Bute Energy
Aberedw Energy Park

Environmental Statement

Chapter 8: Ornithology

Chapter 8
Ornithology

Introduction

8.1 This chapter considers the potential effects of the Proposed Development on Ornithology.

8.2 The objectives of the chapter are to:

- Describe the ornithology baseline;
- Describe the assessment methodology and significance criteria used in completing the assessment;
- Describe the potential effects, including cumulative effects (where applicable);
- Describe the mitigation measures proposed to address likely significant effects (if required); and
- Assess the residual effects remaining following the implementation of mitigation (if required).

8.3 This chapter should be considered in conjunction with the following chapters, which inform, or have been informed by, this assessment:

- **Chapter 7: Ecology (non-avian);** and
- **Chapter 9: Hydrology, Hydrogeology and Geology.**

8.4 The ornithology assessment was undertaken by LUC (see **Appendix 1.1: Statement of Expertise** for further information).

8.5 This chapter is supported by a number of figures which are referenced throughout the text, and which can be found at Volume 2: Figures:

- **Figure 8.1: Ornithology Survey Areas**

- **Figure 8.2: Ornithology Study Areas**
- **Figure 8.3: Vantage Point Locations and Viewsheds**
- **Figure 8.4a: Flight Activity – Non-breeding Season 1 (September 2019 to March 2020)**
- **Figure 8.4b: Flight Activity – Non-breeding Season 1 (September 2019 to March 2020) – Red Kite Only**
- **Figure 8.5a: Flight Activity – Breeding Season 1 (April to August 2020)**
- **Figure 8.5b: Flight Activity – Breeding Season 1 (April to August 2020) – Red Kite Only**
- **Figure 8.6a: Flight Activity – Non-breeding Season 2 (September 2020 to March 2021)**
- **Figure 8.6b: Flight Activity – Non-breeding Season 2 (September 2020 to March 2021) – Red Kite Only**
- **Figure 8.7a: Flight Activity – Breeding Season 2 (April to August 2021)**
- **Figure 8.7b: Flight Activity – Breeding Season 2 (April to August 2021) - Red Kite Only**
- **Figure 8.8: Breeding Bird Survey Results 2020**
- **Figure 8.9: Breeding Bird Survey Results 2021**
- **Figure 8.10: [CONFIDENTIAL] Nest Sites of Schedule 1 Raptors**

8.6 The following appendices are also referred to throughout the chapter and can be found in Volume 3: Technical Appendices:

- **Appendix 8.1a: Ornithology Technical Report 2019 - 2021**
- **Appendix 8.1b: Ornithology Technical Report 2024**
- **Appendix 8.2: Collision Risk Modelling**

Assessment Methodology

Legislation, Policy and Guidance

Legislation

8.7 This assessment is carried out in accordance with the principles contained within the following legislation where they have regard to ornithological interests:

- The Planning (Wales) Act 2015;
- The Town and County Planning (Environmental Impact Assessment) (Wales) Regulations 2017;
- The Wildlife and Countryside Act (1981);
- The Environment (Wales) Act 2016;
- The Conservation of Habitats and Species Regulations 2017 (i.e. the “Habitats Regulations”);
- The Natural Environment and Rural Communities (NERC) Act 2006; and
- The Countryside and Rights of Way (CRoW) Act 2000.

Policy

8.8 The following policies of relevance to the assessment have been considered:

- Future Wales: The National Plan 2024 (2021);
- Planning Policy Wales - Edition 12 (2024);
- The Nature Recovery Action Plan for Wales (2020);
- Planning Policy Wales: Technical Advice Note 5: Nature Conservation and Planning (2009); and
- Powys Local Development Plan 2011 – 2026 (2018).

Guidance

8.9 This assessment is carried out in accordance with the principles contained within the following documents:

- Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: terrestrial, freshwater, coastal and marine (Chartered Institute of Ecology and Environmental Management (CIEEM) 2018)[1];
- BS 42020:2013 Biodiversity: Code of Practice for Planning and Development (British Standards Institution, 2013);
- NatureScot Guidance: Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage (SNH 2017)[2];
- NatureScot Guidance: Assessing Significance of Impacts from Onshore Wind farms on Birds Outwith Designated Areas[3];
- NatureScot Information and Guidance Note: Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model[4];

Consultation

8.10 In undertaking the assessment, consideration has been given to the Scoping Responses and other consultation which has been undertaken as detailed in **Table 8.1**. PEDW summarised comments in relation to ornithology that were received from two stakeholders, but did not add further comments.

[1] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.3 updated September 2024).

[2] SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2 – March 2017. Guidance Note. SNH, Battleby.

[3] SNH (2018a). Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. Version 2 – February 2018. Guidance Note. SNH, Battleby.

[4] SNH (2018c). Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model. Version 2 – September 2018. SNH, Battleby.

Table 8.1 Consultation responses

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
NRW 25/01/2024	Formal Scoping consultation	Ornithology receptors should include species listed in Section 7 of the Environment Act (Wales) 2016, where appropriate.	The classification of sensitive receptors takes account of Section 7 species (see **Table 8.2**).
NRW 25/01/2024	Formal Scoping consultation	Asked to provide detail of survey undertaken in 2024. Recommended that breeding waders are re-surveyed. Indicated that relevant data held by NRW could be made available to supplement the baseline. Recommended the production of mitigation proposals if predicted effects deemed this necessary.	Survey effort and methods are set out in the ES Chapter and in **Appendix 8.1b**). Breeding wader surveys are being undertaken in 2025. No further data has been made available by NRW. No mitigation measures are proposed.
PCC 19/02/2024	Formal Scoping consultation	Assessment methods and issues scoped in/out should be detailed	Assessment methods and rationale for scoping receptors and issues in/out are detailed in the ES Chapter.

Study Area

8.11 Baseline ornithology field surveys to support this assessment were undertaken within survey buffers of up to 2 km from the initial area of the Proposed Development (see **Appendices 8.1a and b** and **Figure 8.1**) in line with survey guidance[2]. This included surveys on land within the Site and coverage of suitable, accessible habitats up to 2 km beyond this.

8.12 The survey area encompassed many areas that are beyond a distance at which effects on breeding and wintering birds could be expected to arise as a result of construction and operation of the Proposed Development. Hence, the study area for assessment comprises habitats and airspace within a series of buffers around the main infrastructure of the Proposed Development as shown in **Figure 8.2**. The Proposed Development's infrastructure includes turbines, tracks (upgrading of existing tracks and proposed new track) and ancillary infrastructure associated with construction and operation. Flight activity is considered with respect to a Flight Activity Assessment Area (FA), comprising a 500 metre (m) buffer around all turbines of the Proposed Development (**Figure 8.2**).

8.13 The other study areas for assessment are: for moorland breeding birds, open ground within a 500 m buffer around the turbines; and for raptors and owls, a buffer of up to 2 km around turbines (**Figure 8.2**).

Desk Based Research and Data Sources

8.14 The following data sources have informed the assessment:

- A desk study was undertaken to identify statutory sites designated for their ornithological features within 10 km of the Development Area for Special Protection Areas (SPA) and within 5 km of the Development Area for Sites of Special Scientific Interest (SSSI) where ornithology is a notified feature.
- Data on the presence of bird species of conservation importance was requested from the Biodiversity Information Service for Powys & Bannau Brycheiniog National Park. Publicly

available data on sensitive bird species was also obtained from the National Biodiversity Network (NBN) Atlas.

- Where appropriate, other published and unpublished literature and research papers were consulted, to assist in the interpretation and determination of species behaviour, population sizes and bird/wind farm interactions. These resources are referenced in the chapter where used.

Field Survey

8.15 Survey scope and methodology was undertaken in line with guidance on survey methods to inform the assessment of impacts on birds of onshore wind farms**Error! Bookmark not defined.** (SNH 2017). Detailed survey effort is presented in **Appendix 8.1**. Surveys were undertaken over the whole Site, and within buffers surrounding the Site, to ensure that baseline data coverage could provide comprehensive input to design evolution and options with regard to ornithology.

8.16 The following field surveys were carried out to inform the assessment:

- Flight activity surveys – October 2019 to September 2021. Bird flight activity was recorded from five vantage points (VPs), with VP locations and viewsheds selected to provide good coverage of the majority of the Site (**Figure 8.1**). Flight activity surveys entailed monthly watches from each VP, for two non-breeding seasons (October 2019 to March 2020 and September 2020 to March 2021) and two breeding seasons (April to August 2020 and 2021). Flight activity surveys recorded occurrences and flights by a range of species (see **Appendix 8.1**) including rare and specially protected raptors, migratory wildfowl species, gulls and certain waders. Other target species included common species of raptor and waders. VPs were located to provide good views of the airspace within and surrounding the proposed turbine area. VP watches followed the methods described by Band *et al*. (2007)[5] and collected flight activity information to allow an estimation of species-specific collision risk to be made using the Band Collision Risk Model (CRM)[5]. VP watches also provided

[5] Band, W., Madders, M. & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G.F.E. & Ferrer, M. (Eds.) Birds and Wind Farms: Risk Assessment and Mitigation, pp 259-275. Quercus, Madrid.

information on how the bird community used the Site, including information on bird behaviour, habitat use and breeding status.

- Winter walkover surveys – November 2019 to March 2020 and November 2020 to March 2021. During the non-breeding season, areas within the Site were visited to collate information on the wintering bird community. Surveyors searched different areas throughout the course of the season, aiming to ensure that all representative habitats in different parts of the Site were visited.
- Breeding bird surveys – May to July 2020 and April to July 2021. Breeding birds on open ground habitat were surveyed by undertaking walkover surveys between April and July (**Figure 8.1**). Surveys were based on the Brown and Shepherd (1993)[6] method for upland breeding waders, with three visits undertaken in 2020 and, following a change in guidance, four visits undertaken in 2021 to ensure comprehensive coverage throughout the breeding season.
- Breeding raptor surveys – May to July 2020 and April to July 2021. Surveys were undertaken to look for any evidence of breeding by rare or specially protected raptors and owls within up to 2 km of the Site. Knowledge of local bird distribution aided by information received from data requests, and an appraisal of key habitat on and around the Site, resulted in survey effort being focussed on locations with potential to support key raptor species. Surveys were guided by information collated during flight activity surveys.
- Breeding raptor surveys – April to July 2024. Follow up surveys to locate raptor breeding sites were undertaken in 2024, guided by the results from previous surveys and local knowledge of the survey team.
- Black grouse surveys – checks for suitable black grouse habitat were made in 2020 and 2021 and these confirmed that no field survey was required (**Appendix 8.1a**).

[6] Brown, A.F. and Shepherd, K.B. (1993) A method for censusing upland breeding waders, Bird Study, 40:3, p.189-195.

- Nightjar survey – limited habitat with potential suitability for nightjar was identified and surveyed in June and July 2020, using the methods detailed in Gilbert *et al*. 1998)[7].

8.17 Additional field surveys are currently being undertaken comprising:

- Flight activity surveys – September 2024 to August 2025. Surveys from five VPs are being undertaken focussed on the final design of the Proposed Development. These will be used to update collision risk estimates.
- Breeding bird surveys – surveys to look for sensitive breeding birds on open ground (April to July 2025).

8.18 Comprehensive survey data collected between September 2019 and August 2021 (**Appendix 8.1a**), and raptor breeding data collected in April to July 2024 (**Appendix 8.1b**) form the baseline for assessment. Further surveys are ongoing covering the period September 2024 to August 2025, and an updated baseline will inform future assessment.

Assessing Significance

Sensitivity

8.19 The Nature Conservation Importance (NCI) of bird species (ornithological receptors) considers the sensitivity of bird populations with reference to their legal status and known recent trends in number, distribution and threat status. NCI is defined according to the definitions set out in **Table 8.2.**

Table 8.2 Nature Conservation Importance (Sensitivity) of Bird Receptors

NCI (Sensitivity)	Definition
High	Species listed in Annex 1 of the EU Birds Directive. Breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981.

[7] Gilbert, G., Gibbons, D.W. and Evans, J. (1998). Bird Monitoring Methods: A Manual of Techniques for UK Key Species. The Royal Society for the Protection of Birds, Sandy, Bedfordshire, England.

NCI (Sensitivity)	Definition
	Qualifying species of SPAs where there is spatial connectivity between the SPA and the Proposed Development.
Medium	Species on the Birds of Conservation Concern (BOCC) 'Red' list[8] or Birds of Conservation Concern in Wales (BOCCW) 'Red List'[9]. Bird species on Section 7 of the Environment Act (Wales) 2016. Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the Proposed Development. Species present in regionally important numbers (>1 % regional population).
Low	All other species not covered above.

Magnitude

8.20 The magnitude of each potential effect is determined following consideration of the spatial and temporal elements of the resulting changes. There are five levels of spatial magnitude (**Table 8.3**) and five levels of temporal magnitude (**Table 8.4**).

8.21 Magnitude will consider the likely susceptibility of populations to an effect, taking account of how a species' ecology may influence the response of the population, including their ranging behaviour, seasonality in occurrence or behaviour, reliance on specific habitats, behavioural sensitivity to disturbance effects at different times of the year, and their ability to recover from adverse effects, e.g. by birds being recruited from elsewhere.

[8] Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain.

[9] Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J. Lindley, P.J., Noble, D.G. & Taylor, R.C. (2022). Birds of Conservation Concern Wales 4: the population status of birds in Wales. Milvus, 2: 1-34.

8.22 Where such information exists from monitoring studies or other research, data on the responses of individual birds and bird populations to wind farms and similar developments are taken into account.

8.23 The predicted magnitude of an effect can be influenced by when it occurs. For example, operations undertaken in daylight hours may have little temporal overlap with the occupancy of birds' night-time roosts; and seasonality in a bird population's sensitivity or occupancy of a site may mean that effects are unlikely during certain periods of the year.

Table 8.3 Spatial Impact Magnitude

Spatial Magnitude	Description
Very high	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80 % of regional population affected.
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80 % of regional population affected.
Moderate	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20 % of regional population affected.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5 % of the regional population affected.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the "no change" situation. Guide: <1 % of regional population affected.

Table 8.4 Temporal Impact Magnitude

Temporal Magnitude	The following definitions have been applied in respect to timescales
Permanent	Effects continuing indefinitely, extending beyond the average span of a human generation (approximately 25-30 years). If there is a high certainty of substantial improvement after this period, for example following project decommissioning or the establishment of high-value habitat, effects could be classified as long-term[10].
Long-term	Approximately 15-30 years.
Medium-term	Approximately 5-15 years.
Short-term	Up to approximately 5 years.
Negligible	Less than 1 year.

8.24 Where the available data allows, the conservation status of each potentially affected species population is considered at an appropriate spatial scale. Effects on a species' national conservation status are a key consideration. However, evaluation of effects on populations at a more refined scale allows some consideration of regional differences in conservation status and threats. Thereafter, consideration of predicted effects on regional populations can be used to explore how this may influence a species' conservation status at the national level[1,3]. For the Proposed Development, effects on species populations are considered at a regional scale, defining Mid Wales (Ceredigion and Powys) as the relevant region, in line with NRW's Area Statement region.

[10] Effects are classified as long-term as effects will persist throughout the operational life (40 years), although beyond the threshold for long-term duration it is anticipated that there should be an improvement following decommissioning.

8.25 For this assessment, conservation status is taken to mean the sum of the influences acting on a population which may affect its long-term distribution and abundance. Conservation status is considered to be favourable where:

- A species appears to be maintaining itself on a long-term basis as a viable component of its habitats;
- The natural range of the species is not being reduced, nor is it likely to be reduced for the foreseeable future; and
- There is (and will probably continue to be) sufficient habitat to maintain the species population on a long-term basis.

8.26 Effects that will adversely affect the favourable conservation status of a species or prevent its recovery to favourable conservation status in Wales, will be judged as of concern.

Significance

8.27 Where potential effects relate to bird populations that constitute all or part of the qualifying interest of an existing (or proposed) internationally or nationally designated site (i.e. a Special Protection Area (SPA), Ramsar site or SSSI, then effects are judged against whether the Proposed Development could significantly affect the site population or its distribution. Where bird populations do not form part of the qualifying interest of a designated site, effects are evaluated in relation to 'wider countryside' populations at a regional scale, assuming that robust information exists or can be derived on population size, range and distribution at this scale. For this assessment, 'wider countryside' populations of potentially affected breeding bird species are spatially defined as those within Mid Wales[11].

8.28 Following the classification of each species' Nature Conservation Importance and consideration of the magnitude of each effect, professional judgement is used to make a reasoned assessment of the likely effect on the conservation status of each potentially affected species within the region.

[11] Natural Resource Wales (NRW) (2024) Mid Wales Area Statement.

8.29 In accordance with the EIA Regulations, each likely effect is evaluated and classified as either Significant or Not Significant. The significance levels of effect on bird populations are described in **Table 8.5**. Detectable changes, i.e. those of 'Major' or 'Moderate' significance, in the conservation status of regional populations of Nature Conservation Importance are considered to be significant effects under the EIA Regulations. Non-Significant Effects are those which are likely to result in barely detectable (Minor) or non-detectable (Negligible) changes in the conservation status of regional (and therefore national) bird populations.

8.30 The assessment of cumulative effects follows NatureScot guidance[4]. Cumulative effects are assessed when detectable changes in relevant population units are predicted to arise due to the Proposed Development 'in-isolation', and due to an additive accumulation of predicted effects from other developments across the region, these may result in significant effects on the regional population. Where in-isolation effects on a species population are classed as Minor or above, the species will be taken forward for cumulative assessment.

Table 8.5 Significance Criteria

Significance of Effect	Description
Major	A detectable change to regional populations of High or Moderate NCI, resulting in total population loss or severe impacts to their conservation status.
Moderate	A detectable change to regional populations of High or Moderate NCI, resulting in population losses that are likely to impact their conservation status.
Minor	Small or barely detectable changes to regional populations of High or Moderate NCI, that are unlikely to impact their conservation status.
Negligible	No or barely discernible changes to regional populations of High or Moderate NCI, with no impact on their conservation status.

Assessment Assumptions

8.31 The following assumptions have informed the assessment of effects:

- Construction will last 15 months so may overlap with two bird breeding seasons and one non-breeding seasons; and
- An appropriate Bird Protection Plan will be in place as part of the detailed CEMP, detailing safeguards to avoid or minimise disturbance to breeding and roosting birds during construction, in accordance with legislative requirements and industry standards.

Assessment Limitations

8.32 Surveys were paused between April and mid-May 2020 due to Covid-19 access restrictions. Some areas outside of the Site could not be accessed due to ongoing social distancing restrictions for the remainder of the survey period. This did not prevent most areas being surveyed from distance to look for evidence of breeding raptors, as per survey guidelines for locating raptor breeding sites[12]. Further raptor surveys were undertaken in 2024, and baseline data is considered to be comprehensive in this regard.

8.33 Whilst the above information gaps have been identified, it is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant environmental effects on Ornithology.

Existing Conditions

Designated Sites

8.34 A search for ornithological designated sites extended to 10 km from the Site for Special Protection Areas (SPA) and to 5 km for SSSI. The location of the Site is not statutorily designated for ornithological interests. There are no SPAs within 10 km of the Site, with the nearest being the Elenydd Mallaen SPA, located over 15 km to the north-west.

[12] Hardey, J., Crick, H.Q.P., Wernham, C.V., Riley, H., Etheridge, B. and Thompson, D.B.A. (2013). Raptors: a field guide for surveys and monitoring. The Stationary Office.

8.35 The River Wye (Tributaries)/Afon Gwy (Isafonydd) SSSI is located within 1 km of the Site. The citation for this SSSI includes wintering goosander.

8.36 There is no connectivity between these designated sites and the Site, as the core foraging ranges of the qualifying or notified features do not extend to the Site[13].

Baseline Bird Populations

Raptors and Owls

8.37 Red kite (Annex 1 and Schedule 1) were recorded frequently throughout the two years of baseline survey. Up to ten red kite breeding attempts were confirmed within 2 km of turbines and a further five breeding attempts were classified as probable. None were within 500 m of turbines (**Figure 8.10**). Red kite flight activity was relatively high, with a total of 656 flights recorded during VP watches. The maximum number of birds in a single flight was 13. In total, 157,231 seconds (s) of flight activity recorded by a total of 832 birds during all VP watches. This resulted in 453 flights by 629 birds generating 48,876.56s of flight activity at Potential Collision Height (PCH) within the FA (**Figure 8.4b, 8.5b, 8.6b and 8.7b; Appendix 8.1a and 8.2**).

8.38 Goshawk (Schedule 1) were recorded in the breeding and non-breeding seasons. Eleven flights by single birds were recorded, totalling 1,307s of flight time. Of this, 594.92s of flight activity was at PCH within the FA (**Figure 8.5a, 8.6a & 8.7a; Appendix 8.1a and 8.2**).

8.39 Three goshawk nesting locations were identified, one approximately 600 m from the nearest proposed turbine and one approximately 750 m from the nearest turbine. The third location is over 2 km from the nearest turbine and from the Site (**Figure 8.10**).

8.40 Hen harrier was recorded on four occasions, all in the non-breeding season. A total of 453s of flight activity was recorded and 13s of this was at PCH within the FA (**Figure 8.4a & 8.6a**; **Appendix 8.1a and 8.2**). There is no suitable hen harrier breeding habitat on the Site and no prospect of a significant effect on the regional population.

[13] SNH (2016). Assessing Connectivity with Special Protection Areas (SPAs). Version 3 – June 2016. Guidance Note. SNH, Battleby.

8.41 A single osprey was recorded on the Site during a walkover survey in 2020 (**Appendix 8.1a**). An osprey breeding site was recorded to the south of the Site in 2024, but this is over 3 km from the nearest turbine (**Figure 8.10**). The osprey nest is sufficiently distant that no disturbance is possible, and no flight activity was recorded by osprey during VP watches.

8.42 Hobby were recorded on three occasions during VP watches, with 170s of flight time recorded, of which 83.15s was at PCH within the FA (**Figure 8.5a & 8.7a; Appendix 8.1a and 8.2**). No breeding by hobby was recorded and there is no prospect of a significant effect on the regional hobby population.

8.43 Merlin were recorded twice throughout the baseline survey period (**Appendix 8.1a**). No breeding was recorded and there is no suitable breeding habitat within the Study Area. There is no prospect of a significant effect on the regional merlin population

8.44 Peregrine were recorded infrequently, with six flights totalling 281s recorded during VP watches (**Figure 8.5a, 8.6a & 8.7a; Appendix 8.1a and 8.2**). Only 70s of flight time was at PCH. Two breeding sites were recorded, both of which were over 3.5 km from the nearest proposed turbine (**Figure 8.10**). Collision risk modelling was undertaken as peregrine are known to breed in the vicinity (**Table 8.6**) but overall, there is no prospect of a significant effect on the regional peregrine population.

8.45 Two barn owl nesting attempts were recorded. One confirmed attempt was 2 km from the nearest turbine and a possible attempt was approximately 900 m from the nearest turbine. Barn owls are not susceptible to disturbance at the is distance and there is no prospect of a significant effect to the regional population.

Waders

8.46 Two curlew flights, comprising a total of eight individuals, were recorded in the breeding season, both records of birds in flight during VP watches. A single bird in flight was also recorded in the non-breeding season. In total, 142s of flight time was recorded and of this, 61.1s was at PCH within the FA (**Figure 8.6a & 8.7a; Appendix 8.1a and 8.2**). No breeding was recorded on the Site and there is no prospect of a significant effect on the regional curlew population.

8.47 Snipe were recorded on one occasion in the breeding season (**Figure 8.6a; Appendix 8.1a**).

8.48 Two small flocks of lapwing (15 and 18 birds) were recorded in flight in the non-breeding season, with a total flight time of 262s (combined duration of 4,446s). Of this 3,589.25s was at PCH within the FA (**Figure 8.4a; Appendix 8.1a and 8.2**). Despite time spent at PCH, two small flocks recorded over two non-breeding seasons will not translate to substantial collision mortality, and within the context of the Welsh wintering population, numbering many thousands of birds (BTO 2025b)[14], there is no prospect of a significant effect.

8.49 A single grey plover and a single ringed plover were recorded during VP watches, but no time was recorded within the FA at PCH (**Figure 8.4a & 8.6a**).

8.50 Flocks of up to 380 golden plovers were recorded in both non-breeding seasons. A total of 66 flights were recorded, meaning that 3,793 flight occurrences by golden plover occurred. Of these, 51 flights totalling 3,241 flight occurrences accumulated a total of 366,583s of flight time at PCH within the FA (**Figure 8.4a & 8.6a; Appendix 8.1a and 8.2**). No golden plover was recorded roosting on the Site.

Other Species

8.51 A small number of gull flights were recorded, comprising black-headed gull, lesser black-backed gull and herring gull. No breeding by gulls was recorded. There is no prospect of a significant effect on regional populations of any gull species.

8.52 No black grouse or nightjar were recorded and no prospect of a significant effect on the regional populations of either species.

Collision Risk Estimates

8.53 Data from flight activity surveys was used to estimate the number of turbine collisions for four species (**Table 8.6**). Full details of the CRM method are presented in **Appendix 8.2**.

[14] BTO (2025b). Wetland Birds Survey (WeBS). https://app.bto.org/webs-reporting/numbers.jsp

Table 8.6 Collision Risk Estimates

Species	Number of annual collisions			Average time between collision (years)
	Year 1	Year 3	Average	
Red kite	1.14	2.55	1.84	0.54
Goshawk	0.001	0.065	0.033	30.30
Peregrine	0.002	0.009	0.006	166.67
Golden plover	61.66	23.26	42.46	0.02

Implications of Climate Change for Existing Conditions

8.54 The UK Climate Change Projections 2018 (UKCP18) predicts changes in key climate characteristics in Wales up to the 2060s, when the operational period of the Proposed Development is likely to end. In summary, the projections highlight that in the 2060s, summer and winter temperatures are likely to be greater than the current baseline (with greater increases predicted in summer), with winter rainfall increasing, summer rainfall decreasing but an overall greater likelihood of storms and extreme weather events.

8.55 The predicted effects of climate change are likely to have a bearing on the future ornithological community at the Site and in the wider region. The warmer, drier summers and milder, wetter, winters may result in changes to bird distribution and bird behaviour in the longer-term; however, the baseline bird community detailed here is considered to provide a valid description of the ornithological assemblage over the lifespan of the Proposed Development. More intense storms may result in breeding failure or reduced availability of nest sites for tree nesting species like red kite and goshawk. Drier summers may reduce the quality of feeding habitat for wader species. Generalist species and species whose geographic range is relatively large, are expected to be more tolerant of the predicted changes, assuming that critical habitat and food requirements remain available, e.g. prey species populations. Species whose current distribution is limited, especially those at the extreme edge of their range, are likely to be more vulnerable.

Future Baseline in the Absence of the Proposed Development

- In the absence of the Proposed Development and bearing in mind potential changes associated with climate change, the ornithology community will most likely remain broadly as it is described above over the period corresponding with the Proposed Development's lifespan, with changes in the size and range of local populations reflecting wider trends in regional populations.

8.56 Habitat change might arise, and food availability (especially carrion) may change as a result of future farming practices within and adjacent to the Site. This will likely have a small effect on the overall ornithological assemblage and limited impacts on species populations, with adverse and beneficial outcomes arising for certain species over short- to medium-timescales.

Embedded Design Mitigation

8.57 The following design measures were implemented during the iterative design process to seek to avoid potentially significant environmental effects:

- Incorporation of relevant buffers around the nesting sites of Schedule 1 birds (150 – 300 m for red kite and 300 – 500 m for goshawk) to reduce the potential for disturbance during the construction and operational phases[15].

Micrositing

8.58 A standard 50 m micrositing allowance is being sought and will be used to determine the final position of the turbines, substation and associated infrastructure, although it will not be varied to such a degree as to cause a notable change in the predicted environmental effects and the assessment presented in this chapter has been undertaken on that basis.

8.59 There are no ornithological features or constraints which have influenced the micrositing allowance.

[15] NatureScot (2022). Disturbance Distances in selected Scottish Bird Species – NatureScot Guidance.

Good Practice Measures

8.60 The assessment is made on the basis that a Bird Protection Plan (BPP) will be drafted and agreed with NRW and implemented prior to construction commencing. The BPP will detail protocols for maintaining compliance with relevant species protection legislation and best practice during the construction phase, to ensure that bird species and important sites for birds (nests, roosts, key feeding sites) are safeguarded from disturbance during critical periods.

8.61 The BPP will be cognisant of relevant legislation, especially the Wildlife and Countryside Act 1981, taking account of the enhanced protections afforded to nest sites and to nesting and roosting birds listed in the Schedules of the Act. Further requirements which will be included in the BPP are:

- Timing of work: Where possible, tree-felling and ground clearance should be scheduled outside of the breeding bird season but should also take account of winter roosts.
- Pre-construction surveys: If work is scheduled to take place during the breeding bird season or at other sensitive times, pre-construction bird surveys should be undertaken within a series of distance buffers from construction works, with specific buffer distances and methods dependent on target species, affected habitat and the likely stage of the breeding cycle.
- Nest protection: Protocols should be developed to ensure nests and other sensitive bird sites are protected from destruction, or to ensure that disturbance is prevented or minimised during construction activities.
- Toolbox talk: The BPP should be overseen by a suitably experienced Ecological Clerk of Works who will oversee the delivery of ‘toolbox talks’ to contractors to make them aware of bird sensitivities, legislative requirements and relevant working protocols.

8.62 The BPP will be overseen by an Ecological Clerk of Works (ECoW), with further detail on the definition of this role and implementation as part of a detailed Construction Environment Management Plan (CEMP). An outline is provided in **Appendix 4.2**.

Micrositing

8.63 Given that the design of the Proposed Development has taken into account the location of nesting sites for protected species and applied suitable buffers, micrositing including any micrositing restrictions, have not been required for ornithology.

Scope of the Assessment

Effects Assessed in Full

8.64 This assessment focusses on the effects of construction and operation of the Proposed Development upon those species identified during the review of desk-based information and field surveys, which, according to their confirmed presence and use of the Site, have the potential to be significantly affected by the Proposed Development.

8.65 Potential effects are evaluated in respect of species of High and Moderate NCI (**Table 8.2**) which are identified as sensitive receptors. Effects upon the following species are assessed:

- Red kite;
- Goshawk; and
- Golden plover.

8.66 The following potential effects were identified following a review of baseline data, embedded design and good practice mitigation for consideration in this assessment:

- Direct loss of habitats, which may be temporary during the construction phase, or long-term as a result of land take to accommodate turbine hardstandings, tracks and other infrastructure associated with the operation of the Proposed Development;
- Indirect habitat loss, arising from the displacement of bird populations from land adjacent to the physical elements of the Proposed Development and disturbance and displacement to birds during construction, and ongoing maintenance activities;
- Collision of individual birds with rotating turbine blades, leading to direct mortality; and

- Cumulative effects on regional (Mid Wales) bird populations arising from any of the above during the operation of the Proposed Development.

Effects Scoped Out

8.67 On the basis of the desk based and field survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, the following effects have been 'scoped out' of detailed assessment:

- Effects on ornithology arising from habitat modification during construction and operation. No substantial changes to the current land management regime or to the hydrology of the Site are anticipated as a result of the Proposed Development (see **Chapter 9**) and, therefore, bird populations will be unaffected by habitat modification.
- Effects on the River Wye (tributaries)/Afon Gwy (Isafonydd) SSSI. The distance to the Site (450 m), and the distance to proposed infrastructure (1.4 km) is greater than the potential disturbance distance of goosander, and this species does not rely on habitats within the Site during any part of the year. No flights by goosander were recorded.
- Effects on the following bird populations: osprey, hen harrier, kestrel, hobby, merlin, peregrine, barn owl, curlew, lapwing, cuckoo, all gull species and all passerine species. Despite the occurrence of some species of High and Moderate NCI, their occurrence and recorded use of habitats and airspace in the vicinity of the site is so limited or distant that there is no potential for significant adverse effects, in isolation or cumulatively, on regional or national populations as a result of construction or operation of the Proposed Development (see **Baseline Conditions**).
- Effects of visible lighting on all bird species. Although there is some uncertainty about the potential effects of visible lighting on birds, two groups are considered to be relatively susceptible: burrow nesting seabirds and nocturnally migrating passerines[16]. There are no

[16] NatureScot (2020). NatureScot Information Note. The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures. September 2020 v1.1.

burrow nesting seabird colonies on the Site or within at least 20 km. No exceptional passerine migration pathway is known to occur over the Site.

- Effects of Decommissioning. Decommissioning is expected to result in similar effects to those encountered during the construction phase, but of a lesser magnitude. A separate BPP will be in place during the decommissioning phase.
- Effects on all species defined as low NCI, as populations of these species are stable, widespread, abundant and insensitive to effects associated with wind farm construction and operation.

Assessment of Effects

8.68 Comprehensive baseline bird surveys were undertaken for three breeding seasons and three non-breeding seasons, with survey coverage extending over 2 km from the Site. In addition, data requests and associated desk studies provided information on the status, distribution and activity of species of high and moderate NCI. These studies provide a thorough description of the population size, distribution and status of the bird community in the vicinity of the Site.

8.69 The assessment of effects considers whether species of high or moderate NCI may be adversely affected due to the Proposed Development as described in **Chapter 4: Development Description**. The assessment considers effects arising as a result of:

- Construction of the Proposed Development;
- Operation of the Proposed Development; and
- Cumulative effects of the Proposed Development.

8.70 Guidance seeks to focus detailed assessment on important features, in this case bird populations of High and Moderate NCI, where these populations are considered to be vulnerable to any of the potential effects identified above[1]. Following consideration of baseline data showing the distribution, status and activity patterns of High and Moderate NCI populations, and an evaluation of their potential to be affected by construction and operation of

the Proposed Development, three species, red kite, goshawk and golden plover are considered for detailed assessment (**Table 8.7**).

Table 8.7 Nature Conservation Importance of Potentially Affected Species

Species	NCI	Rationale
Red kite	High	Annex 1 and Schedule 1 species; potential disturbance and displacement; potential collision risk
Goshawk	High	Schedule 1 species; potential disturbance and displacement; potential collision risk
Golden plover	High	Annex 1; potential disturbance to roost; potential collision risk.

Construction Effects

Predicated Construction Effects

8.71 The construction phase of the Proposed Development will lead to increased levels of noise and visual disturbance due to the presence of vehicles, site machinery and site personnel. Activities associated with construction will include track construction and upgrading, the creation of hardstandings and turbine foundations, cabling works, extraction of material at borrow pits, the construction of a substation, and the erection of turbines. Disturbance can lead to indirect habitat loss, as it has the potential to displace birds from key foraging habitats or important sites like nesting or roosting areas.

8.72 Although difficult to quantify, effects will be greatest in close proximity to construction activities and the consequences of displacement are likely to be more severe in the breeding season. Disturbance could result in behavioural responses by individuals, resulting in increased mortality or a reduction in breeding success. This could arise due to reduced feeding efficiency, disturbance at nest sites leading to breeding failure or increased susceptibility to predators.

8.73 The construction phase is scheduled to last for 15 months, and it is assumed that two breeding seasons and one nonbreeding season will be affected.

8.74 The BPP will guarantee that nest sites of Schedule 1 species are safeguarded, with measures put in place to ensure that sites are buffered to avoid or minimise any effects associated with construction activities, or that activities close to potential nest sites are timed to avoid the breeding season or the most sensitive periods of the breeding season if possible.

8.75 Red kite are judged to have a medium sensitivity to disturbance during the breeding season, and a buffer zone of 150 – 300 m is recommended to safeguard birds at the nest (NatureScot, 2022); the range of buffer distances allows consideration of the extent of screening by habitat or topography between the nest and disturbance sources. This range of buffer distances is also recommended for non-breeding red kites, including at roost sites. Foraging red kites can be tolerant of human activities[17] and are not likely to be substantially displaced by construction activities, and foraging displacement is unlikely to extend more than 100 m from construction work and will be considerably less in most instances.

8.76 Goshawk are judged to have a medium sensitivity to disturbance during the breeding season, with a suggested buffer zone to safeguard nesting sites of 300-500 m (NatureScot, 2022). Goshawk can be relatively tolerant of disturbance, and pairs can become habituated to human activities associated with forestry and recreation. Foraging goshawks may be displaced from areas close to construction activities, although the species are known to forage close to forestry operations. Foraging goshawks are assumed to be displaced from areas within 100-200 m of construction activity, depending on the nature of the activity and the intervening habitat and topography.

8.77 In the winter, non-breeding golden plover roost within upland grasslands, and their presence at the Site is likely to be related to prospecting for and using roost locations, which are close to feeding areas on agricultural fields. Hence, wintering birds can be highly mobile and

[17] Goodship, N. M. and Furness, R. W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species (NatureScot Research Report 1283).

reported disturbance distances of 200 – 500 m means they are likely to avoid construction activities if relatively less disturbed locations are available.

Red kite

8.78 Baseline surveys recorded red kite nests within and surrounding the Site, but none were within 300 m of proposed construction activities, so no disturbance is anticipated for nesting attempts at these locations. During the construction phase, if red kite nested within 300 m of construction activities, these breeding sites will be safeguarded via appropriate measures within the BPP. Hence, no disturbance to nesting red kites is predicted. Red kites can form communal roosts during the non-breeding season and birds using these roosts may also be displaced, but there were no records of communal roosts within 300 m of construction activities, and there is no optimal roosting habitat (sheltered, relatively open woodland) within this potential disturbance zone, so roosting red kites are unlikely to be susceptible to construction disturbance.

8.79 Red kites were recorded frequently on the Site throughout the baseline survey period, in the breeding and non-breeding seasons. Much of this activity was likely to have been related to foraging. Displacement of foraging birds from construction work will depend on the nature the activity but is unlikely to extend further than 100 m and will be considerably less in many instances. Red kites forage over a wide area, and during the breeding season their range may extend to 3 – 6 km from nests. In the winter, non-breeding birds also range widely exploiting feeding and roosting areas that may be different to areas occupied for breeding. Hence, displacement from foraging habitat within the Site during the construction phase is not likely to substantially lower foraging efficiency at any time of the year, as birds will exploit alternative habitat within their seasonal range.

8.80 In summary, the BPP will safeguard nesting sites during the construction phase. The short-term temporal reduction in the availability of foraging habitat is not predicted to substantially alter foraging rates for individuals in the local red kite population, such that measurable effects on survival or productivity will occur. Hence, effects will be spatially low for the regional red kite population. Overall, the effects of construction activities arising from the Proposed Development are predicted to be negligible and not significant.

Goshawk

8.81 Two goshawk nesting sites were recorded, and one of these was close enough to construction activities that disturbance could affect bird activity at the site. However, the BPP will ensure that breeding birds were safeguarded. In addition, this site is well screened from any construction activity by trees and is hidden by site topography, with the closest construction element over 300 m distant. Hence, no disturbance is anticipated to nesting goshawks at these locations.

8.82 Foraging goshawks are likely to use some areas within the Site so may be displaced from construction activities, although their elusive hunting behaviour (fast ambush of avian and mammalian prey) means they move rapidly through the landscape and are less likely to be affected by relatively isolated disturbance sources in otherwise undisturbed habitats. However, few flights were recorded during baseline surveys, and the majority of foraging activity is likely to take place within woodland and farmland beyond where construction activities will be focused.

8.83 Mid Wales supports a robust goshawk population, likely to number well in excess of 100 breeding pairs out of a total estimated Welsh population of 320 pairs[18]. The short-term nature of construction phase work is predicted to be spatially negligible for this population, and no substantial adverse effect on productivity and survival is predicted. Hence, effects on goshawk are deemed to be negligible and not significant.

Golden plover

8.84 Golden plovers were present during the non-breeding season and may roost within the Site during the day as the rough grassland provides suitable habitat – no typical foraging habitat for wintering golden plover is present on the Site. Despite the presence of golden plover flocks over the Site, no roosts were recorded. Although roosting occurs in upland grassland habitat, golden plovers will roost in a variety of habitat, including crops and ploughed fields in lowland agricultural areas, so suitable roosting habitat is available in the wider landscape.

8.85 Thousands of golden plover are likely to make use of habitats within Mid Wales during the winter months, with some individuals passing through on their way to and from breeding

[18] Hughes, J., Spence, I.M & Gillings, S. (2020). Estimating the sizes of breeding populations of birds in Wales. Birds in Wales 17: 56-67.

grounds and other birds making more localised wintering movements in response to food resources, weather patterns and other within-season distributional shifts. Any displacement from potential roosting habitat on the Site as a result of construction activities will most likely result in individuals exploiting alternative suitable areas within the region, with minimal additional energetic expenditure.

8.86 In summary, potential displacement of golden plover from suitable wintering roost habitat on Site may occur in the short-term, but this will not have a measurable effect on the survival rates of the regional wintering population. Overall effects of construction activities on wintering golden plover are predicted to be negligible and not significant.

Committed Additional Mitigation

8.87 No significant effects are predicted for ornithology during the construction phase, so no additional mitigation is required.

Residual Construction Effects

8.88 No significant effects on ornithology are predicted as a result of construction activities.

Operational Effects

Predicted Operational Effects

Displacement

8.89 The operational phase of wind farms may result in the displacement of nesting and foraging birds due to disturbance effects arising from the presence and operation of physical infrastructure and, to a lesser extent, human activity at the Site associated with ongoing maintenance. Studies on the responses of birds to operational wind farms have reported varying effects, with inconsistencies in reported responses for the same species at different sites, and between species at the same site. However, disturbance effects during the operational phase will generally be lower than during construction, and studies have shown that birds will habituate to the presence of wind farms, with displacement effects lower during operation than during

construction[19]. In some circumstances, an operational turbine array could cause a 'barrier effect' to birds in flight, displacing individuals from a wider area as they avoid the site during commuting flights; this may result in higher energetic requirements with knock-on effects on survival and productivity, which could impinge on a species conservation status.

Red kite

8.90 Nesting by red kite was recorded in several locations within the Study Area but no nests are located within 500 m of turbines and operational disturbance is not predicted to have any effect on the use of these sites. Similarly, roosting red kites are not predicted to be displaced from suitable habitat due to the presence of turbines or due to any other activities anticipated as a result of wind farm operation.

8.91 Red kites may be displaced from suitable foraging habitat due to the presence of turbines and operational activities, but any avoidance is expected to be less than that predicted for the construction phase, given that the nature of operational activity on the Site will cause less disturbance in comparison. The regional red kite population is estimated to be around 3,000 adults plus immature birds, and the consequences of limited predicted displacement for a small number of individuals whose range overlaps with the Proposed Development will be insubstantial.

8.92 In summary, although operational displacement effects on red kites are classed as long-term/permanent, the negligible spatial magnitude of effect for the regional red kite population means that the overall effect of operational disturbance is predicted to be negligible for red kites and not significant.

Goshawk

8.93 Nesting goshawks were recorded at two locations. One nest was just over 300 m from a proposed access track, but disturbance resulting from the anticipated low-impact use of this

[19] Pearce-Higgins, J.W., Stephen, L., Douse, A. & Langston, R.H.W. (2012). Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. Journal of Applied Ecology,49: 386-294.

track is not predicted to affect birds at this nest, particularly as the nest is screened by habitat and topography.

8.94 Foraging goshawks are likely to spend most of their time hunting within woodland and farmland outside the Site, as supported by the paucity of flight records recorded during VP watches. On the Site, displacement from suitable hunting areas around the turbines may occur but is very unlikely to extend beyond 100 m and will be relevant to areas that do not provide core foraging resources. Hence, small-scale displacement from areas that are infrequently exploited by hunting goshawks will likely have very limited effects on the productivity and survival of the regional population.

8.95 Operational effects on goshawk, arising from displacement, will be spatially negligible and despite the long-term duration, the overall effect is deemed to be negligible and not significant.

Golden plover

8.96 As discussed for construction effects, any displacement of golden plover will be in relation to use of the Site as a roost in the non-breeding season, relevant to wintering birds and those on passage to and from breeding grounds. Suitable feeding habitat for wintering golden plover is not present on the Site, with potential feeding habitat on agricultural fields in the surrounding area. In addition, no evidence of roosting was recorded on the Site so displacement must assume potential suitability of the Site and consider the extent to which displacement may affect the regional or national wintering population.

8.97 The UK wintering population of golden plover is estimated to be 410,000 individuals, and peak occurrence is in the autumn when breeding birds from the northern and eastern part of the species' range arrive in the UK (BTO 2024a)[20]. Occurrence at the Site also peaked in the autumn, with over 80% of flights (and a higher proportion of individuals) recorded between September and December, supporting an assertion that birds spending time in mid-Wales reflect the distribution and flux of the wider Welsh and UK wintering populations. Over 10,000 golden plovers regularly occur in Wales during the winter, and tens of thousands are regularly

[20] 8BTO (2025a). BirdTrack. https://app.bto.org/birdtrack/explore/outputs.jsp

recorded at locations to the south and west of the Site (BTO 2024b)[14]. It is therefore reasonable to assume that birds recorded on the Site are part of this wider flyway population, and these birds will make use of suitable habitats at various locations along the flyway during the winter months. Hence, any displacement of temporary roosts that did occur at the Site will most likely result in birds using other suitable locations, and much potential roosting habitat occurs in the immediate and wider area.

8.98 In summary, although no roosting by wintering golden plover was recorded at the Site, any displacement from suitable habitat will impinge on a small proportion of the regional and national wintering/passage population and displaced birds will likely exploit widespread alternative habitats in the region. The long-term effect of displacement on wintering golden plover is predicted to be spatially low and most likely negligible given that no roosting was recorded. Effects on wintering golden plover are deemed to be negligible and not significant.

Collision risk

8.99 Flight activity by birds in the vicinity of operational turbines entails a theoretical risk of collision with rotating turbine blades. This assumes that birds are not routinely displaced from areas near to turbines as a result of operational disturbance (see above). Collisions with turbine blades will most likely lead to the death of individuals, and if sufficient direct mortality occurred, the conservation status of regional populations could be negatively affected.

8.100 Collision risk is assumed to depend on the level of ‘at risk’ flight activity near to turbines and the extent to which birds are able to detect and avoid the rotating blades. There is variation in both these aspects for different species, and susceptibility can also vary between seasons and in different weather conditions. Certain species tend to spend a relatively high proportion of flight time at a height that overlaps with the height of rotating blades, whereas others routinely fly below rotor height. Some species appear to be less at risk due to a relatively high avoidance response, opting to avoid airspace occupied by a whole turbine array or by keeping back from individual turbines or turbine blades. The location of a wind farm can also influence the likelihood of collision effects, with developments located within regular flight paths, for example between feeding and roosting areas, migration corridors or areas of high prey density potentially influencing the levels of flight activity.

8.101 Estimates of collision risk are calculated using a Collision Risk Model (CRM), specifically the 'Band' CRM[5] (Band 2007), recommended by NRW as the standard method for estimating collision risk at onshore wind farms. The process requires quantification of the level of flight activity by susceptible bird species in the vicinity of turbines during the baseline survey period and uses this data alongside information on a bird's biometrics and flight speed, plus information on the number, location and technical characteristics of turbines, to model the likelihood of collisions over a given unit of time. The Band CRM process was updated in 2024 to standardise input methods at different stages of the modelling process[21] (NatureScot 2024).

8.102 The first stage of the Band CRM, which processes flight activity data collected during VP watches, can be run in two ways, depending on the broad characteristics of the flight activity in question: directional flight method and non-directional flight method. The directional flight method is appropriate when flights tend to follow relatively consistent and simple movement patterns with respect to direction, and characterise migration flights or regular direct movements between, for example, feeding and roosting areas. The non-directional flight method is appropriate when flight activity is more irregular, and this method was appropriate for all the species modelled here (**Appendix 8.2**).

8.103 Although 'at risk' flight activity was recorded for a number of species of high or moderate NCI, the potential for mortality to lead to an effect on the regional conservation status of several species was implausible based on results from Collision Risk Modelling (goshawk and peregrine) (**Appendix 8.2**) or on cursory examination of the data (curlew, hen harrier, hobby and merlin) (**Appendix 8.1**). Hence, detailed consideration of the potential effects of collision mortality on regional populations is restricted to two species: red kite and golden plover.

Red kite

8.104 The risk of collision for red kite was estimated, using information from flight-activity surveys on the location, height and duration of flights, data on the biometrics of the species,

[21] NatureScot (2024). Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms. NatureScot Guidance Note.

including average flight speed and bird dimensions, and information on the number, location, specification and operational parameters of turbines at the Site.

8.105 Flight activity data from five VP locations was collated. Visible coverage was assumed to extend up to 2 km and 90 degrees either side of each VP, and baseline survey coverage included many areas where turbines are not proposed. Therefore, processing of field data was undertaken to only include recorded flights or flight sections within a 180° arc and up to 2 km from the VP the flight was recorded from. Since birds will only be susceptible to collision within the turbine area itself, flight activity was further filtered to only include flights which passed within a 500 m buffer around turbines, which took account of potential inaccuracies in flight mapping, turbine blade length and potential micrositing. The flight data was then analysed to calculate the duration of each flight within the turbine area that was at potential risk height.

8.106 Following these analyses in respect of red kite flight activity, 493 flights by a total of 629 birds were selected for inclusion in the CRM, on account of at least some time spent at potential collision height within a 500 m buffer of the turbines. Different areas of the 500 m turbine buffer were watched for a variable amount of time over the period of baseline surveys, because some areas were visible from more than one VP. Therefore, flight data from different VPs was weighted by the total duration of watch time within areas visible from each VP and then summed. Information on the duration of at-risk flight activity recorded from each VP was used to calculate the total amount of at-risk flight time, per unit area, per unit time within the 500m turbine buffer.

8.107 The output from the Band CRM for red kite, following the inclusion of a standard avoidance rate of 99% and a percentage of assumed non-operational turbine time due to maintenance and weather conditions of 15%, estimated an average annual collision rate of 1.84 birds per year. Assuming all collisions resulted in the death of a red kite, this equates to the loss of 74 red kites over the 40-year lifespan of the Proposed Development.

8.108 The red kite population in Mid Wales has grown relatively rapidly in recent years, and was estimated at 2,975 adults in 2022, plus a cohort of immature birds yet to enter the breeding population (Hereward et al. 2024). The death of up to two (1.84) red kites because of collision with turbines at the Proposed Development will represent a maximum of 0.07% of the regional

red kite population killed annually. Background adult mortality in Welsh red kites has been estimated at 5 – 25%, translating to annual losses of between 150 and 750 adults in Mid Wales. Therefore, the loss of an additional two birds will increase mortality by between 0.3 and 1.3%. Further, since collision mortality estimates from the Proposed Development could relate to adult and immature birds, the proportional effect of this mortality on the red kite population will be lower as calculations will include the population of adult bids plus immature birds, with the immature cohort likely to comprise many hundreds of additional individuals.

8.109 Collision mortality of red kites as a result of the Proposed Development will have a long-term effect on the regional population, however the predicted effect will be spatially negligible. Recent population modelling of the Welsh red kite population has explored the effect of additional mortality arising from wind turbine collisions (Hereward et al. 2024) and despite some uncertainties in the model's input parameters and predictions, the mortality estimate at the Proposed Development is substantially less than is necessary to result in a population decline. Hence, effects of collision mortality on the Mid Wales red kite population are deemed to be negligible and not significant.

Golden plover

8.110 Information on flights by golden plover was collected and processed as described for red kite, with relevant watch data from VPs restricted to the non-breeding season only. Following analyses, 51 flights by a total of 3,241 birds were selected for inclusion in a Band CRM analysis. The output from the Band CRM for golden plover, following the inclusion of a standard avoidance rate of 98% and a percentage of assumed non-operational turbine time due to maintenance and weather conditions of 15%, estimated an average annual collision rate of 42.46 birds per year. Assuming all collisions resulted in the death, this equates to the loss of 1,698 golden plovers over the 40-year lifespan of the Proposed Development.

8.111 As detailed above in Operational Effects, the golden plovers present at the Site form part of a large wintering and passage population, with tens of thousands of birds present or passing through Mid Wales in the non-breeding season. Collision mortality of 43 birds per year will be barely detectable against the background annual mortality of golden plover, which exceeds 25%

(BTO 2025c)[22], i.e. expected background mortality will be 2,500 out of a population of 10,000 birds, with collision mortality at the Proposed Development representing an increase of around 1.7% in this number, and less than 0.5% mortality in the population. Bearing in mind that the non-breeding population passing through Mid Wales will be at least double this, then the magnitude of the effect will be considerably less. In addition, although more relevant to breeding golden plover, some studies[23] have shown that golden plover can be displaced by operational wind farms, so the occurrence of flocks in the non-breeding season may be less likely following construction, lowering the potential for collisions.

8.112 In summary, the long-term effect of collision mortality on the non-breeding golden plover population is predicted to be spatially low, and more likely negligible, and overall effects are negligible and not significant.

Committed Additional Mitigation

8.113 As no significant effects are predicted on ornithological interests as a result of the operation of the Proposed Development, no mitigation is proposed.

Residual Operational Effects

8.114 Residual effects on ornithology during the operational phase are negligible and not significant.

Cumulative Effects During Construction

Predicted Cumulative Effects During Construction

8.115 For ornithological receptors, effects arising from activities during the construction phase are generally not considered in a cumulative sense, as the short-term duration of potential impacts and uncertainties in relation to the likelihood of temporal overlap with the construction phases of other developments, mean that additive effects are difficult to predict, and also much

[22] BTO (2025c). Bird Facts – Golden plover. https://www.bto.org/understanding-birds/birdfacts/golden-plover

[23] Sansom, A., Pearce-Higgins, J.W. & Douglas, D.J.T. (2016) Negative impact of wind energy development on a breeding shorebird assessed with a BACI study design. Ibis, 158: 541-555.

less likely to arise due to their temporal separation. For example, 14 developments considered in the cumulative assessment, have already been constructed or are under construction (**Table 8.7**). Hence, consideration of cumulative effects is limited to effects predicted during the operational phase, when additive effects on regional populations are more likely to coincide and result in significant effects.

8.116 Cumulative effects during construction are not significant for all ornithological receptors.

Committed Additional Mitigation

8.117 As there are no significant effects, no mitigation is required.

Residual Cumulative Effects During Construction

8.118 There are no residual significant cumulative effects arising from the construction of the Proposed Development.

Cumulative Effects During Operation

Predicted Cumulative Effects During Operation

8.119 Predicted adverse effects on birds arising from the operation of the Proposed Development have the potential to contribute to cumulative effects upon wider regional populations, in this case populations within Mid Wales. The EIA Regulations require that these 'in-isolation' effects be considered alongside predicted effects from other plans or projects in the region. NatureScot guidance[24] on assessing cumulative effects has been followed, which recommends using an additive approach to sum predicted effects from projects and plans in the relevant region arising from displacement, collision risk and barrier effects. Assessment of cumulative effects is restricted to effects that are at least minor in isolation, i.e. where detectable changes to species populations are predicted, that may be major additively.

8.120 Cumulative assessment may be undertaken on species that have undergone detailed assessment in-isolation, i.e. sensitive species of High and Moderate Nature Conservation

[24] SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. Guidance Note. SNH, Battleby.

Importance which demonstrated substantial reliance on or use of habitats and airspace within and surrounding the Proposed Development. In this case, the assessment was limited to consideration of red kite, goshawk and golden plover, as some potential for an effect from the Proposed Development was identified and the effect could be exacerbated cumulatively as regards influencing a species' conservation status.

8.121 In respect of the Proposed Development, the predicted effects of displacement and collision mortality 'in isolation' for High NCI species were considered, where these exceeded Negligible for displacement, or where predicted annual mortality due to turbine collisions was high enough to justify detailed assessment. Displacement effects are predicted to be negligible for all species. Therefore, only collision effects are taken forward to cumulative assessment, with predicted mortality in the red kite population and the non-breeding golden plover population having some potential to contribute to a cumulative effect at a wider spatial scale.

8.122 The approach to cumulative assessment is set out in **Chapter 2: Approach to the EIA**. Cumulative wind farm projects assessed in the ES are provided in **Appendix 2.9.** Mortality predictions for red kite and golden plover at the Proposed Development were considered alongside mortality predictions due to turbine collision at 20 other in-planning, consented or operational wind farm developments in Mid Wales (**Table 8.8**). Searches for planning documents via planning portals, developer web pages and internal databases were made to collate relevant information to inform the cumulative assessment. In some cases, no data were available as indicated in **Table 8.8**.

Table 8.8 Cumulative effects of other wind farm developments in Mid Wales

Development Name	Status	Number of turbines	Annual collision mortality estimate	
			Red kite	Golden plover
Aberedw	**This application**	**18**	**1.84**	**42.46**
Bryn Blaen	Operational	6	1.45[1]	108.09
Bryn Titli	Operational	22	2.3[2]	No CRM undertaken
Carno I	Operational	56	No data available	No data available

Development Name	Status	Number of turbines	Annual collision mortality estimate	
			Red kite	Golden plover
Carno II	Operational	12	No data available	No data available
Carno III	Consented	13	0.56	No CRM undertaken
Cefn Croes	Operational	39	No data available	No data available
Cemmaes 2	Operational	18	No data available	No data available
Esgair Cwmowen	Application Submitted	11	0.202	0.82
Garn Fach	Consented	17	2.61	7.89
Garreg Lwyd Hill	Operational	17	No data available	No data available
Hendy	Under Construction	7	1.447[1]	1.74
Llanbrynmair	Consented	30	0.085	No data available
Llandinam	Operational	102	No data available	No data available
Llandinam Repowering	Consented	34	1.24	No data available
Llangwyryfon	Operational	11	No data available	No data available
Mynydd Clogau	Operational	17	No data available	No data available
Mynydd Gorddu	Operational	19	No data available	No data available
Nant Mithil	Application Submitted	30	10.306	11.25
Rheidol	Operational	8	No data available	No data available
Tirgwynt	Operational	12	No data available	No data available
Total			**22.06**	**172.25**

[1]converted to 99% avoidance rate following new guidance; [2]derived from ongoing study

Red kite

8.123 Cumulative mortality of red kites, compiled from wind farm developments that generated collision estimates, is 22.06 birds per year within Mid Wales. As described above, the Mid Wales red kite population is estimated to be around 3,000 adult birds plus a cohort of immature birds numbering well in excess of 1,000, so additional mortality arising from all planned or operational wind farms in this region is predicted to kill substantially less than 1% of the population. Even if all collisions were by adults, this mortality would remove only 0.74% of the Mid Wales adult population, but the likelihood is that some deaths will be by immature birds, whose flight behaviour and experience may make them more vulnerable to collisions.

8.124 Analyses by Hereward et al. (2024) showed that mortality in the adult Welsh red kite population could exceed background mortality rates by over 12% before a population decline may be expected. This high tolerance to additional mortality was also evident at smaller spatial scales, including Mid Wales. Hence, cumulative mortality impacts predicted here are substantially below a level that could adversely affect the national or Mid Wales red kite population.

8.125 In summary, cumulative operational effects arising from collision mortality on red likes are long-term but spatially negligible and the overall effect is deemed to be negligible and not significant.

Golden plover

8.126 Not all developments considered in the cumulative assessment reported collision predictions for golden plover, and data were unavailable for older operational developments. Hence, the combined prediction of 172.25 annual golden plover deaths, may be lower than mortality predicted by theoretical CRMs for all wind farms in Mid Wales. However, even if mortality at all these wind farms was equivalent to the average number of deaths reported from wind farms where predictions were available (172 deaths at seven wind farms is an average of 29 annual collisions per wind farm) the total annual mortality from all 20 wind farms would be 580 birds, which is less than 5% of the likely minimum 20,000 birds likely to pass through Mid Wales during the non-breeding season.

8.127 In summary, cumulative operational effects on the golden plover population arising from collision mortality are predicted to be spatially low, and despite the long-term effect duration, the over effect is deemed to be minor and not significant.

Committed Additional Mitigation

8.128 No significant cumulative effects are predicted so no mitigation is required.

Residual Cumulative Effects During Operation

8.129 There are no residual significant cumulative effects arising from the operation of the Proposed Development.

Interrelationship Between Effects

8.130 **Chapter 7** presents information on the extent and type of habitat that is predicted to be lost or affected as a result of the Proposed Development, and the OHMP presents proposals for habitat management. A relationship between these habitat changes and bird populations at the Site clearly exists, but all effects are accounted for in this chapter and no additional interrelationships have been identified which alter the predicted effects on ornithology.

Monitoring

8.131 The OHMP includes a range of habitat management proposals targeting improvements in the condition of woodland, open ground, riparian and wetland habitats. Although birds are not the primary target for enhancement, many of the proposed measures have the potential to improve conditions for birds, particularly in the breeding season.

8.132 It is proposed that walkover breeding bird surveys are undertaken to aid evaluation enhancement measures undertaken as part of the final HMP. Surveys should be undertaken in the first, third, fifth and tenth year following implementation of monitoring, and this timing may vary across the HMP area depending on when management is initiated.

Summary of Effects

8.133 No significant effects are predicted.