survey guidance (SNH, 2017) which has been adopted by Natural Resources Wales (NRW), it was identified that Vantage Point (VP) surveys would be required to account for the potential presence of 'scarce' diurnal raptors, waterfowl and wading bird species within and adjacent to the Site.

Five vantage points were established in September 2019 and located adjacent to the Site boundary, where possible, or within the Site if no viable alternative was possible. The VP locations were so placed to cover the buildable (turbine) area of the Site as much of the larger landownership boundary with not be developed. The VP locations and viewsheds are presented in Figure 1. The VP locations and the corresponding viewsheds were verified during a site visit on 2nd October 2019, prior to the commencement of surveys. VP locations and bearings are provided in Table 1.

Table 1 - VP Locations and Orientation

VP	Grid Reference	Bearing
1	SO 10228 51477	67.5°
2	SO 08897 50676	45°
3	SO 10002 50155	270°
4	SO 08264 50625	225°
5	SO 08325 50986	0°

4.3.3 Diurnal Vantage Point Surveys

VP surveys at the Site commenced in October 2019, during which information on bird flight activity was collected during timed watches using recommended guidance and methods, as outlined by NatureScot (SNH, 2017). A total of 24 months of survey data has been gathered, covering the non-breeding and breeding season. Surveys were undertaken in such a way as to minimise any impact on bird behaviour associated with their presence on or near the Site, including arriving at the survey point a minimum of 15 minutes prior to the commencement of each VP watch to allow for a "settling down" period.

All surveys were stratified across three daylight periods (termed 'dawn', 'day' and 'dusk') to allow for diurnal variation in activity rates. All surveys comprised watches lasting no more than three hours in duration and subsequent watches were started following a minimum 30-minute break to ensure surveyors had a break between surveys.

All surveys were undertaken by a single observer in a wide range of weather conditions, but mainly in conditions of good ground visibility (i.e. > 2km) and, within each survey season, were adjusted to account for changes in sunrise and sunset times.

During each VP watch, two methods of recording were used comprising focal sampling of target species and activity summaries of secondary species. Observations were recorded using an expected Potential Collision Height (PCH) of between 50-210m. Data from September was thus collected in seven height bands (HBs) as follows:

- HB1: < 10m;
- HB2: 10 ≥ < 20m;
- HB3: 20 ≥ < 30m;
- HB4: 30≥ < 40m;
- HB5: 40≥ < 50m;
- HB6: 50 ≥ < 210m (PCH); and
- HB7: ≥ 210 m.

Flightline data were noted in the field onto recording sheets and later transferred to a Microsoft Excel spreadsheet for analysis. Each flightline recorded during each VP watch was annotated on to a survey map and cross-referenced to its corresponding data entry on the recording sheet.

The total number of survey hours, by season, across the 24 months of survey at each VP location is presented in Table 2.

Table 2: Total VP Survey Hours per VP

VP	Non-Breeding Season	Breeding Season	Total No. Hours
1	72	72	144
2	72	72	144
3	72	72	144
4	72	72	144
5	72	72	144

4.3.4 Breeding Bird Survey

A modified Brown and Shepherd (1993) survey method, which is designed for moorland/upland habitats, was followed for the breeding bird survey. Breeding bird surveys are not considered to be a requirement within forestry unless significant populations of sensitive Schedule 1 passerine species, such as crossbill (*Loxia curvirostra*), are present. As this does not currently appear to be the case, we have not identified a

need for surveys given alack of areas of forestry within the Site. As such, breeding bird surveys will be restricted to open habitat (i.e. any habitats which are not closed canopy or pricket forestry) but will take in woodland edges for completeness.

The Brown and Shepherd (1993) methodology outlines a two visit approach, however the NatureScot guidance (SNH, 2017) recommends that this survey follows a four-visit approach with visits being carried out between mid-April to July. A minimum of two weeks should be left between survey visits. Due to covid-19 lockdown restrictions, three visits were completed during the 2020 breeding season, although four survey visits were completed in 2021.

A walked transect was followed, visiting all the areas of suitable habitat within a 500m buffer around the site boundary aiming to survey for birds within 100m of all points inside the Site boundary. Within visits, duplicate records of waders separated by less than a threshold distance of 500 m were considered to correspond to birds of the same pair, while those separated by more than the threshold distance were considered to be from different pairs. Exceptions to this occurred when recorded birds seen within the threshold distance of each other as definitely representing different pairs. Standard BTO species codes and behaviour symbology was used to record registrations on to field survey maps.

Following the completion of the survey, all survey data are considered together, along with the noted behaviour observed, and bird territories are defined as either; confirmed, probable, possible or non-breeding.

During the 2020 breeding season (Year 1), surveys were restricted to the red line boundary and took place across the following three periods ('visits') and dates:

- Survey visit 1 – 20th and 22nd May;
- Survey visit 2 – 10th and 11th June; and
- Survey visit 3 – 20th and 24th July.

During the 2021 breeding season (Year 2), surveys took place across the following four visits and where possible included a 500m survey buffer surrounding the Site on the following dates:

- Survey visit 1 – 10th, 11th, 13th, 15th, 16th and 18th April;
- Survey visit 2 –10th, 11th , 12th, 14th, 15th, 16th and 20th May;
- Survey visit 3 – 4th, 6th, 10th, 11th and 12th June; and
- Survey visit 4 – 15th, 18th, 20th, 21st and 23rd July.

4.3.5 Breeding Raptor Survey

The survey for breeding raptors was completed following methods as described in Hardey *et al*. (2013). A four-visit walkover survey approach was used, with survey visits being spaced between May and July 2020 and covering the Site and a 2km site buffer, or "study area", where access permissions allowed. The survey area is continuously scanned for target species during the walkover. This includes stops at "mini" vantage points where the view is scanned for a period (usually 15-20 minutes) across suitable habitat for target species. Surveys for breeding moorland raptors generally require four visits between April and July, although the starting month in the 2020 season was delayed until later in May due to covid-19 restrictions.

The first survey visit is primarily to detect displaying birds and/or territory occupancy by the various target species. A second visit is then used to identify active nests. The third visit is then carried out to check for the presence of young birds, and the final fourth visit is used to record fledged young (Hardey *et al.,* 2013).

During the 2020 breeding season (Year 1), surveys took place across the following four visits and dates:

- Survey visit 1 – 20th , 22nd May and 1st, 2nd June;
- Survey visit 2 – 9th, 10th and 11th June ;
- Survey visit 3 – 19th, 20th and 21st July; and

- Survey visit 4 – 24th July and 1st August.

During the 2021 breeding season (Year 2), surveys took place across the following four visits and dates:

- Survey visit 1 – 12th, 14th, 17th and 19th April;
- Survey visit 2 – 9th, 10th and 11th May;
- Survey visit 3 – 3rd, 5th, 7th, 9th and 14th June; and
- Survey visit 4 – 13th, 14th, 16th, 17th and 19th July.

4.3.6 Winter Walkover Surveys

A winter walkover survey was completed covering open areas of the Site and included three visits completed in both 2019-20 and 2020-21 winter seasons to identify winter roosting and foraging bird populations within the Study Area. Standard BTO species codes and behaviour symbology was used to record registrations on to field survey maps.

The surveys were carried out in line with methods detailed in Gilbert *et al*. (2012) and consisted of three visits during the 2019 – 2020 non- breeding season (Year 1), undertaken on:

- Survey visit 1: 26th November 2019;
- Survey visit 2: 20th January 2020; and
- Survey visit 3: 19th March 2020.

During the 2020 – 2021 non- breeding season (Year 2), surveys took place across the following four visits and dates:

- Survey visit 1: 13th November 2020;
- Survey visit 2: 22nd December 2020; and
- Survey visit 3: 9th March 2021.

As with the breeding walkover bird surveys, the winter walkover survey focused on identifying the presence and/or absence for each target species including Annex 1, Schedule 1, BoCC Red List, WPL and Powys LBAP species.

4.3.7 Black Grouse Survey

In both 2020 no suitable habitat was recorded for black grouse although with surveys limited in timings and areas of coverage due to Covid further checks were completed in 2021 and a black grouse survey walkover at the Site confirmed that a lack of suitable habitat. With a lack of suitable breeding habitat and no recent records in this part of Wales for black grouse and no records of this species noted during any VP or walkover surveys meant full black grouse surveys were not considered necessary.

4.3.8 Nightjar Survey

With covid-19 restrictions meaning access was restricted to the Site boundary, an assessment of habitats within the Site outlined a lack of suitable habitat within the Site boundary for breeding nightjar.

In 2021 small sections within forestry areas were identified as potentially suitable for breeding nightjar in the wider 2km survey buffer. These areas were targeted for targeted nightjar surveys following guideline outlined in Gilbert *et al* (2011) and were undertaken on:

- Survey visit 1: 3rd,5th and 9th June; and
- Survey visit 2: 13th, 14th and 16th July.

4.3.9 Survey limitations

There were no issues with general access to the Site and all surveys were carried out according to current recommended guidelines and took place during appropriate weather conditions.

Due to the Covid-19 lockdown restrictions, and in order to follow associated government guidance, surveys were not undertaken throughout all of April and the first half of May 2020 with surveys restarting at the Site on May 18th. Following the restart of surveys, and in order to maintain social distancing, much of the full survey buffer were not accessed throughout all surveys, this included checking buildings and structures for evidence of breeding target species.

Survey areas without access permissions were scanned, where practical, with binoculars from a distance. All areas with public right of way within the survey buffers were accessed during 2021 breeding surveys.

5. Baseline

5.1 Desk Study

The desk study identified one designated site of international importance for birds inside the 20km buffer of the Site (the Elenydd-Mallaen SPA), and none were found within 40km designated specifically for chough. Two sites of national importance are located within 10km of the Site boundary and are designated for their bird fauna; each site is detailed in Table 3 below and also presented on Figure 2.

A further five SSSI sites are located within the search area although they are designated for terrestrial ecology qualifying features and only make reference to ornithological interests in their citations.

Table 3: Nature Conservation Designations of International and National Importance

Site Name	Designation	Distance to Site	Description
Elenydd-Malleen (Marcheini Uplands, Gilfach Farm and Gamallt)	SPA	15.7km NW	This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive. During the breeding season; ▪ Merlin (*Falco columbarius*), 7 pairs representing at least 0.5% of the breeding population in Great Britain (5 year mean, 1987-1991); ▪ Red Kite (*Milvus milvus*), 15 pairs representing at least 9.4% of the breeding population in Great Britain (Count as at 1997). Although not qualifying species, the SPA is notable also for the following three Annex 1 species: 1-2 pairs of chough (*Pyrrhocorax pyrrhocorax*), part of a small inland population that breed in dis-used lead mines arid quarries, over 10 pairs of peregrine (*Falco peregrinus*), which were initially included in the SPA citation (nearly 1% of the British population) and about 50 pairs of golden plover (*Pluvialis apricaria*) which are on the southern and western edge of their breeding range in Britain.
River Wye (Tributaries) / Afon Gwy (Isafonydd)	SSSI	50m SW	**Ornithological Designation**: Wintering Goosander (*Mergus merganser*) as detailed by Vanstone *et al* (2012) although not outlined as designation by NRW citation, mentioned a s a species of interest.

			Other detail: The tributaries of the River Wye support a range of breeding bird species including common sandpiper (*Actitis hypoleucos*), grey wagtail (*Motacilla cinerea*), dipper (*Cinclus cinclus*) and kingfisher (*Alcedo atthis*).
Glascwm and Gladestry Hills	SSSI	1.4 km E	**Ornithological Designation**: Upland assemblage of moorland & grassland with water bodies. Other Detail: The site has one of the largest red grouse (*Lagopus lagopus scotica*) populations in Wales and is actively managed for grouse. The site is also home to raptors including breeding merlin. The following species are also present: ring ouzel (*Turdus torquatus*), whinchat (*Saxicola rubetra*), redstart (*Phoenicurus phoenicurus*), raven (*Corvus corax*), curlew (*Numenius arquata*), teal (*Anas crecca*) and black-headed gulls (*Chroicocephalus ridibundus*).

It should be noted that all breeding bird species are protected under the WCA.

5.2 Field Surveys

The following section outlines the results of the full 24 months of ornithological survey data completed at the Site to date. VP survey visit details (i.e. dates, times and weather data) are presented in Annex A Table A4, with VP target species activity summarised in Annex A Table A5. The VP survey flightlines are presented in Figure 3 – 5 in the appendices of this report.

For purposes of brevity, the raw flight data have been excluded from this report but a copy can be made available upon request.

5.2.1 Scarce Raptors and Owls

Eight Schedule 1 species (five of which are also Annex 1 listed) were recorded during the ornithological surveys completed between September 2019 and August 2021; barn owl (*Tyto alba*), goshawk (*Accipiter gentilis*), hen harrier (*Circus cyaneus*), hobby (*Falco subbuteo*), merlin (*Falco columbarius*), osprey (*Pandion haliaetus*), peregrine (*Falco peregrinus*) and red kite.

5.2.1.1 Barn owl

Barn owl were not recorded from VP surveys but the breeding raptor surveys confirmed one barn owl breeding attempt 2km south of the site and one possible breeding attempt 200m southeast of the Site (Figure 6).

5.2.1.2 Goshawk

A total of 14 goshawk flights were recorded during the VP surveys (see Annex A: Table A5; Figure 3), with 13 of the 14 flights recorded from VP3 and three of the records from the same VP on 3rd September 2020, four on 9th November 2021, two on 10th June and 3 on 23rd July. The flight time recorded was 1,569 seconds, with 699 seconds recorded at PCH.

Two confirmed goshawk breeding attempts were recorded, one in woodland in the south fringes of the Site, the second almost 2km southwest of the Site. A further possible breeding attempt for goshawk was recorded 400m north of the site and (Figure 6).

5.2.1.3 Hen Harrier

Four flights were recorded for hen harrier all in the non-breeding season, consisting of single birds, two female and two male records, for a total of 453 seconds, all of which took place beneath or above PCH (Annex A: Table A5; Figure 3).

The breeding raptor surveys confirmed that there is no suitable nesting habitat for hen harrier located within the Study Area.

5.2.1.4 Hobby

Three flights was recorded for hobby one in July and two in August, each consisting of a single bird for a total of 170 seconds, 45 of which took place at PCH (Annex A: Table A5; Figure 3).

The breeding raptor survey did not identify any evidence of breeding behaviour for hobby within the Study Area.

5.2.1.5 Merlin

A single merlin flight was recorded from VP5 on 25th February 2021 and the only other record was on 9th June 2020 during breeding walkover surveys.

No evidence of breeding activity was recorded for merlin during the breeding raptor survey.

5.2.1.6 Osprey

A single osprey was recorded on 9th June 2020 during breeding walkover surveys.

No evidence of breeding activity was recorded for osprey during the breeding raptor survey.

5.2.1.7 Peregrine

Six flights totalling seven peregrine were recorded during VP surveys, four recorded within the breeding season and two in the non-breeding season. The total flight time recorded was 281 flight seconds, 70 seconds of which took place at PCH (Annex A: Table A5; Figure 5).

The breeding raptor surveys found two peregrine nest sites, one 1.9 km northwest of the site and a second pair over 2km southeast of the Site (Figure 6).

5.2.1.8 Red Kite

A total of 868 red kite flights comprising 1,222 birds was recorded during the full two years of VP survey between September 2019 and August 2021. The total flight time recorded for red kite throughout the 24 months of VP survey was 141,587 seconds. In total, 44,263 seconds of these flights took place at PCH (Annex A: Table A4; Figure 4). Flight activity was considerably higher in year 2 in particular during the 2021 breeding season, when 333 flights were recorded, as compared to 137 flights in the 2020 breeding season, detailed below in Table 4. There were a total of 251 flights from VP3, 197 from VP4, 170 from VP5, 139 flights from VP1 and 111 flights from VP2.

Table 4 – Red Kite flight activity by VP

Season	Flights	Total birds	Total flight time	Flight time at HB1	Flight time at HB2	Flight time at HB3	Flight time at HB4	Flight time at HB5	Flight time at PCH	Flight time HB7
NBS1	105	121	13,575	505	1,251	2,204	2,309	3,475	**3,425**	406
BS1	137	158	22,327	919	1,298	3,823	5,204	4,540	**6,520**	30
NBS2	293	474	50,035	6,335	7,038	9,000	6,197	5,350	**16,010**	90
BS2	333	469	55,650	9,285	6,056	6,813	6,600	5,438	**18,308**	3,150
Total	868	1,222	141,587	17,044	15,643	21,840	20,310	18,803	**44,263**	3,676

The breeding raptor survey identified evidence of five confirmed and three possible breeding attempts for red kite within the Study Area (see Figure 6). The five confirmed breeding attempts were in woodland, one on the southern edge of the Site boundary, one 300m southeast of the site and the other three over 1km from the Site boundary. The three possible breeding attempts were outside the Site, two between 200-300m west or north of the site. It should be noted the area of woodland holding the possible breeding attempt north of the Site has since been clear felled.

5.2.2 Secondary Target Raptors

5.2.2.1 Buzzard, Kestrel, Sparrowhawk and Raven

Buzzard (*Buteo buteo*), kestrel, sparrowhawk (*Accipiter nisus*) and raven (*Corvus corax*) were commonly recorded within the Site during VP surveys. The breeding raptor survey derived no breeding territories either on the Site boundary or within 500m for kestrel or sparrowhawk. Five confirmed breeding buzzard territories were recorded, all in woodland around the Site boundary.

5.2.3 Waders

No breeding waders were registered within the breeding bird survey area.

5.2.3.1 Curlew

A total of three flights comprising nine curlew were recorded during the VP surveys (Annex A: Table A5; Figure 5), one flight in March 2021 and two in April 2021.

5.2.3.2 Golden Plover

A total of 69 flights comprising 3,992 golden plover (*Pluvialis apricaria*) were recorded during the VP surveys (Annex A: Table A5; Figure 5), with 45 of the flights recorded in 2019-2020 non-breeding season and 20 in the 2020-2021 non-breeding season.

A total 37 of the flights (53% of registered golden plover flights) recorded across 16 days in the 2020 non-breeding season (October and November). The total flight time recorded was 8,472 seconds of which 4,774 seconds was recorded at PCH. The flights are centred over in the western half of the Site and all recorded during.

5.2.3.3 Grey plover

A grey plover (*Pluvialis squatarola*) was recorded from VP2 during the VP surveys on October 7th 2020 (Annex A: Table A5; Figure 5).

5.2.3.4 Lapwing

Two flights for lapwing were recorded throughout all the VP surveys: one flight of 15 birds on 28th December 2019 and a second of 18 birds on 28th February 2020. Flight time totalled 262 flight seconds for this species, all of which took place at PCH (Annex A: Table A5 ; Figure 5).

5.2.3.5 Ringed Plover

A ringed plover (*Charadrius hiaticula*) was recorded during VP surveys on 11th October 2019 (Annex A: Table A5 ; Figure 5).

5.2.3.6 Snipe

Two Snipe (*Gallinago gallinago*) were recorded during VP surveys on 5th October 2020. A snipe was recorded during the third breeding bird survey on 20th July 2020 but no evidence of breeding activity was recorded.

5.2.3.7 Whimbrel

A whimbrel (*Numenius phaeopus*) was heard from VP4 during VP surveys on 12th August 2020.

5.2.4 Other Species

5.2.4.1 Gulls

Black-headed gull (*Chroicocephalus ridibundus*), herring gull (*Larus argentatus*) and lesser black-backed gull (*Larus fuscus*) were recorded occasionally and in small numbers (maximum count of seven) during VP surveys. A total of 41 flights were recorded across the whole of the VP survey period and consisted of a total of 80 birds were registered.

No breeding colonies were noted within the Site or wider area (i.e. 2km beyond the Site boundary).

5.2.4.2 Other Species

A total of 45 other species assessed as confirmed breeding during the 2020 and 2021 breeding bird survey, which included 14 red-listed species as holding territories, as holding territories; these were: cuckoo (*Cuculus canorus*), grey wagtail (*Motacilla cinerea*), house sparrow (*Passer domesticus*), lesser redpoll (*Acanthis cabaret*), linnet (*Linaria cannabina*), mistle thrush (*Turdus viscivorus*), pied flycatcher (*Ficedula hypoleuca*), skylark (*Alauda arvensis*), song thrush (*Turdus philomelos*), spotted flycatcher (*Muscicapa striata*), tree pipit (*Anthus trivialis*), whinchat (*Saxicola rubetra*), wood warbler (*Phylloscopus sibilatrix*) and yellowhammer (*Emberiza citrinella*). The most commonly recorded red-listed species were skylark (185 peak count), song thrush (21) and tree pipit (17) all during 2021 breeding season surveys.

In addition, a further seven amber-listed species were confirmed as breeding: bullfinch (*Pyrrhula pyrrhula*), dunnock (*Prunella modularis*), meadow pipit (*Anthus pratensis*), redstart (*Phoenicurus phoenicurus*), reed bunting (*Emberiza schoeniclus*), stock dove (*Columba oenas*) and willow warbler (*Phylloscopus trochilus*). The most commonly recorded amber-listed species were meadow pipit (135 peak count), willow warbler (80), redstart (83) and dunnock (16), all during 2021 breeding season surveys.

An additional eight species were recorded during the breeding bird survey visits and are considered to be either probably, possibly or non-breeding bird territories and included three Schedule 1 species, crossbill (*Loxia curvirostra*), fieldfare (*Turdus pilaris*) and kingfisher (*Alcedo atthis*) which also an Annex 1 listed species.

6. Discussion

The following section discusses the key issues resulting from the survey findings during the non-breeding season and outlines any potential constraints to the Proposed Development that may be derived from the results. It should be noted that as the turbine locations and specifications have not yet been finalised collision risk modelling (CRM) has not been completed at this stage. Reference is made as to whether CRM is expected to be a requirement on a species-by-species basis.

6.1 Scarce Raptors and Owls

6.1.1 Barn owl

Barn owl is listed as a Schedule 1 species and is protected accordingly. A single barn owl confirmed breeding attempt was recorded 2km south-east of the Site. A second possible barn owl breeding location was identified 200m south of the Site boundary (See Figure 6). With a low density of breeding locations for this species it is considered unlikely that the development of the Site will lead to any disturbance barn owl at their breeding grounds and as such, it is considered that barn owl does not present a potential constraint to the Proposed Development.

6.1.2 Goshawk

Goshawk is listed as a Schedule 1 species and is referenced in the Powys LBAP, albeit without a dedicated species action plan, and is legally protected accordingly. Goshawk is also listed as a species considered to be “at risk from wind farms”, as per NatureScot guidance (SNH, 2006).

Goshawk was infrequently recorded in VP surveys with a total of 14 flights recorded across the 24 months. A single confirmed breeding attempt was recorded on the south centre of the Site in 2021 and the majority of the flight activity is close to this location in and in 2021. A possible territory was also identified c.1.8km south of the southern-most part of the Site boundary in the 2021survey season (See Confidential Figure 6).

As a schedule 1 breeding species, the breeding locations of goshawk are protected, meaning disturbance of birds at the nest during the breeding season (April to August) is an offence. The recommended no-disturbance distance for goshawk is 300-500m (Ruddock & Whitfield, 2007) and this is shown on Confidential Figure 6 as a buffer surrounding the active and possible nest locations.

With 699 flight seconds recorded at PCH, out of a total of 1,569 flights seconds, once a turbine layout has been finalised and turbine specifications are known, collision risk analysis may be required for this species.

6.1.3 Hen Harrier

Hen harrier is listed as Schedule 1 and Annex 1 and WPL priority species and is legally protected accordingly. Hen harrier is also listed as a species considered to be "at risk from wind farms", as per NatureScot guidance (SNH, 2006).

Only four flights, all in the non-breeding season, were registered for this species throughout the 24 months of VP survey, and no suitable nesting habitat was found during the breeding raptor surveys.

With such low levels of flight activity at collision risk height, the potential for collision risk for this species is considered to be negligible. In addition to this the lack of records during the breeding season mean it is considered unlikely that the development of the Site will lead to any disturbance to hen harrier at their breeding grounds and as such, it is considered that hen harrier does not present a potential constraint to the Proposed Development.

6.1.4 Hobby

Hobby is listed as a Schedule 1 species and is legally protected accordingly. It is also referenced in the Powys LBAP, albeit not with a dedicated species action plan. Only three flights were registered for this species throughout the 24 months of VP survey, and no evidence of breeding was found during the breeding raptor surveys.

With such low levels of flight activity at collision risk height, the potential for collision risk for this species is considered to be negligible. In addition, the lack of breeding activity during the breeding season indicates that it is unlikely that the development of the Site will lead to any disturbance to hobby at their breeding grounds. As such, it is considered that hobby does not present a potential constraint to the Proposed Development.

6.1.5 Merlin

Merlin is listed as a Schedule 1 and Annex 1 and WPL priority species and is legally protected accordingly. Merlin is also listed as a species considered to be "at risk from wind farms", as per NatureScot guidance (SNH, 2006). Only a single flight, in the non-breeding season, was registered for this species throughout the 24 months of VP survey and no suitable nesting habitat was found during the breeding raptor survey.

With no flight activity at collision height and no evidence of any breeding activity with the Site and 2km survey buffer, it is not expected that development of the Site will have any significant impact on the local merlin population and as such, it is considered that merlin does not present a potential constraint to the Proposed Development.

6.1.6 Osprey

Osprey are listed as a Schedule 1 and Annex 1 species as well as referenced in the Powys LBAP (but are not subject to a dedicated species action plan) and is legally protected accordingly. The walkover surveys registered a single record for osprey although no evidence of breeding was noted for this species. It is not expected that development of the Site will have any significant impact on the local osprey population and, as such, it is considered that osprey does not present a potential constraint to the Proposed Development.

6.1.7 Peregrine

Peregrine is listed as a Schedule 1 and Annex 1 listed species and is legally protected accordingly. It is also referenced in the Powys LBAP, albeit not with a dedicated species action plan. Peregrine is also listed as a species considered to be "at risk from wind farms", as per NatureScot guidance (SNH, 2006).

A total of six flights totalling seven birds were recorded from VP surveys and two confirmed nest sites both over 1.5km outside the Site boundary were recorded for peregrine. As a schedule 1 breeding species, the breeding locations of peregrine are protected, meaning disturbance of birds at the nest during the breeding season (April to August) is an offence. The recommended no-disturbance distance for peregrine is 500-750m (Ruddock & Whitfield, 2007). Although it is unlikely that development of the Site will impact on these breeding locations the no-disturbance standoff distances are shown on Figure 6 as a buffer surrounding each eerie location.

With low levels of flight activity at collision height (70 seconds) and no evidence of any breeding activity with the Site and immediate surrounds, it is not expected that development of the Site will have any significant impact on the local peregrine population. As such, it is considered that peregrine does not present a potential constraint to the Proposed Development.

6.1.8 Red Kite

Red kite is listed both as a Schedule 1 and Annex 1 species and is legally protected accordingly. Red kite is also listed as a species considered to be "at risk from wind farms", as per NatureScot guidance (SNH, 2006). Red kite is a priority species in the Powys LBAP and the subject of a dedicated species action plan. It is important to note that the red kite population in Wales has experienced extremely successful population expansion following an effective reintroduction and supplementary feeding programmes initiated in the early 1990s.

Flight activity for this species increased considerably in the second year of survey as compared to the first year, with activity at its peak during 2021 breeding season, with the majority of activity being centred around lowland slopes along the southern edge of the Site and along the northwest site boundary. Given a total of 868 flights (totalling 1,222 birds) over the two years of VP survey equating to a total of 44,263 flights seconds at PCH was recorded out of a total of 141,587 seconds. This was recorded as 9,945 flight seconds at PCH in the 2020 survey year and 34,318 flights seconds at PCH in 2021.

Given the large amount of flight activity recorded across the Site, in particular with the second year, once a turbine layout has been finalised, collision risk analysis will therefore be required for this species.

The breeding raptor surveys conducted in 2020 and 2021 identified a total of five breeding attempts for red kite within the survey area: one on the southern site boundary and four within the 2km survey buffer. As a schedule 1 breeding species, the breeding locations of red kite are protected, meaning disturbance of birds at the nest during the breeding season (April to August) is an offence. The recommended no-disturbance distance for red kite is 300-500m (Ruddock & Whitfield, 2007) and this is shown on Figure 6 as a buffer surrounding the nest location.

In the event that the Site is progressed further and taken forwards to the planning stage, additional species-specific mitigation will be required for red kite in order to avoid potential impacts and significant effects to the Welsh population of this species. This will likely involve the adoption of alternative farming practices (such as the removal of carcasses and/or lambing afterbirth from the hillside and diversionary feeding away from the Site/turbine array) in the years prior to construction and throughout the operational period of the Proposed Development. Discussions are proposed with NRW in order to determine their interpretation specifically of red kite given their population expansion and Schedule 1 protected status.

In addition it may be required by NRW to consider the long term impacts of collision on red kite by completing a Population Viability Assessment (PVA) which is a theoretical model which is used to predict the population of a species including any potential losses due to the proposed wind farm development.

6.2 Secondary Target Raptors and Owls

Buzzard, kestrel and sparrowhawk are all referenced in the Powys LBAP but are not subject to a dedicated species action plan. Additionally, kestrel are BoCC Amber listed species and is also listed on the WPL.

Despite the protections offered these more common species of raptor, a wind farm development at this location may have some limited potential for impacts at the local population level although it is not anticipated that such impacts would be significant in the medium to longer term.

6.3 Waders

The breeding bird survey determined that there are no breeding territories for any species of wader within the Study Area.

6.3.1 Curlew

Curlew is a BoCC red list and WPL list species and is subject to a dedicated species action plan under the Powys LBAP. Numbers of this species are rapidly declining across Wales as well as the UK as a whole. As such, curlew is considered to be a species of conservation concern.

Only three flights registered for this species throughout the 24 months of VP survey and no breeding activity recorded during the breeding bird surveys. With no breeding activity and low levels of flight activity it is considered unlikely the Proposed Development will have any significant impact on this species.

6.3.2 Golden plover

Golden plover is an Annex 1 species and WPL priority listed species and are protected accordingly. There is no SPA designated for golden plover located within 10km of the Site. Golden plover is also listed as a species considered to be “at risk from wind farms”, as per NatureScot guidance (SNH, 2006).

Groups of up to 300 birds have been recorded frequently on the Site during the non-breeding season VP surveys as well as during the winter walkover surveys. With 3,992 seconds of a total of 8,472 flights seconds recorded at PCH, once a turbine layout and specifications have been confirmed collision risk analysis will be required for this species.

6.3.3 Lapwing

Lapwing is a BoCC red list and WPL list species and referred to in the Powys LBAP. Numbers of this species are rapidly declining across Wales and the UK, hence being BoCC red-listed. As such it is considered to be a species of conservation concern.

Only two flights were registered for this species throughout the 24 months of VP survey and no breeding activity recorded during the breeding bird surveys. With no breeding activity and low levels of flight activity it is considered unlikely the Proposed Development will have any significant impact on this species.

6.3.4 Grey Plover, Ringed Plover and Snipe

Ringed plover is a BoCC Red list species and snipe and grey plover are BoCC Amber List species and are referred to in the Powys LBAP, although not subject to a dedicated species action plan. Single registrations were noted for these wader species. With such low levels of activity recorded within the Study Area, it is deemed unlikely the Proposed Development will have any significant impact on these species.

6.4 Other Species

6.4.1 Nightjar and Black Grouse

With no registrations made for either black grouse or nightjar, it is considered unlikely the Proposed Development will have any significant impact on these species.

6.4.2 Gulls

The three gull species recorded during surveys are BoCC red (herring gull) and amber listed (lesser black-backed gull and black-headed gull) species. Lesser black-backed gull and herring gull are also included on the Powys LBAP, while black-headed gull and herring gull are both also listed on the WPL.

Gulls were recorded in small numbers throughout VP surveys with occasional larger flocks recorded flying across the Site and no records of breeding for these species were recorded. It is deemed unlikely the Proposed Development will have any significant impact on these species.

6.4.3 Other Species

A total of 21 other lowland and farmland bird species of conservation concern common were assessed as confirmed breeding during the breeding bird survey. A further 24 species were registered during the breeding bird survey were observed across subsequent survey visits.

Although some of these species are also listed on the WPL and the Powys LBAP (although none with a dedicated species action plan), it is considered unlikely that development of the Site will cause significant impacts on the populations of these more common species of bird.

Records of waterfowl were limited to the presence of mallard and mute swan either from VP or breeding surveys.

7. Summary

Surveys were conducted from October 2019 through till August 2021 across the Proposed Development Site for the proposed Aberedw Wind Farm in order to assess the ornithological baseline conditions and to inform a subsequent EcIA as part of a future planning application.

Although the Covid-19 lockdown during the summer of 2020 restricted the surveys conducted in late March and April, the suite of surveys were completed taking into account of the specific conditions and updated risk assessments as best as practicably possible. Although the breeding season in 2020 was truncated, a full breeding season of surveys was completed in 2021, with all surveys completed within the recommended survey windows.

Eight Schedule 1 species, barn owl, goshawk, osprey, peregrine, red kite, hen harrier, merlin and hobby, were recorded during the ornithological surveys. The breeding raptor survey confirmed breeding for goshawk, and red kite on the Site boundary. Further breeding territories, and possible territories, were confirmed for peregrine, red kite and goshawk within the wider 2km survey buffer. Hen harrier, hobby, osprey and merlin were observed on very few occasions and are not breeding within the Site and 2km survey buffer. Nightjar and black grouse were not recorded during any surveys.

Red kite were regularly recorded in the 2020 VP survey year and registered flight activity almost tripled in the 2021 VP survey year. The potential for collision risk of red kite will need to be discussed with NRW including potential approaches for mitigation to reduce impacts and undertaking population modelling to consider the potential impacts of collision risk.

Only a single species of wader, golden plover, was recorded on more than three occasions during the VP surveys, with curlew, grey plover, lapwing, ringed plover, snipe each recorded rarely. No species of wader was assessed as holding breeding territories within the Study Area.

Gull flight activity was generally low throughout the year of VP surveys and the records of waterfowl were limited to the presence of mallard and mute swan either from VP or breeding surveys.

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Figures

N

KEY

- Site Boundary
- 500m buffer
- vp1
- vp2
- vp3
- vp4
- vp5
- viewshed vp1
- viewshed vp2
- viewshed vp3
- viewshed vp4
- viewshed vp5

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

Aberedw Windfarm
Year 2 Avian Report

Figure 1

VP Locations and Viewsheds

Date:	Drawn by:	Checked by:	Version:
02/11/2021	AT	RK	V1

Project Number 2730

N

Elenydd-Malleen (Marcheini Uplands) SPA

Glascwm and Gladestry Hillst

River Wye and Tributariest

MYNYDD EPPYNT

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

KEY

- Site Boundary
- 10km buffer
- 20km buffer
- Special Protection Area (SPA)
- Site of Special Scientic Interest (SSSI)

0 4 8 km

Scale 1:170,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 2

Ornithological Designations

Date:	Drawn by:	Checked by:	Version:
02/11/2021	AT	RK	V1

Project Number: 2730

N

KEY

Site Boundary

Flightlines

- Goshawk
- Hen Harrier
- Hobby
- Merlin
- Peregrine

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 3

Raptor (excl. red kite) Flightlines

Date:	Drawn by:	Checked by:	Version:
02/11/2021	AT	RK	V1

Project Number: 2730

N

KEY

Site Boundary

Flightlines

Red Kite

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 4a - Red Kite Flightlines

Non-breeding Season Year 1

Date:	Drawn by:	Checked by:	Version:
16/12/2021	AT	RK	V1

Project Number: 2730

N

KEY

Site Boundary

Flightlines

Red Kite

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 4 - Red kite Flightlines

Breeding Season Year 1

Date:	Drawn by:	Checked by:	Version:
16/12/2021	AT	RK	V1

Project Number 2730

N

KEY

Site Boundary

Flightlines

Red Kite

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 4 - Red Kite Flightlines

Non-breeding Season Year 2

Date:	Drawn by:	Checked by:	Version:
16/12/2021	AT	RK	V1

Project Number: 2730

N

KEY

Site Boundary

Flightlines

Red Kite

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 4 - Red Kite Flightlines

Breeding Season Year 2

Date:	Drawn by:	Checked by:	Version:
16/12/2021	AT	RK	V1

Project Number: 2730

N

KEY

Site Boundary

Flightlines

- Curlew
- Golden Plover
- Grey Plover
- Lapwing
- Ringed Plover
- Snipe

0 0.5 1 km

Scale 1:20,000 @ A3

ITPENERGISED

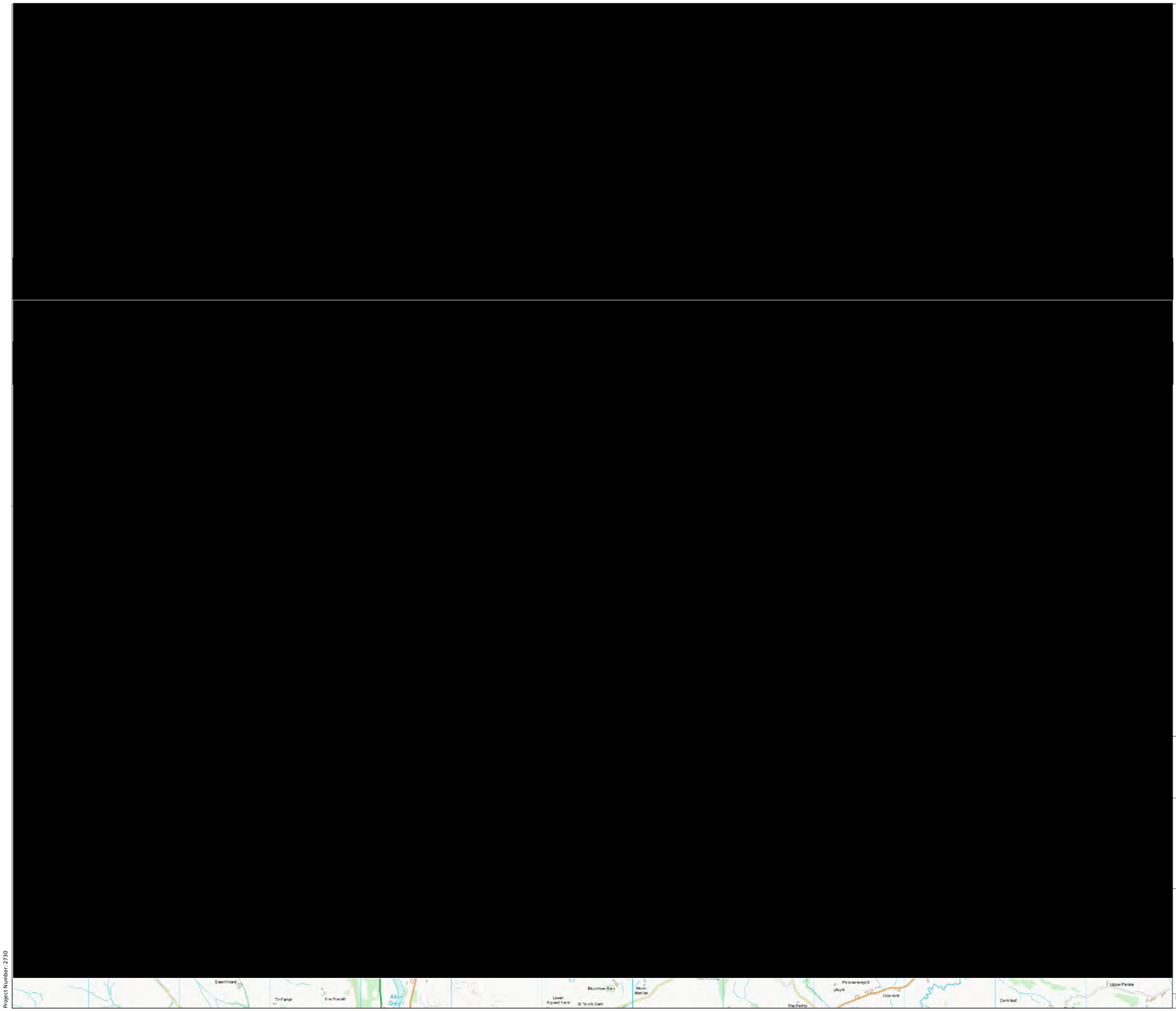
Aberedw Proposed Windfarm
Year 2 Avian Report

Figure 5

Wader Flightlines

Date:	Drawn by:	Checked by:	Version:
02/11/2021	AT	RK	V1

Project Number: 2730



KEY

- Site boundary
- Aberedw 2km buffer

Species - Status

- Barn owl - nest
- Barn owl - possible
- Buzzard - nest
- Goshawk - nest
- Goshawk - possible
- Red Kite Nest
- Red kite possible
- Peregrine - nest
- Raven
- Nest 300m buffer
- Nest 500m buffer
- Nest 750m buffer

0 1 2 km

Scale 1:40,000 @ A3

ITPENERGISED

Aberedw Proposed Windfarm

Figure 6

Raptor Breeding Data 2020 - 2021

Date:	Drawn by:	Checked by:	Version:
16/12/2021	AG	AT	V1

Project Number: 2730

Annex A – Survey Data Tables

Table A4 – VP Survey Visit Data

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
22-Oct-19	2	11:00	14:00	3	NW	1	7	0	0	0
22-Oct-19	2	07:30	10:30	3	NW	1	6	0	0	0
15-Oct-19	3	14:30	17:30	3	S	2	7	1	0	0
15-Oct-19	3	11:00	14:00	3	S	1	8	1	0	0
24-Oct-19	5	09:00	12:00	3	SW	2	7	0	0	0
11-Oct-19	5	14:00	17:00	3	W	3	8	1	0	0
11-Oct-19	5	10:30	13:30	3	SW	3	8	1	0	0
08-Nov-19	2	09:45	12:45	3	NE	2	3	0	0	0
08-Nov-19	2	13:15	16:15	3	N	1	1	0	0	0
06-Nov-19	3	09:30	12:30	3	SW	1	8	1	0	0
07-Nov-19	4	13:45	16:45	3	SW	2	6	0	0	0
07-Nov-19	4	10:00	13:00	3	SW	1	6	0	0	0
06-Nov-19	3	13:00	16:00	3	SW	1	7	0	0	0
05-Nov-19	5	14:15	17:15	3	NW	2	8	0	0	0
12-Oct-19	4	10:30	13:30	3	SW	2	8	0	0	0
12-Oct-19	4	14:30	17:30	3	SW	2	8	0	0	0
10-Nov-19	1	08:45	11:45	3	NE	3	2	0	0	0
10-Nov-19	1	12:45	15:45	3	NE	3	4	0	0	0
23-Oct-19	1	07:15	10:15	3	SE	1	8	0	0	0
23-Oct-19	1	10:45	13:45	3	SSE	1	4	0	0	0
22-Nov-19	3	07:30	10:30	3	SE	2	8	1	0	0
22-Nov-19	3	11:00	14:00	3	E	2	8	1	0	0
27-Nov-19	4	13:45	16:45	3	NW	2	8	0	0	0
27-Nov-19	4	10:00	13:00	3	N	2	8	1	0	0
28-Nov-19	5	08:15	11:15	3	NE	2	3	0	0	0
28-Nov-19	5	11:45	14:45	3	NE	2	1	0	0	0
29-Nov-19	1	09:45	12:45	3	E	1	0	0	0	0
29-Nov-19	1	13:15	16:15	3	E	0	1	0	0	0
30-Nov-19	2	07:35	10:35	3	NE	1	3	0	0	0
30-Nov-19	2	11:00	14:00	3	NE	1	3	0	0	0
17-Dec-19	5	09:45	12:45	3	SW	1	2	0	0	1
17-Dec-19	5	13:15	16:15	3	SW	1	1	0	0	0
18-Dec-19	3	08:00	11:00	3	S	2	8	0	0	1
18-Dec-19	3	11:30	14:30	3	S	4	8	0	0	0

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
19-Dec-19	2	09:00	12:00	3	W	4	8	2	0	0
19-Dec-19	2	12:30	15:30	3	W	3	8	1	0	0
27-Dec-19	4	08:05	11:05	3	W	2	8	1	0	0
27-Dec-19	4	11:40	14:40	3	SW	3	7	0	0	0
28-Dec-19	1	08:30	11:30	3	W	2	7	0	0	0
28-Dec-19	1	12:00	15:00	3	SW	2	8	1	0	0
21-Jan-20	5	14:00	17:00	3	NW	2	8	0	0	0
21-Jan-20	5	10:30	13:30	3	NW	1	2	0	0	1
22-Jan-20	4	10:15	13:15	3	NE	2	8	0	0	0
22-Jan-20	4	13:45	16:45	3	NE	1	8	0	0	0
23-Jan-20	1	08:00	11:00	3	NW	1	8	0	0	0
23-Jan-20	1	11:30	14:30	3	NW	1	8	0	0	0
24-Jan-20	2	10:00	13:00	3	NE	1	8	1	0	0
24-Jan-20	2	13:30	16:30	3	NE	1	8	1	0	0
27-Jan-20	3	13:30	16:30	3	W	3	8	0	0	0
27-Jan-20	3	10:00	13:00	3	W	3	8	0	0	0
26-Feb-20	1	10:35	13:35	3	WNW	3	7	1	1	0
26-Feb-20	1	14:05	17:05	3	WNW	3	7	1	1	0
24-Feb-20	2	11:30	14:30	3	W	2	8	0	0	0
24-Feb-20	2	15:10	18:10	3	W	3	8	1	0	0
27-Feb-20	3	10:10	13:10	3	NW	3	4	0	1	0
27-Feb-20	3	13:40	16:40	3	WNW	3	4	0	0	0
25-Feb-20	4	11:45	14:45	3	W	2	8	0	0	0
25-Feb-20	4	15:15	18:15	3	WSW	3	8	2	0	0
28-Feb-20	5	06:30	09:30	3	W	2	8	4	0	0
28-Feb-20	5	10:00	13:00	3	SW	2	8	3	0	0
20-Mar-20	1	05:45	08:45	3	NE	2	8	0	0	0
20-Mar-20	3	16:00	19:00	3	ENE	2	3	0	0	0
21-Mar-20	2	05:50	08:50	3	NE	1	1	0	0	0
21-Mar-20	2	09:30	12:30	3	ENE	2	0	0	0	0
22-Mar-20	3	11:00	14:00	3	E	2	3	0	0	0
22-Mar-20	1	14:30	17:30	3	E	2	3	0	0	0
20-Mar-20	4	10:15	13:15	3	ENE	3	7	0	0	0
20-Mar-20	4	13:45	16:45	3	ENE	3	7	0	0	0
10-Mar-20	5	08:15	11:15	3	SW	3	6	0	0	0
10-Mar-20	5	11:45	14:45	3	SW	2	6	0	0	0
28-May-20	5	12:00	15:00	3	SE	2	1	0	0	0

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
28-May-20	5	15:30	18:30	3	E	2	1	0	0	0
28-May-20	4	19:00	22:00	3	SE	1	2	0	0	0
30-May-20	4	09:30	12:30	3	NE	2	2	0	0	0
30-May-20	2	13:15	16:15	3	ENE	2	1	0	0	0
30-May-20	2	16:45	19:45	3	ENE	1	0	0	0	0
28-May-20	1	18:50	21:50	3	SE	1	2	0	0	0
28-May-20	1	15:00	18:00	3	ESE	2	4	0	0	0
31-May-20	3	04:30	07:30	3	ENE	2	0	0	0	0
31-May-20	3	08:00	11:00	3	ENE	2	0	0	0	0
14-Jun-20	3	19:00	22:00	3	WNW	2	5	0	0	0
14-Jun-20	3	15:30	18:30	3	SSW	2	7	0	0	0
15-Jun-20	1	08:00	11:00	3	NW	2	5	0	0	0
15-Jun-20	1	04:20	07:20	3	W	2	5	0	0	0
15-Jun-20	2	12:00	15:00	3	SW	2	5	0	0	0
15-Jun-20	2	15:30	18:30	3	SW	1	3	0	0	0
15-Jun-20	5	19:10	22:10	3	NW	1	5	1	0	0
23-Jun-20	5	14:00	17:00	3	SSW	2	1	0	0	0
23-Jun-20	4	17:30	20:30	3	SW	2	1	0	0	0
25-Jun-20	4	15:00	18:00	3	NW	1	3	0	0	0
22-Jul-20	1	16:00	19:00	3	NW	3	7	0	0	0
21-Jul-20	1	14:50	17:50	3	NW	2	5	0	0	0
23-Jul-20	2	11:30	14:30	3	W	3	8	1	0	0
24-Jul-20	2	15:00	18:00	3	W	3	8	1	0	0
22-Jul-20	3	12:30	15:30	3	SW	3	5	1	0	0
22-Jul-20	3	09:00	12:00	3	W	3	5	0	0	0
27-Jul-20	4	05:15	08:15	3	SW	2	3	0	0	0
27-Jul-20	4	08:45	11:45	3	SW	2	3	0	0	0
15-Jul-20	5	14:30	17:30	3	NW	3	8	0	0	0
15-Jul-20	5	18:00	21:00	3	NW	2	7	0	0	0
13-Aug-20	1	16:45	19:45	3	E	1	8	0	0	0
20-Aug-20	1	08:10	11:10	3	S	2	5	0	0	0
27-Aug-20	1	08:15	11:15	3	SE	2	8	1	0	0
27-Aug-20	1	12:00	15:00	3	SE	2	8	2	0	0
06-Aug-20	2	05:30	08:30	3	S	2	8	2	0	0
06-Aug-20	2	09:00	12:00	3	S	2	8	2	0	0
20-Aug-20	2	13:15	16:15	3	SSW	2	5	0	0	0
27-Aug-20	2	17:25	20:25	3	SE	1	8	1	0	0

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
06-Aug-20	3	13:15	16:15	3	S	2	8	1	0	0
12-Aug-20	3	18:00	21:00	3	SE	1	4	0	0	0
13-Aug-20	3	13:00	16:00	3	E	2	8	0	0	0
13-Aug-20	3	09:30	12:30	3	E	1	7	0	0	0
12-Aug-20	4	05:30	08:30	3	E	1	4	0	0	0
12-Aug-20	4	09:00	12:00	3	SE	2	4	0	0	0
18-Aug-20	4	05:45	08:45	3	WSW	2	8	1	0	0
26-Aug-20	4	11:30	14:30	3	W	2	7	1	0	0
07-Aug-20	5	07:00	10:00	3	SW	2	4	0	0	0
07-Aug-20	5	11:00	14:00	3	S	2	4	0	0	0
14-Aug-20	5	08:35	11:35	3	SE	1	8	0	0	0
14-Aug-20	5	12:10	15:10	3	SE	1	8	0	0	0
01-Sep-20	1	13:30	16:30	3	SW	2	7	0	0	0
01-Sep-20	1	17:00	20:00	3	SW	2	0	0	0	0
02-Sep-20	2	13:35	16:35	3	S	5	0	0	0	0
02-Sep-20	2	17:05	20:05	3	SSW	3	0	0	0	0
03-Sep-20	3	13:35	16:35	3	W	4	0	0	0	0
03-Sep-20	3	17:05	20:05	3	WSW	4	0	0	0	0
04-Sep-20	4	13:30	16:30	3	WSW	4	8	0	0	0
04-Sep-20	4	17:00	20:00	3	WSW	3	7	0	0	0
07-Sep-20	5	13:20	16:20	3	WSW	4	8	1	0	0
07-Sep-20	5	16:50	19:50	3	WSW	4	8	2	0	0
05-Oct-20	1	07:25	10:25	3	WSW	4	8	1	0	0
05-Oct-20	1	10:55	13:55	3	W	4	8	4	0	0
07-Oct-20	2	07:25	10:25	3	W	3	7	0	0	0
07-Oct-20	2	10:55	13:55	3	W	3	6	0	0	0
13-Oct-20	3	07:25	10:25	3	WNW	2	7	3	0	0
13-Oct-20	3	10:55	13:55	3	NNW	3	4	0	0	0
26-Oct-20	4	06:50	09:50	3	WNW	4	7	4	0	0
26-Oct-20	4	10:20	13:20	3	W	5	6	1	0	0
27-Oct-20	5	06:50	09:50	3	SSE	4	8	3	0	0
27-Oct-20	5	10:20	13:20	3	SW	5	8	4	0	0
02-Nov-20	1	10:25	13:25	3	WSW	7	5	4	0	0
02-Nov-20	1	13:55	16:55	3	WSW	6	6	1	0	0
04-Nov-20	2	10:15	13:15	3	WSW	2	1	0	0	0
04-Nov-20	2	13:45	16:45	3	NW	2	7	1	0	1
04-Nov-20	3	10:10	13:10	3	SSE	3	8	0	0	0

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
04-Nov-20	3	13:40	16:40	3	SE	3	8	4	0	0
04-Nov-20	4	10:00	13:00	3	S	4	8	1	0	0
04-Nov-20	4	13:30	16:30	3	S	5	8	1	0	0
04-Nov-20	5	09:50	12:50	3	WSW	4	8	1	0	0
04-Nov-20	5	13:20	16:20	3	SW	4	8	5	0	0
21-Dec-20	1	08:15	11:15	3	SW	3	8	2	0	0
21-Dec-20	1	11:45	14:45	3	WSW	5	8	3	0	0
07-Dec-20	2	08:00	11:00	3	NE	1	8	1	0	0
07-Dec-20	2	11:30	14:30	3	NNE	2	8	3	0	0
09-Dec-20	3	08:05	11:05	3	W	3	8	0	0	0
09-Dec-20	3	11:35	14:35	3	SSW	2	8	0	0	0
15-Dec-20	4	08:05	11:05	3	SSW	2	7	3	0	0
15-Dec-20	4	11:35	14:35	3	SSW	3	7	1	0	0
17-Dec-20	5	08:00	11:00	3	SW	4	4	0	0	0
17-Dec-20	5	11:30	14:30	3	SSW	5	8	3	0	0
11-Jan-21	1	10:00	13:00	3	WSW	5	8	0	0	0
11-Jan-21	1	13:30	16:30	3	WSW	5	8	4	0	0
12-Jan-21	2	10:00	13:00	3	NW	2	8	2	0	0
12-Jan-21	2	13:30	16:30	3	NNE	1	8	0	0	0
14-Jan-21	3	10:00	13:00	3	WNW	4	8	0	0	0
14-Jan-21	3	13:30	16:30	3	WNW	5	7	1	0	0
21-Jan-21	4	10:15	13:15	3	WSW	4	2	0	1	0
21-Jan-21	4	13:45	16:45	3	WSW	4	7	1	0	0
28-Jan-21	5	10:25	13:25	3	WSW	4	7	0	0	0
28-Jan-21	5	13:55	16:55	3	W	4	8	3	0	0
01-Feb-21	1	07:55	10:55	3	NE	1	8	0	1	2
01-Feb-21	1	11:25	14:25	3	SE	2	8	0	1	2
03-Feb-21	2	07:50	10:50	3	SW	2	5	0	0	0
03-Feb-21	2	11:20	14:20	3	W	4	5	0	0	0
22-Feb-21	3	07:15	10:15	3	W	3	7	3	0	0
22-Feb-21	3	10:45	13:45	3	WSW	2	3	0	0	0
23-Feb-21	4	07:05	10:05	3	S	5	7	1	0	0
23-Feb-21	4	10:35	13:35	3	SSW	5	8	0	0	0
25-Feb-21	5	07:10	10:10	3	W	2	2	0	0	0
25-Feb-21	5	10:40	13:40	3	W	3	3	0	0	0
17-Mar-21	1	11:55	14:55	3	NNW	3	7	0	0	0
17-Mar-21	1	15:25	18:25	3	N	3	2	0	0	0

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
22-Mar-21	2	12:00	15:00	3	W	3	8	0	0	1
22-Mar-21	2	15:30	18:30	3	W	3	3	0	0	1
24-Mar-21	3	12:05	15:05	3	W	4	7	0	0	0
24-Mar-21	3	15:35	18:35	3	WSW	4	6	0	0	0
30-Mar-21	4	13:15	16:15	3	S	3	4	0	0	0
30-Mar-21	4	16:45	19:45	3	SE	2	7	0	0	0
31-Mar-21	5	13:15	16:15	3	SSW	2	7	1	0	0
31-Mar-21	5	16:45	19:45	3	ESE	2	4	0	0	0
15-Apr-21	1	06:05	09:05	3	NE	2	1	0	0	1
13-Apr-21	1	13:30	16:30	3	SW	2	6	0	0	0
14-Apr-21	2	06:20	09:20	3	NE	0	0	1	0	1
11-Apr-21	2	13:00	16:00	3	NNW	3	5	0	1	0
13-Apr-21	3	09:30	12:30	3	SSE	1	6	0	0	0
16-Apr-21	3	17:12	20:12	3	ENE	1	4	0	0	0
18-Apr-21	4	06:00	09:00	3	W	1	4	0	0	1
10-Apr-21	4	14:00	17:00	3	NE	3	6	0	2	0
14-Apr-21	5	09:50	12:50	3	NE	2	5	0	0	0
12-Apr-21	5	17:06	20:06	3	NW	1	4	0	0	0
14-May-21	1	08:30	11:30	3	SE	1	7	0	0	0
12-May-21	1	17:56	20:56	3	W	1	6	0	0	0
16-May-21	2	11:30	14:30	3	SE	1	7	0	0	0
17-May-21	2	18:04	21:04	3	W	3	4	0	0	0
14-May-21	3	04:50	07:50	3	NE	1	8	0	0	0
12-May-21	3	14:30	17:30	3	SSW	3	6	0	0	0
17-May-21	4	08:32	11:32	3	NW	3	4	0	0	0
11-May-21	4	17:55	20:55	3	SE	1	8	0	0	0
17-May-21	5	05:17	08:17	3	NW	2	4	0	0	0
11-May-21	5	14:30	17:30	3	S	3	5	0	0	0
04-Jun-21	1	18:27	21:27	3	W	3	6	0	0	0
04-Jun-21	1	15:00	18:00	3	SW	1	5	0	0	0
08-Jun-21	2	04:40	07:40	3	SW	1	6	0	0	0
08-Jun-21	2	08:10	11:10	3	SW	2	5	0	0	0
04-Jun-21	3	11:30	14:30	3	SW	2	5	0	0	0
10-Jun-21	3	14:30	17:30	3	SW	4	8	0	0	0
06-Jun-21	4	11:30	14:30	3	SE	1	7	1	0	0
06-Jun-21	4	18:29	21:29	3	NE	1	6	0	0	0
08-Jun-21	5	11:40	14:40	3	SW	2	4	0	0	0

Date	Vantage Point	Start time	Stop Time	Time (Hrs)	Wind Direction	Wind speed	Cloud cover	Rain	Snow	Frost
05-Jun-21	5	15:00	18:00	3	NE	2	6	0	0	0
23-Jul-21	1	11:00	14:00	3	E	4	6	0	0	0
23-Jul-21	1	14:20	17:20	3	E	4	6	0	0	0
18-Jul-21	2	11:15	14:15	3	SW	2	3	0	0	0
18-Jul-21	2	14:30	17:30	3	SW	2	5	0	0	0
24-Jul-21	3	07:20	10:20	3	NE	2	8	0	0	0
23-Jul-21	3	18:10	21:10	3	E	3	6	0	0	0
20-Jul-21	4	05:00	08:00	3	NA	0	1	0	0	0
20-Jul-21	4	08:20	11:20	3	NW	2	1	0	0	0
20-Jul-21	5	12:00	15:00	3	W	2	2	0	0	0
20-Jul-21	5	15:20	18:20	3	NW	3	3	0	0	0
14-Aug-21	1	07:45	10:45	3	SW	2	8	1	0	0
14-Aug-21	1	11:00	14:00	3	SW	3	8	1	0	0
12-Aug-21	2	14:55	17:55	3	SW	3	6	0	0	0
13-Aug-21	2	07:45	10:45	3	SW	3	7	0	0	0
11-Aug-21	3	07:00	10:00	3	SW	2	8	0	0	0
11-Aug-21	3	10:20	13:20	3	SW	3	8	0	0	0
12-Aug-21	4	08:15	11:15	3	SW	3	6	0	0	0
13-Aug-21	4	14:20	17:20	3	SW	4	7	0	0	0
12-Aug-21	5	11:35	14:35	3	SW	4	7	0	0	0
13-Aug-21	5	11:05	14:05	3	SW	4	7	0	0	0

Meteorological Key:

Wind speed	Cloud cover	Rain	Snow	Frost
calm = 0 light air = 1 Light breeze = 2 Gentle Breeze = 3 Mod. Breeze = 4 fresh breeze = 5 strong breeze = 6 mod. gale = 7 fresh gale = 8 strong gale = 9	In eighths e.g 0/8 = no cloud 8/8 = full cloud cover	None = 0 Occasional=1 Drizzle / mist = 2 Light shower = 3 Heavy shower = 4 Heavy rain = 5	None = 0 On Site = 1 Snowing = 2	None = 0 Ground = 1 All day = 2

Table A5- Summary of Target Species Flight Time

Species	Number of Flights	Total birds	Sum of Duration (Seconds)	Duration at HB1	Duration at HB2	Duration at HB3	Duration at HB4	Duration at HB5	Duration at HB6 (PCH)	Duration at HB7
Curlew	3	9	151			9		15	**110**	17
Hen Harrier	4	4	453	333	60	15	15	15		15
Lapwing	2	33	262						**262**	
Golden Plover	69	3,992	8,472	510	470	422	259	822	**4,774**	1,215
Merlin	1	1	25	13		12				
Red Kite	868	1,222	141,587	17,044	15,643	21,840	20,310	18,803	**44,263**	3,676
Ringed Plover	1	1	45		45					
Goshawk	14	15	1,569	60	120	217	236	252	**699**	
Hobby	3	3	170		51	15		51	**45**	8
Snipe	1	2	20	20						
Grey plover	1	1	20	20						
Peregrine	6	7	281	30	26	30	20	54	**70**	51
Curlew	3	9	151			9		15	**110**	17

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