

CONTENTS

INTRODUCTION	1
SCOPE AND CONSULTATION	2
Effects Assessed in Full	2
Effects Scoped Out	3
APPROACH AND METHODS	3
Study Area	3
Desk Based Research and Data Sources	4
Field Surveys	4
Assessment Methods	7
Assumptions, Limitations and Confidence	10
BASELINE CONDITIONS	11
Current Baseline	11
ORNITHOLOGICAL CONSERVATION EVALUATION	19
Conservation Evaluation of Breeding Bird Populations	19
Conservation Evaluation of Wintering Bird Populations	21
ASSESSMENT OF EFFECTS	24
NatureScot Key Species Potentially at Risk	25
Potential Construction Effects	25
Potential Operational Effects	32
Mitigation	41
Assessment of Residual Effects	42
Potential Cumulative Effects	42
STATEMENT OF SIGNIFICANCE	44
REFERENCES	47

TABLES

Table 9-1: Scoping Responses	2
Table 9-2: Value (conservation importance) of bird species	7
Table 9-3: Definition of terms relating to the magnitude of change from ornithological impacts	8

Table 9-4: Magnitude of Change and Conservation Value Matrix.....	9
Table 9-5: Special Protection Ares within 20km of the Proposed Development, their qualifying features and likely connectivity to the Site.....	12
Table 9-6: Breeding Bird Populations in the West Scales Core Survey Area (2023 and 2024).....	12
Table 9-7: Key Species Flight Rates recorded over the VP survey area during the 2023 and 2024 breeding season vantage point surveys	15
Table 9-8: Autumn/Winter Bird Populations (wintering waterfowl survey area during 2023-24 and 2024-25) – daytime surveys	16
Table 9-9: Autumn/Winter Bird Populations during the 2024-25 nocturnal surveys.....	17
Table 9-10: Key Species Flight Rates recorded over the VP survey area during the 2023-24 and 2024-25 autumn/winter vantage point surveys	17
Table 9-11: Conservation Evaluation of the West Scales Breeding Bird Populations (2023 and 2024).....	19
Table 9-12: Conservation Evaluation of the West Scales Wintering Bird Populations (2023-24 and 2024-25).....	22
Table 9-13. Conservation Importance of Breeding Birds in the West Scales Energy Park Potential Disturbance Zone	28
Table 9-14. Conservation Importance of Wintering Birds in the West Scales Energy Park Potential Disturbance Zone	29
Table 9-15: Collision Risk Modelling Predictions	36
Table 9-16: Cumulative Ornithological Assessment: other wind farm sites within 20km buffer.....	42
Table 9-17: Cumulative Ornithological Assessment: other wind farm sites within 20km of the Solway Firth SPA/Ramsar site	43
Table 9-18. Summary of the effects of the Proposed Development on features of ornithological interest.....	45

FIGURES

Figure 9.1: Special Protection Areas and Ramsar Sites within 20 km

Figure 9.2: VP Viewshed and Survey Areas

Figure 9.3: Breeding Bird Survey

Figure 9.4: VP Survey Flight Lines – Whooper Swan

Figure 9.5: VP Survey Flight Lines – Pink-footed Goose

Figure 9.6: VP Survey Flight Lines – Greylag Goose

Figure 9.7: VP Survey Flight Lines – Red Kite

Figure 9.8: VP Survey Flight Lines – Goshawk

Figure 9.9: VP Survey Flight Lines – Golden Plover

Figure 9.10: VP Survey Flight Lines – Lapwing

Figure 9.11: VP Survey Flight Lines – Curlew

Figure 9.12: VP Survey Flight Lines – Common Gull

Figure 9.13: VP Survey Flight Lines – Herring Gull

Figure 9.14: VP Survey Flight Lines – Black-headed Gull

Figure 9.15: VP Survey Flight Lines – Peregrine

Introduction

- 9.1 This Chapter considers the likely significant effects on ornithology associated with the construction and operation of the Proposed Development. The specific objectives of the chapter are to:
- describe the current ornithological baseline;
 - describe the assessment methodology and significance criteria used in completing the impact assessment;
 - describe the potential effects, including direct, indirect and cumulative effects;
 - describe the mitigation measures proposed to address the likely significant effects; and
 - assess the residual effects remaining following the implementation of mitigation measures.
- 9.2 The assessment has been carried out by Dr Steve Percival of Ecology Consulting.
- 9.3 The Chapter is supported by the following Technical Appendices and Figures:
- **Technical Appendix 9.1: Breeding Bird Surveys 2023;**
 - **Technical Appendix 9.2: Wintering Bird Surveys 2023-24;**
 - **Technical Appendix 9.3: Breeding Bird Surveys 2024;**
 - **Technical Appendix 9.4: Wintering Bird Surveys 2024-25;**
 - **Technical Appendix 9.5: Collision Risk Modelling Calculations;**
 - **Technical Appendix 9.6: Draft Breeding Bird Protection Plan;**
 - **Technical Appendix 9.7: Shadow Habitats Regulations Assessment; and**
 - **Technical Appendix 9.8: Confidential Information on Schedule 1 Breeding Birds (with Confidential Appendix Figure 9.8.1: Distribution of Schedule 1 Species).**
 - **Figure 9.1: Special Protection Areas and Ramsar Sites Within 20km;**
 - **Figure 9.2: VP Viewshed and Survey Areas;**
 - **Figure 9.3: Breeding Bird Surveys Key Species;**
 - **Figure 9.4: VP Survey Flight Lines: Whooper Swan;**
 - **Figure 9.5: VP Survey Flight Lines: Pink-footed Goose;**
 - **Figure 9.6: VP Survey Flight Lines: Greylag Goose;**
 - **Figure 9.7: VP Survey Flight Lines: Red Kite;**
 - **Figure 9.8: VP Survey Flight Lines: Goshawk;**
 - **Figure 9.9: VP Survey Flight Lines: Golden Plover;**
 - **Figure 9.10: VP Survey Flight Lines: Lapwing;**
 - **Figure 9.11: VP Survey Flight Lines: Curlew;**
 - **Figure 9.12: VP Survey Flight Lines: Common Gull;**

- **Figure 9.13: VP Survey Flight Lines: Herring Gull;**
- **Figure 9.14: VP Survey Flight Lines: Black-headed Gull;**
- **Figure 9.15: VP Survey Flight Lines: Peregrine.**

Scope and Consultation

9.4 Consultation with the relevant consultees was undertaken primarily through the scoping process. The issues raised and key outcomes of this consultation relating to ornithology are summarised in **Table 9-1**.

Table 9-1: Scoping Responses

Consultee and Date	Issue Raised	Response / Action Taken
NatureScot (NS) 5 June 2025	NS agreed with the scope of the bird survey and assessment proposed but made the following comments:	Noted.
	<ul style="list-style-type: none"> • NS noted the high level of bird activity in baseline surveys including species associated with the Solway Firth SPA, in particular whooper swans, pink footed geese, common gull and some wading birds, which could give rise to an NS objection. 	Noted. The assessment has included specific assessment of the effects on the SPA - see Technical Appendix 9.7 .
	<ul style="list-style-type: none"> • NS raised some concerns about the vantage point survey methodology, specifically location of vantage point within site boundary and potential observer effects on data. 	VP was selected to give optimal view over the proposed wind turbines (and solar photovoltaic (PV) arrays), not the whole red line boundary. VP was 440 m from nearest turbines, so not likely to have affected bird behaviour. No evidence from baseline data to support any observer effect.
	<ul style="list-style-type: none"> • NS noted high level of activity for breeding birds associated with the development site - impacts will need to be assessed, and appropriate mitigation considered. 	Noted – see sections on ‘Assessment of Effects’ and ‘Mitigation’ in this chapter.
Natural England 2 July 2025	Welcome the scope of the EIA for the designated sites and landscapes within the English border potentially impacted by the scheme. No additional requests with regards to the scope. Requested re-consultation at the Environmental Statement stage.	Noted.

Effects Assessed in Full

9.5 The key issues for the assessment of potential ornithological effects include the following, based on NS (formerly Scottish National Heritage (SNH)) guidance published in 2018a:

- direct loss of bird habitat through the construction of the energy park infrastructure;
- disturbance of birds during construction and operation (including displacement of flight activity through barrier effects);
- mortality of birds through collision with wind turbine blades or towers during operation; and

- cumulative effects of wind farm operational disturbance and collision mortality, on the national and Natural Heritage Zone (NHZ) populations of key target species.

9.6 Key target species for the assessment have been identified following SNH 2018a guidance using the following criteria:

- species listed on Annex 1 of the EU Birds Directive;
- species listed on Schedule 1 of the 1981 Wildlife & Countryside Act;
- species identified by SNH 2018a as 'Priority bird species for assessment when considering the development of onshore wind farms in Scotland'. These include:
 - species that are widespread across Scotland which utilise habitats or have flight behaviours that may be adversely affected by a wind farm;
 - 'restricted range' species; and
 - red-listed species on the Birds of Conservation Concern list (Stanbury *et al.* 2021).

9.7 The ornithological assessment has, therefore, given particular consideration to all species recorded during the baseline surveys at the site that meet any of these criteria.

Effects Scoped Out

9.8 No ornithological issues have been scoped out from this assessment, though, following SNH 2018a guidance, the assessment focussed on the key species likely to be affected by the Proposed Development.

Approach and Methods

Study Area

9.9 The ornithology study areas included all areas within the potential zone of ornithological influence of the Proposed Development, with reference to NatureScot (SNH 2017) guidance. The specific study areas were as follows:

- Ornithological designated sites: sites designated for ornithological interests within 5km of the Site (all statutory protected sites) and within 20km (internationally important sites), see **Figure 9.1**.
- Core breeding bird surveys: included the Site boundary (the Site), plus a 500m buffer, shown in **Figure 9.2**. It covered an area of 3.8km². Full access was available to the Proposed Development but limited to publicly accessible areas outside the Site.
- Wider key species breeding surveys: a 2km buffer, covering an additional 21.8km². Surveys comprised walkovers (restricted to the Site and public access), supplemented by a series of mini-vantage points (shorter watches from additional vantage points (VP)) to cover other areas. The extent of the survey area is shown in **Figure 9.1**.
- Wintering bird field surveys: these covered the same 2km buffer around the Proposed Development, where access/viewing was possible (limited to publicly accessible areas outside the Site boundary).
- Flight activity (VP) surveys, as shown in **Figure 9.2**; and

- Cumulative effects: other wind farms within the 'West Southern Uplands and Inner Solway' (NHZ19) NatureScot Natural Heritage Zone¹ were included in the assessment of potential cumulative ornithological effects.

9.10 The survey areas comprised predominantly lowland farmland habitat used for grazing stock, with an extensive area of peat workings to the west of the Proposed Development and broad-leaved woodland to the north.

Desk Based Research and Data Sources

9.11 The ornithological desk study provided information on the ornithological interest of the study area within 20km of the Site, including the locations of any relevant statutory protected sites and collation of data on key species such as raptors and breeding waders. Data from the following sources of information were sought for the desk study:

- NatureScot website (<https://sitelink.nature.scot/home>) – statutory designated site boundaries, including Sites of Special Scientific Interest (SSSI) and SSSI citation details;
- Joint Nature Conservation Committee (JNCC) website (<https://jncc.gov.uk/our-work/special-protection-areas-overview/>) – European protected site boundaries and designations (SPA/Ramsar);
- Wetland Bird Survey annual reports (Calbrade *et al.* 2025);
- The Birds of Scotland (Forrester *et al.* 2007);
- Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland (Balmer *et al.* 2013);
- Dumfries and Galloway Raptor Study Group; and
- Information published in Environmental Statements (ES) and Environmental Impact Assessment (EIA) Reports for other developments in the NHZ 19 'West Southern Uplands and Inner Solway'.

Field Surveys

9.12 A comprehensive range of bird surveys have been undertaken at the Site between April 2023 and March 2025. This included surveys over two full breeding seasons (2023 and 2024) and two winter periods (2023-24 and 2024-25), to give two full years of baseline bird data, in line with the current NatureScot survey guidance (SNH 2017). These surveys comprised:

- Year-round VP surveys to quantify bird flight activity;
- Breeding bird walkover mapping survey;
- Species-specific breeding bird surveys; and
- Autumn/winter walkover surveys.

9.13 Full details of the surveys, dates and weather conditions are given in **Technical Appendices 9.1 - 9.4**.

¹ <https://raptormonitoring.org/natural-heritage-zones>

Vantage Point Surveys (year-round)

- 9.14 VP surveys were carried out to determine flight activity within the Site and its surrounds. The VP surveys quantified the bird numbers that could potentially be at risk of collision (including roost flight observations at dawn/dusk). All flight lines of target species were mapped, and the flight height and duration of each flock/individual recorded. The following species were recorded:
- All birds of prey and owls;
 - All waders (including lapwing and golden plover) and gulls;
 - All ducks, geese, swans, cormorants, herons, coot and grebes;
 - Large flocks (>100 birds) of other species (except woodpigeon and rook); and
 - Any other notable species, including SNH 2018a priority species.
- 9.15 A single VP was used, to give sufficient coverage of the site and its surrounds. Computer GIS-generated (Global Mapper v21) viewsheds are shown in **Figure 9.2**. The same locations were used for all surveys, with the following surveys being undertaken at each VP:
- Breeding season:
 - 2023 and 2024 – April to August – 36 hours, plus an additional 6 hours in April and May to cover goose migration (including specifically targeting barnacle goose spring migration).
 - Autumn/winter:
 - 2023-24 – September to March – 72 hours/VP (including additional goose flight surveys); and
 - 2024-25 – September to March – 72 hours/VP (including additional goose flight surveys)

Core Breeding Bird Walkover Surveys

- 9.16 The breeding bird walkover survey followed the standard Brown and Shepherd (1993) moorland survey method with two additional visits as recommended in NatureScot (SNH 2017) guidance. These surveys covered the Site plus a 500m buffer (where access/viewing was possible). The extent of the breeding bird survey area is shown in **Figure 9.2**.
- 9.17 All bird locations and behaviour were mapped at 1:10,000 scale, using the standard British Trust for Ornithology (BTO) Common Birds Census notation, and all species were recorded. In addition, the survey effort per unit area was standardised to make the surveys as repeatable as possible, recording systematically for approximately two hours per km². The chosen route ensured that all parts of the ornithology study area were covered within approximately 100m of the observer, where access was possible. The survey route was plotted on the survey map as it was undertaken.
- 9.18 The surveys avoided strong winds, heavy rain, fog and low cloud. Birds were located by walking, listening and scanning by eye and with binoculars. Standard BTO notation was used to record the birds' activities; singing, calling, carrying nest material, nests or young found, repetitively alarmed adults, disturbance displaying, carrying food or in territorial dispute.

- 9.19 The survey data were analysed to determine spatially distinct clusters of records, equivalent to breeding territories, with the number of such territories used to calculate the breeding population for each species (Gilbert *et al.* 1998). A record in potentially suitable breeding habitat on a single visit was considered sufficient to indicate a potential breeding attempt.

Species-specific Breeding Bird Surveys (Wider Area Surveys)

- 9.20 As the site and its surrounds supported potentially suitable habitat for a range of scarce raptors, additional species-specific surveys were undertaken during April-August 2023 and 2024. Surveys were undertaken within the Site and a 2km buffer zone (the 'wider breeding bird survey area') where potentially suitable breeding habitat for these species are present. Walkovers were carried out where access was allowed, supplemented by a series of mini-VPs (short watches from additional VPs) chosen to observe over the Proposed Development plus a 2km buffer. This comprised surveys for hen harrier, osprey, goshawk, red kite, peregrine, merlin, short-eared owl and barn owl, following the standard methodologies detailed in Gilbert *et al.* (1998) and Hardey *et al.* (2013).
- 9.21 In addition, any other key target species observed during these surveys were recorded, including lapwing, curlew and golden plover.

Autumn/Winter Field Count Surveys

- 9.22 Survey work was undertaken to provide further information on any important bird populations using the area during the winter. This comprised surveys of the wintering birds within the Proposed Development plus a 2km buffer. It included surveys at dawn and dusk to check the area specifically for roosting hen harriers and other important raptors, and covering all habitats possibly used by wintering waterfowl as feeding/roosting sites (including pink-footed geese, greylag geese and whooper swans) to give contextual information about where goose and swan feeding flocks were located, and possible linkage to SPAs. Surveys were instantaneous 'look-see' counts, recording a snapshot of the birds present in each field/count sector when surveyed (Gilbert *et al.* 1998).
- 9.23 These surveys were carried out as follows:
- 2023-24 and 2024-25 – September to March - twice-monthly surveys

Nocturnal Autumn/Winter Surveys

- 9.24 Additional nocturnal surveys were carried out between September 2024 and March 2025, to investigate waterfowl feeding activity on the site at night. An image intensifier and infra-red lamp were used, in combination with monitoring flock movements by sound and observations at dawn/dusk. Two night visits were undertaken each month (14 in total). The survey method was essentially the same as the daylight field/sector surveys, instantaneous counts of bird numbers in each field, recording the behaviour of each flock and any flying birds. This covered a range of moon conditions, including bright moonlight under the full moon. Limitations to the visibility distance (usually up to 300m) and Health and Safety considerations meant that it was not possible to cover the whole wider survey area. Instead, the aim was to focus on sampling the Proposed Development. A total of 14 points were surveyed on each visit, giving coverage of approximately 4.0km².

Assessment Methods

- 9.25 The significance of the potential effects of the Proposed Development has been classified by professional consideration of the value of the receptor and the magnitude of the potential change.
- 9.26 The assessment includes a full evaluation of the ornithological importance of the bird populations at the Site and identification of any particularly sensitive areas. The assessment has been carried out with reference to the methodologies produced by NatureScot (SNH 2018a) for the wider countryside, and the CIEEM Guidelines (2018).
- 9.27 An assessment of the effects of the Proposed Development on European Protected Sites under the Habitats Regulations is presented separately in **Technical Appendix 9.7**.

Criteria for Assessing Value (Conservation Importance)

- 9.28 Value (conservation importance) was assigned using the criteria set out in **Table 9-2**, drawing upon those adopted by NS in Guidelines for Selection of Biological SSSI, using 1% of the resource to define international and national importance (very high and high values) (Calbrade *et al.* 2025). An additional category of regional importance (medium value) was assigned for species approaching the threshold for national importance and those for which the survey area held a notable concentration in a county context. A further category of 'local importance' (low value) was used for species that did not reach regional or national importance at the site but were still of some conservation interest. This included all species on the red or amber lists of the 'Birds of Conservation Concern' (Stanbury *et al.* 2021). National reference populations were taken from Woodward *et al.* (2020) and regional NHZ populations from Wilson *et al.* (2015). In addition, listings on Annex 1 of the EU Birds Directive, Schedule 1 of the Wildlife and Countryside and Scottish Biodiversity List (SBL) species were all considered in the evaluation process.
- 9.29 The sensitivity (conservation importance, as defined in **Table 9-2**) of the receptors present in the 20km study area were identified, and then the magnitude of the possible impact on those receptors were determined (as described in **Table 9-3**).

Table 9-2: Value (conservation importance) of bird species

Value	Definition
Very High	Cited interest of SPAs, SACs and SSSIs. Cited means mentioned in the citation text for those protected sites as a species for which the Site is designated (SPAs/SACs) or notified (SSSIs).
High	Other species that contribute to the integrity of an SPA or SSSI. A local population of more than 1% of the national population of a species. Any ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK). EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or Wildlife and Countryside Act (W&C Act) Schedule 1 species (if not covered above). Other specially protected species.
Medium	Regionally important population of a species, either because of population size or distributional context. UK BAP priority species (if not covered above).
Low	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above.

Negligible	Green-listed species (Stanbury <i>et al.</i> 2021) of favourable conservation status.
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Magnitude of Change

- 9.30 An impact is defined as a change of particular magnitude to the abundance and/or distribution of a population as a result of the Proposed Development. The magnitude of change is assessed in terms of the extent (spatial) and the temporal aspects of the impact, in terms of timing, frequency, duration and reversibility. **Table 9-3** shows the definitions of the change magnitude classification used for the assessment.

Table 9-3: Definition of terms relating to the magnitude of change from ornithological impacts

Magnitude of Change	Definition
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that post development character/ composition/ attributes will be fundamentally changed and may be lost from the Site altogether. Guide: >80% of population/habitat lost.
High	Major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/habitat lost.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20% of population/habitat lost.
Low	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/ composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/habitat lost.
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: <1% of population/habitat lost.

Significance Criteria

- 9.31 The combined assessment of the magnitude of change and the value of the receptor, determined the significance of potential effects. These two criteria were cross-tabulated to assess the overall effect and significance of that effect (**Table 9-4**). The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant effects in terms of the EIA Regulations. This gives a guide as to the determination of significance, though the final assessment was still subject to professional judgment.

Table 9-4: Magnitude of Change and Conservation Value Matrix

MAGNITUDE	CONSERVATION VALUE				
		Very high	High	Medium	Low
	Very high	Very high	Very high	High	Medium
	High	Very high	Very high	Medium	Low
	Medium	Very high	High	Low	Very low
	Low	Medium	Low	Low	Very low
	Negligible	Low	Very low	Very low	Very low

- 9.32 The interpretation of these significance categories are as follows:
- **Very low** and **low** are not normally of concern, though normal design care should be exercised to minimise adverse effects;
 - **Very high** and **high** represent adverse effects on bird populations which are regarded as significant for the purposes of EIA; and
 - **Medium** represents a potentially significant adverse effect on which professional judgment must be made, though mitigation should be able to reduce it below the significance threshold.
- 9.33 The NatureScot (SNH 2018b) wider countryside assessment guidance defines the key significance test as follows: “*An impact should be judged as of concern where it would adversely affect the favourable conservation status of a species, or stop a recovering species from reaching favourable conservation status, at international or national level or regionally.*” It notes that the key baseline population for breeding birds should be the NatureScot NHZ population. The Proposed Development lies within the ‘West Southern Uplands and Inner Solway’ (NHZ19) NatureScot Natural Heritage Zone.
- 9.34 A cumulative ornithological assessment (using the same criteria as the main assessment) followed NatureScot (SNH 2018b) guidance on ‘Assessing the cumulative impacts of onshore wind farms on birds’, considering impacts on the favourable conservation status of key species within the relevant NHZ, in this case NHZ 19 ‘Western Southern Uplands and Inner Solway’.
- 9.35 As the 20km study area held species specially protected under Schedule 1 of the 1981 Wildlife and Countryside Act, information on the breeding sites and associated flight activity of the species listed on that Schedule is provided in **Confidential Technical Appendix 9.9**. It is important that their breeding locations are kept confidential to minimise the risk of persecution and disturbance. Following NatureScot (SNH 2016b) guidance, the amount of information contained in that Confidential Technical Appendix has been kept to a minimum but includes all data that indicate breeding locations.

Collision Risk Modelling

- 9.36 In order to further inform the determination of the likelihood of significant adverse effects occurring, collision risk modelling was carried out for all the key target species using the recently published NatureScot (2024) model. For the purpose of the modelling the rotor height envelope was assumed to be 38-200m (with a 162m diameter rotor and 119m hub height). Further details are provided in **Technical Appendix 9.6: Collision Risk Modelling Calculations**. The modelling included 12 key target species (whooper swan,

pink-footed goose, greylag goose, red kite, goshawk, peregrine, golden plover, lapwing, curlew, common gull, herring gull and black-headed gull).

- 9.37 The NatureScot-recommended collision risk model was used in this assessment (Band 2024). The model runs as a two-stage process. Firstly, the risk is calculated with the assumption that flight patterns are unaffected by the presence of the wind turbines, i.e. that no avoidance action is taken. This is essentially a mechanistic calculation, with the collision risk calculated as the product of (i) the probability of a bird flying through the rotor swept area, and (ii) the probability of a bird colliding if it does so. This probability is then multiplied by the estimated numbers of bird movements through the wind farm rotors at the risk height (i.e. the height of the rotating rotor blades) in order to estimate the theoretical numbers at risk of collision if they take no avoiding action.
- 9.38 The second stage then incorporates the probability that the birds, rather than flying blindly into the wind turbines, will actually take a degree of avoiding action, as shown to occur in all studies of birds at existing wind farms. NatureScot recommends a precautionary approach, using a value of 98% as a general default avoidance rate, 99% for some larger raptors (including red kite, Urquhart and Whitfield 2016) and 99.8% for geese (NatureScot 2025). This precautionary approach is useful as an initial filter to identify sites where collision risk is clearly not an issue but does not necessarily provide a realistic estimate of actual likely collision rates when compared with data from existing wind farms. The magnitude of the change was determined as a percentage increase in the existing baseline mortality (to put the potential wind farm mortality into the ecological context of the birds' population dynamics), though professional judgement was also applied in the assessment of any non-negligible magnitude collision risks predicted.
- 9.39 Details of the input data and the collision risk calculations are given in **Technical Appendix 9.6**. Body sizes and baseline mortality rates were taken from Robinson (2005) and Bilerman *et al.* (2026), and flight speeds from Alerstam *et al.* (2007).

Statement of Significance

- 9.40 A Statement of Significance is provided in the Residual Effects section of this chapter, see paragraphs 9.181 to 9.182 and Table 9-18.

Assumptions, Limitations and Confidence

- 9.41 No significant information gaps have been identified. Inevitably, with any ornithological survey, it cannot be guaranteed to detect all target species/individuals and surveys cannot be fully representative of all conditions (e.g. severely reduced visibility). However, in this case it was concluded that the baseline surveys provide a robust data set on which to carry out the assessment.
- 9.42 Though full access was available for the whole of the Proposed Development, access to a wider area around this was not possible because of landownership restrictions and confidentiality issues. Buffer areas were surveyed by viewing from within the Proposed Development and from public rights of way. The survey area for the 2023 breeding and the 2023-24 winter surveys was slightly reduced as the initial development site was smaller.
- 9.43 As a result of these access restrictions and minor survey area changes, the breeding bird populations within the potential impact zone of the Proposed Development may have been slightly underestimated, with the size of that underestimate dependent on the detectability of the species involved. For example, curlew and lapwing, both high visible species, are less likely to have been affected in comparison with more cryptic species

such as snipe. For the purposes of the assessment, it was assumed that all-population estimates that could be affected were minimum values and consideration given that slightly higher numbers could be affected. Consequently, the assessment remains robust.

Baseline Conditions

Current Baseline

Statutory Protected Sites

9.44 There are seven statutory designated nature conservation sites in the search area around the Proposed Development (5km for nationally important Sites of Special Scientific Interests (SSSI) and 20km for internationally important European Protected Special Protection Areas (SPA) and Ramsar Sites):

- **Solway Firth SPA** – 2km south from the Proposed Development (from the application boundary – all distances given are between closest points of this boundary and the protected site) – large estuarine/marine site designated for its non-breeding bird assemblage including internationally important numbers of red-throated diver, whooper swans, barnacle geese, golden plover, ringed plover and bar-tailed godwit; nationally important numbers of shelduck, teal, shoveler, goldeneye, grey plover, sanderling, dunlin, turnstone, common scoter, goosander, lapwing, cormorant, black-headed gull, common gull and herring gull; and migratory species including pink-footed geese, pintail, scaup, oystercatcher, knot, curlew and redshank.
- **Solway Firth SAC** – 2km south from the Proposed Development – designated for its river lamprey and sea lamprey populations and the following habitats: dune grassland, estuaries, glasswort and other annuals colonising mud and sand, intertidal mudflats and sandflats, reefs and subtidal sandbanks.
- **Upper Solway Flats and Marshes SSSI/Ramsar** – 2km south from the Proposed Development (and largely synonymous with the Solway Firth SPA) – notified for its breeding bird assemblage, nationally important wintering populations of oystercatcher, sanderling, knot, curlew, redshank, turnstone, golden plover, ringed plover, grey plover, bar-tailed godwit, and dunlin and internationally important wintering numbers of barnacle goose, pink-footed goose, shelduck, and whooper swan.
- **Raeburn Flow SSSI/SAC** – 3.8km north east from the Proposed Development – notified for its raised bogs but not any ornithological interest features.
- **South Solway Mosses SAC** – 6km south west from the Proposed Development – designated for its estuarine raised bogs but not any ornithological features.
- **River Eden SAC** – 9.3km south east from the Proposed Development – designated for its rich aquatic flora, alluvial forests, fish fauna and otters, but no ornithological features.
- **Langholm, Newcastleton Hills SPA** – 17.9km north east from the Proposed Development – upland moorland designated for its breeding hen harrier population (SPA), its upland breeding bird assemblage, upland habitats and geological interest (SSSI). The Proposed Development lies well outside the core range of 2km for hen harrier, so there would not be expected to be any effect on this SPA, but this will be further informed by analysis of the baseline site survey data.

- **Solway Mosses North SAC** – 19.7km west from the Proposed Development – designated for its raised bog but not any ornithological features.

9.45 The potential connectivity of each of the SPAs to the site is summarised in **Table 9-5**. This lists the qualifying features for each SPA, the distance from the Site at its closest point and an initial assessment of whether the site falls within the core range of each (as set out in SNH 2016a). As set out in this guidance, “*In most cases the core range should be used when determining whether there is connectivity between the proposal and the qualifying interests*”, so this has been used for this assessment (though with consideration of the maximum ranges too).

Table 9-5: Special Protection Ares within 20km of the Proposed Development, their qualifying features and likely connectivity to the Site

SPA	Distance from Proposed Development	Qualifying features	Qualifying features for which site lies within core range (SNH 2016a)
Solway Firth SPA/Ramsar site	2km	Internationally important wintering waterfowl community including bar-tailed godwit, barnacle goose, golden plover, whooper swan, ringed plover, curlew, dunlin, knot, oystercatcher, pink-footed goose, pintail and redshank	Whooper swan (up to 5km) Barnacle goose (15km, up to 25km) Pink-footed goose (15-20km) Common gull, herring gull and black-headed gull (no formal distance identified by NS but likely to be linked).
Langholm-Newcastle Hills SPA	18km	Breeding hen harrier	None – the Proposed Development lies outside the 2km core range for this species (and outside maximum range of 10km), so no likely connectivity.

Field Survey Results: Breeding Birds

9.46 **Table 9-6** summarises the breeding bird populations found within the survey area during each of the breeding bird surveys. It shows the estimated number of breeding pairs recorded during each of the two survey years (2023 and 2024). **Technical Appendices 9.1** and **9.2** provide further details of all the breeding bird populations.

Table 9-6: Breeding Bird Populations in the West Scales Core Survey Area (2023 and 2024)

Species	Estimated number of breeding pairs in 2023	Estimated number of breeding pairs in 2024
Greylag Goose	1	0
Shelduck	0	1
Mallard	11	7
Quail	0	1
Pheasant	5	8
Sparrowhawk	1	0
Buzzard	2	2

Species	Estimated number of breeding pairs in 2023	Estimated number of breeding pairs in 2024
Kestrel	2	1
Lapwing	1	1
Curlew	0	1
Stock Dove	3	7
Woodpigeon	27	29
Collared Dove	2	2
Great Spotted Woodpecker	2	1
Skylark	7	10
Swallow	16	8
Tree pipit	1	0
Meadow Pipit	15	10
Pied Wagtail	6	5
Wren	52	76
Duncock	13	6
Robin	18	29
Stonechat	2	3
Blackbird	38	39
Song Thrush	13	17
Mistle Thrush	4	2
Grasshopper Warbler	2	4
Sedge Warbler	8	6
Blackcap	7	10
Garden Warbler	0	1
Whitethroat	9	10
Chiffchaff	4	7
Willow Warbler	49	70
Goldcrest	5	14
Long-tailed Tit	5	2
Blue Tit	17	20
Great Tit	22	12
Coal Tit	17	14
Treecreeper	4	1
Jay	1	2
Magpie	2	2
Jackdaw	1	3

Species	Estimated number of breeding pairs in 2023	Estimated number of breeding pairs in 2024
Carrion Crow	22	29
Hooded Crow	1	0
Starling	5	19
House Sparrow	7	7
Tree Sparrow	0	2
Chaffinch	53	73
Goldfinch	27	22
Siskin	6	12
Linnet	11	6
Lesser Redpoll	6	1
Bullfinch	1	2
Yellowhammer	11	6
Reed Bunting	10	15

Species-Specific Breeding Bird Survey Results

- 9.47 Only a single species specially protected under Schedule 1 of the Wildlife and Countryside Act or listed in Annex 1 of the EU Birds Directive was recorded breeding within the core or the wider survey area in 2023 or 2024: a single pair of quail in 2023 (see **Confidential Technical Appendix 9.9**). None were found breeding in the wider survey area.
- 9.48 Other species were recorded breeding during these surveys within the wider survey area included:
- **Shelduck** – three pairs were breeding in the Todholes area to the west of the Proposed Development in 2023, and one in 2024. An additional pair bred just outside the south-eastern edge of the 2km zone on Kirtle Water in 2024.
 - **Buzzard** – three pairs were scattered across the wider survey area in 2023, and four in 2024.
 - **Sparrowhawk** – a pair was breeding in the south-eastern edge of the wider survey area in 2024.
 - **Curlew** – a pair on the farmland to the west of the Proposed Development in 2023 and 2024, and another to the south in 2024.
 - **Lapwing** – nine breeding pairs were recorded in 2023 but only one in 2024, all in the same area on farmland to the northeast of the Proposed Development.
 - **Raven** – a pair bred on the pylons to the south-east of the Proposed Development in 2023 but they were not seen there in 2024.
- 9.49 Barn owl was seen within the Proposed Development in 2023 and is likely to have been breeding. Further details are given in the **Confidential Technical Appendix 9.8**.
- 9.50 The following additional key target species were recorded within the survey area, but no evidence was found for any of them breeding.

- Red kite;
- Goshawk; and
- Peregrine.

9.51 The Dumfries and Galloway raptor Study Group did not hold any records relevant to the Proposed Development (Chris Rollie, *in litt.*).

Vantage Point Survey Results: Breeding Season

9.52 The rates of bird flight movement observed across the site during the breeding season VP surveys are summarised in **Table 9-7**. This gives the flight rate per hour of observation in each year and the overall total number of flights recorded.

9.53 **Table 9-7** also gives the percentage of flights of each species that were recorded at rotor height over both years' baseline data (rotor height has been assumed for the purpose of the assessment as 38-200m).

Table 9-7: Key Species Flight Rates recorded over the VP survey area during the 2023 and 2024 breeding season vantage point surveys

Species	Flight rate in 2023 (birds/hour)	Flight rate in 2024 (birds/hour)	Total number observed	% flights at rotor height (38-200 m)
Pink-footed Goose	-	9.3	447	84%
Greylag Goose	2.7	0.1	133	23%
Shelduck	0.1	0.1	11	0%
Mallard	0.5	1.2	82	3%
Little Egret	0.04	0.02	3	0%
Grey Heron	0.3	0.1	17	20%
Red Kite	0.04	0.02	3	75%
Goshawk	-	0.02	1	50%
Sparrowhawk	0.1	0.1	11	27%
Buzzard	1.5	2.2	176	29%
Kestrel	0.6	0.5	52	3%
Peregrine	0.1	0.04	5	88%
Oystercatcher	0.02	0.1	8	50%
Golden Plover	-	0.04	2	60%
Lapwing	0.2	1.4	74	26%
Snipe	0.02	-	1	0%
Whimbrel	0.02	-	1	0%
Curlew	0.1	0.3	21	63%
Common Gull	87.5	5.1	4,445	45%
Lesser Black-backed Gull	25.6	43.0	3,295	30%
Herring Gull	12.9	0.6	645	30%

Great Black-backed Gull	0.04	0.04	4	29%
Black-headed Gull	68.7	5.6	3,564	48%

Results: Winter Field Surveys

Daytime Surveys

9.54 The results of the winter field surveys are summarised in **Table 9-8**. The Table shows the mean and peak counts recorded on the ground within 2km of the Proposed Development in each of the survey years (September 2023-March 2024 and September 2024-March 2025).

Table 9-8: Autumn/Winter Bird Populations (wintering waterfowl survey area during 2023-24 and 2024-25) – daytime surveys

Species	Mean count 2023-24	Mean count 2024-25	Peak count 2023-24	Peak count 2024-25
Mute Swan	0.1	-	2	-
Whooper Swan	11.0	19.2	30	50
Pink-footed Goose	446.8	289.8	2,100	1,255
Greylag Goose	22.4	18.4	66	155
Shelduck	0.1	0.4	1	4
Wigeon	-	0.1	-	1
Teal	-	3.4	-	16
Mallard	-	3.5	-	16
Shoveler	-	0.1	-	2
Little Egret	0.2	0.1	2	1
Grey Heron	1.3	0.1	5	1
Sparrowhawk	-	0.1	-	1
Buzzard	1.4	1.7	6	5
Kestrel	0.3	1.6	1	4
Peregrine	0.1	0.1	1	1
Oystercatcher	-	5.3	-	31
Golden Plover	3.2	21.4	30	299
Lapwing	39.1	94.4	222	509
Ruff	0.1	-	2	-
Black-tailed Godwit	-	0.4	-	5
Curlew	14.0	40.3	57	155
Common Gull	644.3	318.9	2,443	764
Lesser Black-backed Gull	9.1	3.9	59	12

Species	Mean count 2023-24	Mean count 2024-25	Peak count 2023-24	Peak count 2024-25
Herring Gull	22.3	24.3	115	173
Great Black-backed Gull	0.2	-	2	-
Black-headed Gull	56.4	78.9	388	526

Nocturnal Surveys

9.55 The results of the winter field surveys are summarised in **Table 9-9**. The Table shows the mean and peak counts recorded on the ground within 2km of the Proposed Development during the September 2024-March 2025 surveys.

Table 9-9: Autumn/Winter Bird Populations during the 2024-25 nocturnal surveys

Species	Mean count 2024-25	Peak count 2024-25
Pink-footed Goose	59.6	463
Wigeon	0.1	1
Teal	0.3	3
Mallard	0.3	2
Golden Plover	0.8	7
Lapwing	6.8	45
Curlew	0.1	1
Barn Owl	0.3	1
Tawny Owl	0.3	1

Vantage Point Survey Results: Winter

9.56 The rates of bird flight movement observed across the Site during the autumn/winter VP surveys are summarised in **Table 9-10**. This shows a comparison of the flight rates recorded in each of the two autumn/winters (2023-24 and 2024-25). **Table 9-10** also gives the overall percentage of flights of each species that were recorded at rotor height (38-200m).

Table 9-10: Key Species Flight Rates recorded over the VP survey area during the 2023-24 and 2024-25 autumn/winter vantage point surveys

Species	Flight rate in 2023-24 (birds/hour)	Flight rate in 2024-25 (birds/hour)	Total number observed	% flights at rotor height (38-200 m)
Mute Swan	0.1	-	3	0%
Whooper Swan	1.4	1.4	134	21%
Pink-footed Goose	408.9	274.1	32,784	84%
Greylag Goose	2.8	3.4	294	23%

Shelduck	0.04	-	2	0%
Teal	-	0.3	12	100%
Mallard	0.8	3.0	183	3%
Goosander	-	0.04	2	100%
Cormorant	0.04	-	2	100%
Little Egret	0.02	0.1	4	0%
Grey Heron	0.1	0.2	15	20%
Red Kite	-	0.02	1	75%
Goshawk	0.04	0.02	3	50%
Sparrowhawk	0.1	0.2	15	27%
Buzzard	1.7	2.0	175	29%
Kestrel	0.5	0.9	70	3%
Peregrine	0.04	0.04	4	88%
Golden Plover	2.7	1.3	189	60%
Lapwing	5.3	6.8	581	26%
Ruff	0.04	-	2	0%
Snipe	0.8	0.4	57	0%
Curlew	-	0.2	10	63%
Green Sandpiper	0.02	0.02	2	0%
Mediterranean Gull	0.04	-	2	0%
Common Gull	759.3	479.0	59,440	45%
Lesser Black-backed Gull	90.3	55.8	7,008	30%
Herring Gull	20.7	33.8	2,615	30%
Great Black-backed Gull	0.6	0.2	40	29%
Black-headed Gull	147.8	88.1	11,325	48%
Kittiwake	0.02	-	1	0%

Future Baseline

- 9.57 In the “do nothing” scenario without the construction of the Proposed Development, it is anticipated that the current management of the Site will continue as part of wider estate management activities and that the bird populations currently present will continue at the site, though subject to changes occurring at the national and regional levels, such as the national decline in curlew population (Franks *et al.* 2017). Local future trends in numbers will be dependent primarily on habitat change. Further afforestation could reduce open-ground species, such as the breeding waders, but temporarily improve conditions for black grouse and hen harriers. The main current land use within the site (stock grazing) would likely continue. Baseline surveys carried out for the Proposed Development represent a snapshot of the bird community at the time and changes are also likely to

occur as a result of climate change, though would be anticipated to be minor over the lifetime of the Proposed Development.

Ornithological Conservation Evaluation

Conservation Evaluation of Breeding Bird Populations

9.58 The conservation value of the breeding bird populations was determined using the criteria specified in **Table 9-2**. The results are summarised in **Table 9-11**. All species with very high – low value have been taken forward in the ornithological assessment (i.e. only those with negligible value have been scoped out at this stage).

Table 9-11: Conservation Evaluation of the West Scales Breeding Bird Populations (2023 and 2024)

Species	Breeding pairs (peak 2023 and 2024)	EU Ann 1	WCA Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP priority sp	Conservation Value
Greylag Goose	1			A			Low
Shelduck	1			A			Low
Mallard	11			A			Low
Quail	1		✓	A			High
Pheasant	8						Negligible
Sparrowhawk	1			A			Low
Buzzard ²	2						Negligible
Kestrel ²	2			A		✓	Low
Lapwing ²	1			R	✓	✓	Medium
Curlew ²	1			R	✓	✓	Medium
Stock Dove ¹	7			A			Low
Woodpigeon	29			A			Low
Collared Dove	2						Negligible
Great Spotted Woodpecker	2						Negligible
Skylark	10			R	✓	✓	Medium
Swallow ¹	16						Negligible
Tree Pipit	1			R	✓	✓	Medium
Meadow Pipit	15			A			Low
Pied Wagtail ¹	6						Negligible
Wren	76			A			Low
Dunnoch	13			A	✓		Medium
Robin	29						Negligible

Species	Breeding pairs (peak 2023 and 2024)	EU Ann 1	WCA Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP priority sp	Conservation Value
Stonechat	3						Negligible
Blackbird	39						Negligible
Song Thrush	17			A	✓	✓	Medium
Mistle Thrush	4			R			Low
Grasshopper Warbler	4			R	✓	✓	Medium
Sedge Warbler	8			A			Low
Blackcap	10						Negligible
Garden Warbler	1						Negligible
Whitethroat	10						Negligible
Chiffchaff	7						Negligible
Willow Warbler	70			A			Low
Goldcrest	14						Negligible
Long-tailed Tit	5						Negligible
Blue Tit	20						Negligible
Great Tit	22						Negligible
Coal Tit	17						Negligible
Treecreeper	4						Negligible
Jay	2						Negligible
Magpie ¹	2						Negligible
Jackdaw	3						Negligible
Carrion Crow	29						Negligible
Hooded Crow	1					✓	Low
Starling	19			R	✓		Medium
House Sparrow	7			R	✓	✓	Medium
Tree Sparrow ¹	2			R	✓	✓	Medium
Chaffinch	73						Negligible
Goldfinch	27						Negligible
Siskin	12					✓	Low
Linnet ¹	11			R	✓	✓	Medium
Lesser Redpoll	6				✓	✓	Medium
Bullfinch	2			A	✓	✓	Medium
Yellowhammer ¹	11			R	✓	✓	Medium

Species	Breeding pairs (peak 2023 and 2024)	EU Ann 1	WCA Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP priority sp	Conservation Value
Reed Bunting ¹	15			A	✓	✓	Medium

Note: superscripts indicate contribution to the JNCC breeding bird assemblage score for the main habitat within the survey area, 'Lowland farmland'.

- 9.59 One high-value species was found breeding within the core survey area: quail (a single pair on the north-eastern edge of the survey area in 2024, see **Confidential Technical Appendix 9.8**). There were occasional records of barn owl during the winter night surveys, suggesting birds may be resident in the area, but no evidence of breeding was found within the survey area.
- 9.60 Fifteen breeding species were classed as medium conservation value: lapwing, curlew, skylark, tree pipit, dunnoek, song thrush, grasshopper warbler, starling, house sparrow, tree sparrow, linnet, lesser redpoll, bullfinch, yellowhammer and reed bunting. All were classed as medium value because of their listing on the UK Biodiversity Action Plan list of priority species. They are mostly species that have declined widely across Britain but are still common and widespread.
- 9.61 A further 14 breeding species were classed as low sensitivity, through their listing on RSPB *et al.*'s (Stanbury *et al.* 2021) amber lists of birds of conservation concern and/or the Scottish Biodiversity List.
- 9.62 The overall conservation value of the breeding bird community in 2023 and 2024, measured from the core survey data as the breeding bird assemblage score, was 16. This is below the threshold for national importance (23) for the main habitat within the survey area, 'Lowland Farmland' (Drewitt *et al.* 2020), so the breeding bird assemblage has been classed as regionally important (medium value).
- 9.63 Other species observed during the breeding bird surveys but not breeding included two very high-value species, whooper swan and pink-footed goose (Solway Firth SPA qualifying species); six high-value species (little egret, goshawk, red kite, peregrine, golden plover and whimbrel) all EU Annex 1/Wildlife and Countryside Act Schedule 1 species; three medium-value (herring gull, a UK BAP priority species, and common gull and black-headed gull, seen in regionally important numbers); and nine additional low-value species (through their red/amber listing). These species were generally seen only infrequently in generally low numbers during these surveys.

Conservation Evaluation of Wintering Bird Populations

- 9.64 The conservation value of the wintering bird populations was determined using the criteria specified in **Table 9-2**. The results are summarised in **Table 9-12**. All species with very high – low value have been taken forward in the ornithological assessment (i.e. only those with negligible value have been scoped out at this stage).
- 9.65 This included 14 very high value species (SPA/Ramsar site species; whooper swan, pink-footed goose, barnacle goose, shelduck, teal, shoveler, cormorant, oystercatcher, golden plover, lapwing, curlew, common gull, herring gull and black-headed gull), eight high sensitivity species (little egret, red kite, goshawk, peregrine, ruff, green sandpiper, Mediterranean gull and barn owl) that are EU Birds Directive Annex 1/Wildlife and

Countryside Act Schedule 1 species, one medium value (lesser black-backed gull, present in regionally important numbers) and 12 low sensitivity species.

Table 9-12: Conservation Evaluation of the West Scales Wintering Bird Populations (2023-24 and 2024-25)

Species	Peak	SPA sp	>1% NHZ	EU Ann 1	WCA Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP priority sp	Conservation Value
Mute Swan	2								Negligible
Whooper Swan	50	Q	✓	✓	✓	A		✓	Very high
Pink-footed Goose	2,100	Q	✓			A			Very high
Greylag Goose	155					A			Low
Barnacle Goose ²	(390)	Q	✓	✓		A		✓	Very high
Shelduck	6	A				A			Very high
Wigeon	1					A			Low
Teal	16	A				A			Very high
Mallard	17					A			Low
Shoveler	2	A				A			Very high
Goosander	2								Negligible
Cormorant	1	A							Very high
Little Egret	2			✓					High
Grey Heron	5								Negligible
Red Kite	1			✓	✓			✓	High
Goshawk	1				✓				High
Sparrowhawk	2					A			Low
Buzzard	6								Negligible
Kestrel	4					A		✓	Low
Peregrine	1			✓	✓			✓	High
Oystercatcher	31	Q				A			Very high
Golden Plover	354	Q	✓	✓				✓	Very high
Lapwing	525	A	✓			R	✓	✓	Very high
Snipe	6					A			Low

² Included in the Table but all flocks observed were outwith the survey area.

Species	Peak	SPA sp	>1% NHZ	EU Ann 1	WCA Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP priority sp	Conservation Value
Black-tailed Godwit	5				✓	R	✓	✓	High
Ruff	1			✓	✓	R		✓	High
Curlew	155	Q	✓			R	✓	✓	Very high
Green Sandpiper	1				✓	A		✓	High
Mediterranean Gull	2			✓	✓	A			High
Common Gull	4,906	A	✓			A			Very high
Lesser Black-backed Gull	1,081		✓			A			Medium
Herring Gull	565	A	✓			R	✓	✓	Very high
Great Black-backed Gull	6					A			Low
Black-headed Gull	2,291	A	✓			A			Very high
Kittiwake	1					R			Low
Barn Owl	1				✓			✓	High
Tawny Owl	1					A			Low

9.66 The key Autumn/Winter birds recorded were as follows:

- **Whooper swan** – a herd of up to 50 whooper swans was recorded regularly on the farmland to the east of the Site from late November 2024 onwards (1-3km from the initial proposed wind turbine locations), in the same area where up to 30 were recorded in 2023-24. None were seen on the ground within the Site itself, and there were only occasional flights over in both winters. Their flight lines are shown in **Figure 9.4**. The peak count (50) represents 19% of the SPA population of 268.
- **Pink-footed goose** – this species fed regularly in the wider survey area, though not within the Site itself (the nearest feeding flock was recorded 1.1km from the proposed wind turbine location, compared with 0.7km in 2023-24). Large numbers overflowed the Site, mainly when moving between inland feeding areas and night roosts on the Solway Firth. Their flight lines are shown in **Figure 9.5**. The peak count over the two winters (2,100) represents 18% of the SPA population of 11,508.
- **Greylag goose** – this species was found mainly in the north-western part of the survey area, with no records on the ground within the Site. They regularly overflowed the site but only in small numbers (**Figure 9.6**). The peak count of 155 is 28% of the Solway Estuary population of 554, though this is not an SPA-qualifying or named assemblage species.
- **Golden Plover** – occasional records of this species were scattered across the survey area, including a flock of 117 within the Site on 20 November 2024. Numbers were generally higher in 2024-25 than 2023-24, but all in that winter were from a

single date (20 November 2024). There were also occasional flocks seen overflying during the VP surveys. Their flight lines are shown in **Figure 9.9**. The peak count (354) represents 6% of the SPA population of 6,169.

- **Lapwing** – recorded more regularly, with a peak count of 222. They were seen across the survey area, but only two records on the ground within the Site (a single individual and a flock of 67), and only occasional overflights. Their flight lines are shown in **Figure 9.10**. The peak count (525) represents 9% of the SPA population of 5,851.
- **Curlew** – mainly found to the south of the Site. None were seen on the ground within the Proposed Development site. Only five curlew flights were recorded during the VP surveys (**Figure 9.11**). The peak count (155) represents 7% of the SPA population of 2,251.
- **Common Gull** – this species was abundant across most of the survey area, though they were found in lower numbers within and near the Site (peak 33 within the Site). Large numbers overflow the Site, mainly when moving between inland feeding areas and night roosts on the Solway Firth. Their flight lines are shown in **Figure 9.12**. The peak count (4,906, recorded during the 23 February 2025 VP survey) exceeds the SPA population of 4,074. However, the WeBS SPA count is likely a substantial underestimate, as it does not specifically cover the dawn/dusk period when the gulls would be using the SPA (rather than foraging on surrounding agricultural land). It is, though, clear that the survey area is important for this species.
- **Herring Gull** – herring gulls were also widely distributed across the survey area (peak 565), with only two records from within the Site (30 birds on 23 October 2023 and a single individual on 06 November 2024). Their flight lines are shown in **Figure 9.13**. The peak count represents 21% of the SPA population of 2,700 (though, as for common gull, the SPA population is likely to be an underestimate).
- **Black-headed Gull** – this species was widely distributed across the survey area but again with only three records on the ground within the Site (12 on 19 December 2024, and 25 and 2 on 25 January 2025). It was frequently seen overflying. Their flight lines are shown in **Figure 9.14**. The peak count (2,291) represents 32% of the SPA population of 7,120 (though, as for common gull and herring gull, the SPA population is likely to be an underestimate).
- **Barn Owl** – single individuals were recorded regularly during the night surveys, scattered across the survey area but including within the Proposed Development.

9.67 Lastly, there were two additional records of another Solway Firth SPA species, **barnacle goose**, but these were only seen just outside the survey area (5 over-flying on 25 January 2025 and 390 on 07 March 2025 feeding 2.8km south east from the nearest proposed wind turbine). In the 2023-24 winter, two flocks were seen on 22 November 2022: 200 2.8km south east from the nearest proposed wind turbine, and 750 3.4km south east. There was no evidence that the survey area was important to this species in either winter.

Assessment of Effects

9.68 The key issues for the assessment of potential ornithological effects relating to the Proposed Development are identified below (see SNH 2018a):

- direct loss of bird habitat through construction of the new access track, wind turbine bases and solar PV arrays;

- indirect disturbance of birds during construction and operation; and
- direct collision risk to birds during operation (wind turbines).

9.69 No ornithological issues were scoped out from this assessment, though, following SNH (2018a) guidance, the assessment has focussed on the key species likely to be affected by the Proposed Development. Key species were defined using the following criteria:

- species listed on Annex 1 of the EU Birds Directive;
- species listed on Schedule 1 of the 1981 Wildlife & Countryside Act; and
- species identified by SNH 2018a as 'Priority bird species for assessment when considering the development of onshore wind farms in Scotland'. These include:
 - species that are widespread across Scotland which utilise habitats or have flight behaviours that may be adversely affected by a wind farm;
 - 'restricted range' species; and
 - red-listed species on the Birds of Conservation Concern list.

9.70 The assessment also considers and applies the tests given in NS's guidance on the assessment of effects of wind farms in the wider countryside (SNH 2018a). This guidance lists a range of priority '*species potentially at risk of impact*', of which the following were recorded during the baseline surveys: whooper swan, pink-footed goose, greylag goose, goshawk, red kite, peregrine, golden plover, lapwing, curlew, and herring gull. The potential effects of the Proposed Development on each of these have been specifically considered and assessed below.

NatureScot Key Species Potentially at Risk

- 9.71 NatureScot (SNH 2018a) has identified a range of key species at potential risk of impact from wind farms. These species form the key focus of the ornithological impact assessment in the following section. In total, only one such species potentially at risk of impact were found breeding within the potential disturbance zone around the Site (see **Figure 9.3**), a single pair of curlew in 2024.
- 9.72 Key species recorded using the potential disturbance zone but not breeding there included red kite, goshawk, golden plover, lapwing, curlew, peregrine and herring gull.
- 9.73 Key species recorded at risk of collision (i.e. flying through the site at rotor height) included whooper swan, pink-footed goose, greylag goose, red kite, goshawk, curlew, golden plover, lapwing, and peregrine.

Potential Construction Effects

Direct Effects: Loss of Habitat (direct loss of habitat through construction of the Proposed Development)

Nature of Impact

- 9.74 There will be a direct loss of habitat resulting from the construction of the Proposed Development. Table 3.1 of **Technical Appendix 8.5 Outline Habitat Management Plan** sets out the losses of each habitat that would occur as a result of the Proposed Development.

- 9.75 Habitat loss is the potential impact from large-scale solar PV development that has raised most concern to date in relation to birds (Lovich and Ennen 2011, Smit 2012, UNEP/CMS 2015).
- 9.76 The permanent land take would be limited to the wind turbine foundations, solar PV modules, access tracks, permanent crane hardstands, a substation compound, and an anemometry mast, which account collectively for 9.06 ha. of permanent habitat loss. Additional temporary land take during construction would add further temporary habitat loss of about another 5.26 ha. The habitat lost would be predominantly agriculturally-improved grassland.
- 9.77 The use of existing tracks and the careful selection of routes for the access tracks and wind turbine locations, alongside use of proven construction techniques would ensure that such effects on birds would be of low/negligible magnitude (even in a local context). In addition, the applicant has committed to the production and implementation of a Construction Environmental Management Plan (CEMP) to the satisfaction of NS and other relevant stakeholders, before construction commences, and would follow Windfarm Good Construction Guidance by Scottish Renewables *et al.* (2019).

Ornithological Receptor Value

- 9.78 Direct habitat loss will reduce habitat availability to the species breeding and foraging within the Proposed Development. The numbers breeding within the Proposed Development footprint are shown in **Table 9-13**, including one NS key species (curlew – 1 pair), three additional medium value species (skylark, song thrush and reed bunting) and five low value species (stock dove, woodpigeon, meadow pipit, wren and mistle thrush).
- 9.79 Non-breeding birds affected by this habitat loss observed using the Proposed Development footprint included five very high value SPA species (teal, lapwing, golden plover, common gull and herring gull), though all were only recorded there infrequently and in very low numbers. One high value species (barn owl) was seen there and one low value species (kestrel). There was no evidence that this zone was important for any of these species.

Magnitude of Change

- 9.80 Direct habitat loss to breeding and non-breeding birds will be negligible in the context of the availability of the habitats that will be affected (predominantly agriculturally improved grassland), and in the context of the sizes of these birds' home ranges.

Significance of Effects

- 9.81 The very small loss of breeding and foraging habitat of negligible magnitude on high/medium value receptors results in an effect of negligible significance (as per **Table 9-4**) for all bird species affected, which is considered **not significant** in EIA terms.
- 9.82 Furthermore, the enhancement measures set out in **Technical Appendix 8.5: Outline Habitat Management Plan** will deliver a net gain to local bird populations through the restoration and enhancement of rush pasture and transition mire, and the creation of native woodland and hedgerows.

Indirect Effects: Construction Disturbance (Noise and Visual)

- 9.83 Some short-term displacement during wind farm operation of species such as curlew may occur during construction, but populations have subsequently re-established themselves

(Bullen Consultants 2002). Most species that have been studied have not been significantly affected (Phillips 1994, Thomas 1999, Gill 2004, Devereaux *et al.* 2008, Percival and Percival, 2011). An RSPB study (Pearce-Higgins *et al.* 2012) reported partial displacement of breeding upland birds around wind turbines for a distance up to 800m and reported significant reductions in golden plover density up to 400m from wind turbines, though another study on the same species found no significant disturbance to this species (Douglas *et al.* 2011). The scale and pattern of displacement is similar to that reported for breeding waders in general (Hotker *et al.* 2006), with most studies reporting only small scale (0-200m) displacement distances and a smaller number over a greater distance. Noise and disturbance generated by construction can also result from solar farms (Jenkins *et al.* 2017).

- 9.84 It was assumed for the purposes of the assessment that all birds occurring within 500m of wind turbines, solar PV modules and other Site infrastructure were at risk of disturbance during construction.
- 9.85 The indirect effect of disturbance is likely to be highest during construction owing to the increased activity onsite. Pearce-Higgins *et al.* (2012) found that red grouse, snipe and curlew densities all declined at wind farm sites during construction, whilst densities of skylark and stonechat increased. Construction also involves the presence of work personnel onsite which itself can be an important source of potential disturbance. Pearce-Higgins *et al.*, for example, reported decreases in curlew density during construction of 40% and snipe by 53%. Other species, such as golden plover (Sansom *et al.* 2016), though have been shown to be unaffected by construction disturbance. The assessment of construction disturbance has assumed that all birds within 500m of the Proposed Development could potentially be at risk of displacement (Percival 2005, Drewitt and Langston 2006). It should be noted that only partial displacement within this zone might be expected (Pearce-Higgins *et al.* 2009), but it is assumed for the purposes of this assessment that all birds occurring within the zone are at risk of disturbance. For NatureScot priority species (SNH 2018a) consideration has also been given to the disturbance distances given in Goodship and Furness (2022).

Nature of the Impact

- 9.86 The estimated onsite construction period for the Proposed Development is expected to last approximately 16 months. The construction works will take place throughout the year, including the summer months when the weather is more favourable and ground conditions are drier.
- 9.87 Noise and visual disturbance associated with construction activities could potentially affect breeding and foraging birds in the locality of the wind turbine positions, access tracks and other infrastructure components. Birds that are disturbed at breeding sites are vulnerable to a variety of potential effects that could lead to a reduction in the productivity or survival of their populations. These include the chilling or predation of exposed eggs and chicks and damage of eggs and chicks due to panicked adults. Birds subject to disturbance outside the breeding season may also feed less efficiently or resort to less favoured roosting areas, either of which may reduce their survival prospects. The potential impact will vary between species according to each species' tolerance of disturbance from human activity and the availability of suitable alternative breeding and foraging habitat.

Ornithological Receptor Value

- 9.88 **Table 9-13** shows the peak breeding bird populations of conservation importance (i.e. non-negligible value) that were found within the Proposed Development footprint (which

would be directly affected by habitat loss), those within 500m of the proposed wind turbine locations and within 500m of the other associated infrastructure (including access tracks and solar PV modules) during the baseline surveys, where this distance has been used to identify the potential disturbance zone (though also giving consideration to particularly sensitive species in a wider area around that).

Table 9-13. Conservation Importance of Breeding Birds in the West Scales Energy Park Potential Disturbance Zone

Species	Peak breeding pairs within Proposed Development footprint	Peak breeding pairs <500 m from wind turbines	Peak breeding pairs <500 m from all infrastructure	Conservation Value Within Potential Disturbance Zone
Shelduck	0	0	1	Low
Mallard	0	5	5	Low
Kestrel	0	2	2	Low
Curlew	1	1	1	Medium
Stock Dove	1	2	4	Low
Woodpigeon	2	24	24	Low
Skylark	1	5	5	Medium
Tree Pipit	0	1	1	Medium
Meadow Pipit	1	11	13	Low
Wren	2	41	48	Low
Dunnock	0	4	5	Medium
Song Thrush	1	9	9	Medium
Mistle Thrush	1	2	3	Low
Grasshopper Warbler	0	2	2	Medium
Sedge Warbler	0	3	3	Low
Willow Warbler	0	49	53	Low
Hooded Crow	0	1	1	Low
Starling	0	5	15	Medium
House Sparrow	0	0	2	Medium
Tree Sparrow	0	2	2	Medium
Siskin	0	5	5	Low
Linnet	0	2	5	Medium
Lesser Redpoll	0	5	5	Medium
Yellowhammer	0	1	1	Medium
Reed Bunting	1	10	10	Medium

- 9.89 **Table 9-14** shows the peak wintering bird populations of conservation importance that were found within 500m of the proposed wind turbine locations and other associated infrastructure (including access tracks) during the daytime and nocturnal baseline surveys, where this distance has been used to identify the potential disturbance zone (though also giving consideration to particularly sensitive species in a wider area around that).

Table 9-14. Conservation Importance of Wintering Birds in the West Scales Energy Park Potential Disturbance Zone

Species	Peak winter count within Proposed Development footprint	Peak winter count <500 m from wind turbines	Peak winter count <500 m from all infrastructure	Conservation Value Within Potential Disturbance Zone
Teal	1	1	1	Very high
Mallard	0	1	1	Low
Sparrowhawk	0	1	1	Low
Kestrel	1	2	3	Low
Golden Plover	4	117	117	Very high
Lapwing	4	67	67	Very high
Common Gull	20	33	52	Very high
Lesser Black-backed Gull	0	8	8	Medium
Herring Gull	2	30	30	Very high
Black-headed Gull	0	27	37	Very high
Barn Owl	1	1	1	High

Effects of Construction Disturbance

- 9.90 The following section assesses the construction disturbance effects on each of the NatureScot (SNH 2018) key species that were found within the potential disturbance zone within the breeding season (**Table 9-13**) and at other times of year (**Table 9-14**).

Lapwing

- 9.91 No lapwing were recorded breeding within 500m of the Proposed Development infrastructure, so this species would not be likely to be affected by construction disturbance at that time of year.
- 9.92 A peak of 67 lapwing was recorded on the ground within 500m of the Proposed Development infrastructure, so would be at risk of disturbance during construction. The only other record was of a single individual during the day and a small flock of four at night on one occasion, so it is clear that this zone is not important for this species. Lapwing is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during construction, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 67 individuals would be of negligible magnitude on a

very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Golden Plover

- 9.93 No golden plover were recorded breeding within the survey area, so this species would not be likely to be affected by construction disturbance at that time of year.
- 9.94 A peak of 117 golden plover was recorded on the ground within 500m of the Proposed Development infrastructure, so would be at risk of disturbance during construction. The only other records were of small flocks of five during the day and four at night on one occasion each, so it is clear that this zone is not important for this species. Golden plover is a qualifying species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during construction, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 117 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Curlew

- 9.95 Only one NS Key Species was found breeding within 500m of the Proposed Development infrastructure, a single pair of curlew (**Figure 9.3**). This species is a red-listed Scottish BAP species, so has been classed as medium value (though a Solway Firth SPA species this is for its non-breeding rather than its breeding population). The NHZ population is 4,284 pairs (Wilson *et al.* 2015), so the numbers within the potential disturbance zone would only be considered locally important.
- 9.96 This species has been shown to be affected by disturbance during breeding, particularly during construction (Pearce-Higgins *et al.* 2012), so some displacement of breeding birds during the construction phase would be expected. The effect in the worst-case scenario, assuming complete displacement from this zone, would be of negligible magnitude on a medium value receptor, which would be of negligible significance and **not significant** in EIA terms.
- 9.97 No curlew were recorded outside the breeding season on the ground within potential impact zone, so this species would not be likely to be affected by construction disturbance at that time of year.

Common Gull

- 9.98 This species was not breeding within 500m of the Proposed Development, so disturbance effects on this species would be limited to non-breeding birds.
- 9.99 A peak of 52 common gulls was recorded on the ground within 500m of the Proposed Development infrastructure, so would be at risk of disturbance during construction. There were six other records over the two baseline winters of 1-40 individuals. Common gull is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during construction, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 52 individuals would be of negligible magnitude on a

very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Herring Gull

- 9.100 This species was not breeding within 500m of the Proposed Development, so disturbance effects on this species would be limited to non-breeding birds.
- 9.101 A peak of 30 herring gulls was recorded on the ground within 500m of the Proposed Development infrastructure, so would be at risk of disturbance during construction. The only other records were of two records of two birds and a single individual, so it is clear that this zone is not important for this species. Herring gull is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during construction, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 30 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Black-headed Gull

- 9.102 This species was not breeding within 500m of the Proposed Development, so disturbance effects on this species would be limited to non-breeding birds.
- 9.103 A peak of 27 black-headed gulls was recorded on the ground within 500m of the Proposed Development infrastructure, so would be at risk of disturbance during construction. There were three other records in this zone during the two baseline winters of two, four and 12 individuals. Black-headed gull is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during construction, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 27 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Barn Owl

- 9.104 Barn owls (high value) were recorded regularly during the autumn/winter night surveys, so are likely to be resident in the general area, though no evidence was found of breeding within the potential impact zone of the Proposed Development infrastructure. A single pair would be regionally important. It is possible that they could nest closer to the Site in future years. This species is specially protected from disturbance under Schedule 1 of the Wildlife and Countryside Act, so mitigation measures would be put in place to ensure **no significant effect** during construction.

Other Scarce Raptor Species

- 9.105 Several other high value raptor species were observed flying over the Site during the baseline surveys, including red kite, goshawk and peregrine. All were, however, only seen infrequently, with no evidence of breeding within the survey area or that it was important for foraging. Whilst some displacement may occur during construction, this would be an

effect of negligible magnitude and significance on all these species, and therefore **not significant** in EIA terms.

- 9.106 Furthermore, these species would benefit from the enhancement measures set out in **Technical Appendix 8.5: Outline Management Plan**, which will deliver a net gain to local bird populations through the restoration and enhancement of rush pasture and transition mire, and the creation of native woodland and hedgerows.

Potential Operational Effects

Operational Displacement

Nature of Impact

- 9.107 The presence and operation of wind turbines and solar PV modules could potentially displace birds from breeding and foraging areas. Birds may avoid the operational wind turbines and the surrounding area due to the visual appearance of large vertical structures in the landscape, the mechanical noises and wind noises of the blades, or the presence of periodic maintenance vehicles and personnel. Solar PV modules, too, could cause displacement. Displacement could force birds into less suitable habitat, and this might reduce their ability to survive and reproduce. If not displaced, birds may experience reduced foraging success or reduced productivity. Displacement effects can vary over time as birds habituate to the presence of operating wind turbines/solar PV modules or site-faithful birds are lost from the population.

Ornithological Receptor Value

- 9.108 **Table 9-13** shows the peak breeding bird populations that were found within 500m of the proposed wind turbine locations during the baseline surveys, where this distance has been used to identify the potential operational distance zone (though also giving consideration to particularly sensitive species in a wider area around that).
- 9.109 **Table 9-14** shows the peak non-breeding bird populations that were found on the ground within 500m of the proposed wind turbine locations during the baseline surveys, where this distance has been used to identify the potential distance zone (though also giving consideration to particularly sensitive species in a wider area around that).

Effects of Operational Disturbance on NatureScot Key Species

- 9.110 The following section assesses the operational disturbance effects on each of the NS key species found within the potential disturbance zone within the breeding season (**Table 9-13**) and at other times of year (**Table 9-14**).

Lapwing

- 9.111 No lapwing were recorded breeding within 500m of the proposed wind turbines, so this species would not be likely to be affected by operational disturbance at that time of year.
- 9.112 A peak of 67 lapwing was recorded on the ground within 500m of the proposed wind turbines, so would be at risk of disturbance during operation. The only other record was of a single individual during the day and a small flock of four at night on one occasion, so it is clear that this zone is not important for this species. Lapwing is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential

disturbance zone would be only locally important. Some disturbance of these birds may occur during operation, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 67 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Golden Plover

- 9.113 No golden plover were recorded breeding within the survey area, so this species would not be likely to be affected by construction disturbance at that time of year.
- 9.114 A peak of 117 golden plover was recorded on the ground within 500m of the proposed wind turbines, so would be at risk of disturbance during operation. The only other records were of small flocks of five during the day and four at night on one occasion each, so it is clear that this zone is not important for this species. Golden plover is a qualifying species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during operation, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 117 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Curlew

- 9.115 Only one NS Key Species was found breeding within 500m of the proposed wind turbines, a single pair of curlew (**Figure 9.3**). This species is a red-listed Scottish BAP species, so has been classed as medium value (though a Solway Firth SPA species this is for its non-breeding rather than its breeding population). The NHZ population is 4,284 pairs (Wilson *et al.* 2015), so the numbers within the potential disturbance zone would only be considered locally important.
- 9.116 This species has been shown to be affected by disturbance during breeding, particularly during construction (Pearce-Higgins *et al.* 2012), so some displacement of breeding birds during the operational phase would be expected. The effect in the worst-case scenario, assuming complete displacement from this zone, would be of negligible magnitude on a medium value receptor, which would be of negligible significance and **not significant** in EIA terms.
- 9.117 No curlew were recorded outside the breeding season on the ground within potential impact zone, so this species would not be likely to be affected by operational disturbance at that time of year.

Common Gull

- 9.118 This species was not breeding within 500m of the Proposed Development, so disturbance effects on this species would be limited to non-breeding birds.
- 9.119 A peak of 33 common gulls was recorded on the ground within 500m of the proposed wind turbines, so would be at risk of disturbance during operation. There were three other records in this zone over the two baseline winters, of 2-20 individuals. Common gull is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during operation, though probably not the complete

displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 33 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Herring Gull

- 9.120 This species was not breeding within 500m of the Proposed Development, so disturbance effects on this species would be limited to non-breeding birds.
- 9.121 A peak of 30 herring gulls was recorded on the ground within 500m of the proposed wind turbines so would be at risk of disturbance during operation. The only other records were of two birds together and a single individual, so it is clear that this zone is not important for this species. Herring gull is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during operation, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 30 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Black-headed Gull

- 9.122 This species was not breeding within 500m of the Proposed Development, so disturbance effects on this species would be limited to non-breeding birds.
- 9.123 A peak of 27 black-headed gulls was recorded on the ground within 500m of the proposed wind turbines, so would be at risk of disturbance during operation. There were two other records during the two baseline winters, of two and 12 individuals. Black-headed gull is an assemblage species for the Solway Firth SPA, so has been classed as very high value. No NHZ non-breeding population estimate is available (Wilson *et al.* 2015) but the numbers within the potential disturbance zone would be only locally important. Some disturbance of these birds may occur during operation, though probably not the complete displacement assumed in this worst-case assessment. Even in that worst case, an occasional displacement of up to 37 individuals would be of negligible magnitude on a very high value receptor, resulting in an effect of low significance, which would be **not significant** in EIA terms.

Barn Owl

- 9.124 Barn owls (high value) were recorded regularly during the autumn/winter night surveys, so are likely to be resident in the general area, though no evidence was found of breeding within the potential impact zone of the Proposed Development. A single pair would be regionally important. There may be some displacement during operation, but this would be only of negligible magnitude on a high value species, of very low significance and **not significant** in EIA terms.

Other scarce raptor species

- 9.125 Several other high value raptor species were observed flying over the Site during the baseline surveys, including red kite, goshawk and peregrine. All were, however, only seen infrequently, with no evidence of breeding within the survey area or that it was important for foraging for any of them. Whilst some displacement may occur during construction, this

would be an effect of negligible magnitude and significance on all these species, and therefore **not significant** in EIA terms.

- 9.126 Furthermore, these species would benefit from the enhancement measures set out in **Technical Appendix 8.5: Outline Habitat Management Plan**, which will deliver a net gain to local bird populations through the restoration and enhancement of rush pasture and transition mire, and the creation of native woodland and hedgerows

Direct Operational Effects: Collision Mortality

- 9.127 There have been a number of wind farms that have caused significant bird mortalities through collision, but their characteristics are very different to those at the Proposed Development. Most notably, at Altamont Pass in California and Tarifa in southern Spain, large numbers of raptors were killed through collision with wind turbines (Orloff and Flannery 1992, Janss 1998, Thelander *et al.* 2003). Such problems have occurred where large numbers of sensitive species occur in close proximity to very large numbers (hundreds/thousands) of wind turbines, and usually where the wind farm area provides a particularly attractive feeding resource. For onshore wind farm sites in the UK, with similar bird densities to the Site, collision rates have generally been very low and not considered to be significant (see, for example, Percival *et al.* 2015, Percival *et al.* 2018, Percival *et al.* 2025).
- 9.128 The Proposed Development's collision risk zone was taken as the wind turbines plus a 581m buffer (500m plus blade length of 81m, following NS guidance). Full details of the collision risk calculations are given in **Technical Appendix 9.6**.
- 9.129 Reference NHZ population sizes were derived from Wilson *et al.* (2015), and Solway Firth SPA/Ramsar populations from the most recently available WeBS five-year mean peak counts (Calbrade *et al.* 2025). For winter gulls, it was clear that the WeBS count considerably underestimated the numbers present, so instead the most recently published BTO Winter Gull Roost counts were used (Banks *et al.* 2007).

Nature of Impact

- 9.130 Birds that collide with a wind turbine blade are likely to be killed or fatally injured. Increased mortality rates from collision with wind turbines could potentially affect the maintenance of bird populations, particularly for species that are otherwise experiencing poor reproductive or survival levels due to other factors, e.g. food availability. The frequency of collisions with wind turbines is assumed to be dependent on the amount of flight activity across the Site and the ability of birds to detect the rotating blades and take avoidance action.
- 9.131 The solar PV array associated infrastructure also has the potential to adversely affect local ecological populations, for overhead lines particularly through the risk of collision and electrocution (Lehman *et al.* 2007; Jenkins *et al.* 2010; Dwyer *et al.* 2014). Overhead lines are not included as part of the Proposed Development.
- 9.132 Operational displacement and collision with wind turbines are spatially mutually exclusive (if a bird is displaced from the wind farm, it is not at risk of collision). However, displacement effects may change through time, as birds that were at first displaced from an area may habituate to the presence of the operating wind turbines after a period of time and become exposed to the risk of collision.
- 9.133 **Table 9-15** summarises the collision risk analysis for each key species modelled. For further details, see **Technical Appendix 9.6: Collision Risk Modelling Calculations**.

- 9.134 **Table 9-15** gives the number of collisions predicted per year based on the precautionary NS avoidance rate of 99% for red kites, 99.5% for swans, 99.8% for the two goose species, 99.5% for large gulls, 99.2% for small gulls and 98% for all other species (following NatureScot 2025), the percentage increase that this would represent over the baseline mortality and an assessment of the magnitude of change.

Table 9-15: Collision Risk Modelling Predictions

Species	Precautionary avoidance rate	Precautionary predicted number of collisions per year	Percentage increase over baseline mortality	Magnitude
Whooper Swan	99.5%	0.004	0.01%	Negligible
Pink-footed Goose	99.8%	7.54	0.37%	Negligible
Greylag Goose	99.8%	0.08	0.07%	Negligible
Goshawk	98%	0.043	0.32%	Negligible
Red Kite	99%	0.059	0.04%	Negligible
Golden Plover	98%	0.28	0.02%	Negligible
Lapwing	98%	0.22	0.01%	Negligible
Curlew	98%	0.13	0.02%	Negligible
Common Gull	99.2%	88.1	4.49%	Low
Herring Gull	99.5%	1.29	0.36%	Negligible
Black-headed Gull	99.2%	13.1	0.40%	Negligible
Peregrine	98%	0.044	0.23%	Negligible

- 9.135 The following section assesses the operational collision risk to each of the NS key species that were found within the collision risk zone (**Table 9-15**).

Whooper Swan

- 9.136 A total of only six whooper swan flocks (of 2-12 birds) were seen flying through the collision risk zone during the baseline surveys (**Figure 9.4**). Whooper swan is a qualifying species for the Solway Firth SPA/Ramsar site, so is of very high value. Overall collision risk was estimated at 0.004 collisions per year (equivalent to only a 0.01% increase over the SPA baseline population mortality), a change of negligible magnitude, resulting in effects that would be **not significant** in EIA terms.
- 9.137 There would clearly be no threat to the SPA/Ramsar, regional or national population of this species, so no significant adverse effect would occur, following the SNH 2018a guidance.

Pink-footed Goose

- 9.138 Pink-footed goose was classed as very high value as a qualifying feature of the Solway Firth SPA/Ramsar site. Pink-footed geese were regularly recorded overflying the Site in large numbers, (**Figure 9.5**), mainly to/from a feeding area to the north east of the Proposed Development. Collision risk was predicted as 7.54 per year using the

precautionary NatureScot-recommended avoidance rate of 99.8%, equivalent to only a 0.37% increase over the baseline mortality. This number would be negligible in the context of the background population mortality, given the background annual mortality rate of 17%, extensive shooting mortality and increasing population trend (doubling since 1995/96, Calbrade *et al.* 2025).

- 9.139 Evidence from existing wind farms would suggest that the actual number of collisions would be less than the model predictions. Three studies at wind farms in the UK all reported empirical pink-footed goose avoidance rates higher than the precautionary NatureScot 99.8% (with only single dead geese being recorded at all three sites over at least three years of surveys at each, Percival *et al.* 2015, Percival *et al.* 2018, Percival *et al.* 2025). A study in Denmark also reported a higher avoidance rate of 99.9% (Drachman *et al.* 2021).
- 9.140 Collision risk to pink-footed geese would therefore result in a negligible magnitude of change, with the resulting effects being **not significant** in EIA terms, in both the context of the NHZ population and the SPA populations.

Greylag Goose

- 9.141 Greylag goose flight activity occurred year-round but in low numbers. Flights through the collision risk zone are shown in **Figure 9.6**. The predicted collision risk of 0.08 (equivalent to a 0.07% increase over the baseline mortality), would be a change of negligible magnitude and significance, which would be **not significant** in EIA terms.

Goshawk

- 9.142 Goshawk is listed on Schedule 1 of the Wildlife and Countryside Act, so is of high value. Four goshawk flights were recorded at rotor height through the collision risk zone during the baseline surveys (all single individuals) (**Figure 9.7**), with resulting collision risk predicted at 0.04 per year, respectively, equivalent to a 0.3% increase over the baseline mortality. Collision risk to this species would be of negligible magnitude (in the context of the NHZ population of 31 pairs) and would be **not significant** in EIA terms.

Red Kite

- 9.143 Red kite is listed on Schedule 1 of the Wildlife and Countryside Act and Annex 1 of the EU Birds Directive, so is of high value. Flight activity over the Site was low, with only three flights in total through the collision risk zone (Figure 9.8). The collision risk was predicted at 0.06 per year, respectively, equivalent to a 0.04% increase over the baseline mortality. Collision risk to this species would be of negligible magnitude (in the context of the NHZ population of 83 pairs) and would therefore be **not significant** in EIA terms.

Golden Plover

- 9.144 Golden plover were seen occasionally flying through the collision risk zone mainly during both winter periods (**Figure 9.9**), with nine flocks recorded (1-60 individuals). Collision risk to golden plover (a very high-value receptor, as a Solway Firth SPA/Ramsar qualifying species) was predicted to be 0.28 per year. This would represent a 0.02% increase over the baseline mortality for the Solway Firth SPA/Ramsar population, so it would be an effect of negligible magnitude and would be **not significant** in EIA terms.

Lapwing

- 9.145 Lapwing were seen regularly flying through the collision risk zone in low numbers, during both the breeding and winter periods (21 flocks in total, up to 65 individuals, **Figure 9.10**). Collision risk to lapwing (a very high-value receptor, as a Solway Firth SPA/Ramsar assemblage species) was predicted to be 0.22 per year. This would represent a 0.01% increase over the baseline mortality for the Solway Firth SPA/Ramsar population, so it would be an effect of negligible magnitude and would be **not significant** in EIA terms.

Curlew

- 9.146 Curlew were frequently observed flying through the collision risk zone in low numbers (**Figure 9.11**), with 16 flocks in total of up to 6 individuals. Collision risk to curlew (a very high-value receptor, as a Solway Firth SPA/Ramsar assemblage species) was predicted to be 0.13 per year. This would represent a 0.02% increase over the baseline mortality for the SPA/Ramsar population, so it would be an effect of negligible magnitude and be **not significant** in EIA terms .

Common Gull

- 9.147 Common gull was classed as very high value as an assemblage feature of the Solway Firth SPA/Ramsar site. Common gulls were regularly recorded in large numbers overflying the site, (**Figure 9.12**), mainly to/from feeding areas and their night roost on the Solway Firth. Collision risk was predicted as 88.1 per year using the precautionary NatureScot-recommended avoidance rate of 99.2%, equivalent to a 4.5% increase over the baseline mortality. This effect of low magnitude would be of medium significance (and hence potentially significant). However, the actual likely collision risk will be lower than this precautionary value. The avoidance rate applied is considered overly precautionary, as acknowledged in the application of a higher avoidance rate for offshore wind farm assessments (99.5%, which would reduce the collision risk to 55 per year). Furthermore, recent research at operational wind farms has shown gulls to exhibit an even higher avoidance rate. Percival *et al.* (2018) reported a 99.95% avoidance rate for black-headed gull and 99.99% for gulls overall, and Skov *et al.* (2025) reported similar very low levels of collision. Based on this empirical evidence it was concluded that the collision risk to common gull would be negligible magnitude and would be **not significant** in EIA terms in both the context of the NHZ and the SPA populations.

Herring Gull

- 9.148 Herring gull was classed as very high value as an assemblage feature of the Solway Firth SPA/Ramsar site. Herring gulls were regularly recorded overflying the Site, (**Figure 9.12**), mainly to/from feeding areas and their night roost on the Solway Firth. Collision risk was predicted as 1.29 per year using the precautionary NatureScot-recommended avoidance rate of 99.5%, equivalent to only a 0.36% increase over the baseline mortality, an effect of negligible magnitude that would be **not significant** in EIA terms in both the context of the NHZ and the SPA populations. Furthermore, the actual collision risk is likely to be rather lower given the recent empirical evidence of gull behaviour from existing wind farms discussed above

Black-headed Gull

- 9.149 Black-headed gull was classed as very high value as an assemblage feature of the Solway Firth SPA/Ramsar site. Black-headed gulls were regularly recorded overflying the

Site in large numbers, (**Figure 9.14**), mainly to/from feeding areas and their night roost on the Solway Firth. Collision risk was predicted as 13.1 per year using the precautionary NatureScot-recommended avoidance rate of 99.2%, equivalent to a 0.40% increase over the baseline mortality, an effect of negligible magnitude that would be **not significant** in EIA terms in both the context of the NHZ and the SPA populations. Furthermore, the actual collision risk is likely to be rather lower given the recent empirical evidence of gull behaviour from existing wind farms discussed above

Peregrine

- 9.150 Peregrine is listed on Schedule 1 of the Wildlife and Countryside Act and Annex 1 of the EU Birds Directive, so is of high value. Only eight peregrine flights were recorded at rotor height through the collision risk zone (**Figure 9.15**), with resulting collision risks predicted at 0.04 per year, equivalent to a 0.23% increase over the baseline NHZ mortality. Collision risk to this species would be of negligible magnitude and would be **not significant** in EIA terms.

Indirect Effects: Barrier Effect

- 9.151 A further potential operational disturbance effect could be disruption to important flight lines (barrier effect). Birds may see the Proposed Development and change their route to fly around it, rather than through it. This would reduce the risk of collision but could possibly have other effects, for example potentially making important feeding areas less attractive, by acting as a barrier to the birds reaching them, and, if diversions were of a sufficient scale, resulting in increased energy consumption. The distance needed to divert around the Proposed Development would be relatively small and would not be expected to act as a major barrier to movements and no important regularly used flight routes across the site have been identified. Accordingly, the ecological consequences of any such changes in flight lines would be of negligible magnitude and would be **not significant** in EIA terms.

Assessment of Effects on Other High Value Species

- 9.152 Two additional high value species were recorded in the study area during the baseline surveys: quail and barn owl. They are both specially protected from disturbance during breeding under Schedule 1 of the Wildlife and Countryside Act, so have been classed as high value.

Quail

- 9.153 This species was breeding on farmland in the buffer zone around the Proposed Development (see **Confidential Technical Appendix 9.8** for further details). This species is classed as high value because it is specially protected from disturbance during the breeding season under Schedule 1 of the 1981 Wildlife and Countryside Act. This species could be affected by disturbance during construction, so mitigation measures will be put in place to avoid a significant effect. As a result, any effects on this species would be of negligible magnitude and **not significant** in EIA terms.

Barn Owl

- 9.154 There were several sightings of this species during the night surveys, though no evidence of breeding was found within the Proposed Development. It is possible that it could move into that area in the future, in which case it could be vulnerable to construction

disturbance. As it is specially protected from disturbance during the breeding season under Schedule 1 of the 1981 Wildlife and Countryside Act, mitigation measures will be put in place to avoid a significant effect. As a result, any effects on this species would be of negligible magnitude and **not significant** in EIA terms.

Assessment of Effects on Other Medium Value Species

- 9.155 Twelve other medium value species were recorded breeding within the potential impact zone: skylark, tree pipit, dunnoek, song thrush, grasshopper warbler, starling, house sparrow, tree sparrow, linnet, lesser redpoll, yellowhammer and reed bunting. There would be some minor loss of habitat to the Proposed Development infrastructure, as noted by NS in the scoping consultation, the loss of open ground to the Solar PV modules. None of these species would be likely to be significantly affected by the Proposed Development, given experience from other wind farms (Meek *et al.* 1993, Phillips 1994, Thomas 1999, Percival 2005, Devereux *et al.* 2008) and solar farms (Copping *et al.* 2025, Walston *et al.* 2025) and their large UK and Scottish population sizes. Effects on these medium value species would be of low/negligible magnitude and **not significant** in EIA terms.

Assessment of Effects on Other Low Value Species

- 9.156 The low value species are of lesser concern, as a higher magnitudes of change would be necessary in order for a significant effect to occur. Effects on these low value species would be of low/negligible magnitude and **not significant** in EIA terms.

Effects on Protected Sites

European Protected Sites

- 9.157 The potential ornithological effects of the Proposed Development on European Protected Sites are assessed in **Technical Appendix 9.7**. Possible effects on the Solway Firth SPA/Ramsar site whooper swan, pink-footed goose, common gull, herring gull and black-headed gull populations constituted possible Likely Significant Effect (LSE) of the Proposed Development (either alone or in combination) in the context of the Habitats Regulations.
- 9.158 There would be a collision risk to the Solway Firth SPA/Ramsar whooper swan, pink-footed goose, common gull, herring gull and black-headed gull populations, but this would be only a negligible magnitude effect on the SPA populations. The conservation objective *“to maintain the population of the species as a viable component of the SPA”* would not be undermined. This level of additional mortality would not represent an adverse effect on the integrity of the SPA.
- 9.159 Neither cumulative disturbance nor cumulative collision risk would represent an adverse effect on the integrity of the SPA.

Other Protected Sites

- 9.160 No significant effects would be likely to occur on the ornithological interest features of any other statutory protected sites, with no other SSSIs with any ornithological interest features within 5km.

Mitigation

- 9.161 The ornithological assessment has concluded that the Proposed Development would not result in any significant ornithological effects, but nonetheless, the best practice measures described below would be followed, and will ensure compliance with the nature conservation legislation. Furthermore, measures to benefit biodiversity will need to be delivered as part of the project to satisfy NPF4 (as set out in the OHMP in **Technical Appendix 8.5**).

Mitigation of the Construction Phase

- 9.162 The applicant has committed to the production of a CEMP to the satisfaction of NS and other relevant stakeholders, before construction commences, and would follow Windfarm Good Construction Guidance, Scottish Renewables *et al.* (2019). An outline CEMP is included in **Technical Appendix 3.1**. An Environmental Clerk of Works (ECoW) will be appointed to monitor the implementation of the CEMP, the Breeding Bird Protection Plan (BBPP – see **Technical Appendix 9.6**) and the Outline Habitat Management Plan (OHMP – see **Technical Appendix 8.5**).
- 9.163 A BBPP will be required to ensure compliance with the Wildlife and Countryside Act to (a) avoid any disturbance to species specially protected under Schedule 1 of that Act and (b) avoid any damage to active nests. A draft BBPP is included within **Technical Appendix 9.6**.
- 9.164 Several species specially protected from disturbance during breeding under Schedule 1 of the Wildlife and Countryside Act were recorded during the surveys, including quail, red kite, goshawk and barn owl. It will be essential to ensure that no Schedule 1 species are disturbed during the breeding season, particularly during the construction phase, therefore, a BBPP will be developed and implemented. Further surveys for these and any other Schedule 1 species will be undertaken to inform the BBPP at fortnightly intervals through the breeding season (March-August) during the construction period. If any nesting Schedule 1 birds are found then potentially disturbing activities would be suspended for the breeding season within an appropriate zone (dependent on the location of the birds and the species involved, to be agreed with NS and the local planning authority, following Goodship and Furness 2022). The BBPP will also include measures to ensure the protection of all other nesting birds.
- 9.165 Where works affecting habitats that could be used by nesting birds take place between March and August (inclusive), they will only be carried out following an on-site check for nesting birds by an experienced ecologist. If this indicates that no nesting birds are likely to be harmed by the works, then the works will proceed. If nesting birds are found to be present, work will not take place in that area until the adult birds and young have left the nest. A protection zone will be clearly marked around the nest site to prevent accidental disturbance or damage.

Mitigation of the Operational Phase

- 9.166 No mitigation for the operational phase of the Proposed Development will be required.
- 9.167 However, the measures that will be delivered through the OHMP (**Technical Appendix 8.5**) will also deliver a benefit to the local bird populations. This will include:
- Restoration and enhancement of rush pasture and transition mire
 - Creation of native woodland

- Creation of hedgerow
- Provision and maintenance of bird nest boxes.

Assessment of Residual Effects

- 9.168 The residual ornithological effects of the Proposed Development will be a non-significant loss of a small amount of upland moorland habitat to the Proposed Development, and a non-significant risk of disturbance and collision.
- 9.169 Using evidence from existing wind and solar farms, it is considered unlikely that there will be any long-term impact on the integrity of the study area's ornithological features or the conservation status of the species found here.

Potential Cumulative Effects

- 9.170 The potential for cumulative ornithological effects was considered following the SNH 2018b guidance on 'Assessing the Cumulative Impacts of Onshore Wind Farms on Birds', considering impacts on the favourable conservation status of key species within the relevant NHZ (in this case, NHZ 19, the 'West Southern Uplands and Inner Solway'). The cumulative assessment has focused on developments within 20 km of the site boundary, as only sites within this distance are likely to have any ornithological connectivity with the Proposed Development. This includes operational and consented developments, as well as those in the planning process (though not those in scoping, as insufficient information was available to assess those). Details of the developments within this range are given in **Table 9-16**.

Table 9-16: Cumulative Ornithological Assessment: other wind farm sites within 20km buffer

Name / Status	Distance to Proposed Development (km)	Number of Turbines	Maximum blade tip height (m)
Operational / Under Construction			
Beck Burn (Solway Moss)	7.0	9	126.5
Solwaybank	11.1	15	126.5
Todhills, Blackford	11.5	1	67.5
Minsca	12.6	16	120.0
Hallburn	13.9	6	126.5
Great Orton	14.2	6	68.5
Midtown Farm	14.3	1	74.0
Tempest Tower	14.4	1	54.7
Spital Sykes Farm	15.6	1	67.0
Ewe Hill	16.6	22	109.6
Orton Park	16.8	2	86.5
Orton Grange Farm	17.2	1	65.0
How End Farm	18.3	1	75.0
Craig	18.6	5	99.5

Name / Status	Distance to Proposed Development (km)	Number of Turbines	Maximum blade tip height (m)
Craig Extension	19.3	1	99.5
Crossdykes	19.4	10	176.5
Consented			
Hopsrig	19.7	12	140.0
Application / Appeal			
Bloch	12.2	21	230.0
Callisterhall	14.8	7	200.0
Loganhead Resub	18.4	9	200.0
Hopsrig Resub	19.6	13	200.0
Hopsrig	19.7	12	200.0

- 9.171 Additional consideration has also been given to other developments that could affect the Solway Firth SPA/Ramsar site (i.e. lie within 20km of the SPA) at greater distance from the Proposed Development, as shown in **Table 9-17**.

Table 9-17: Cumulative Ornithological Assessment: other wind farm sites within 20km of the Solway Firth SPA/Ramsar site

Name / Status	Distance to Proposed Development (km)	Number of Turbines	Maximum blade tip height (m)
Operational / Under Construction			
Hellrigg	20.6	4	121.0
Westnewton	27.7	3	100.0
Plascow Farm	39.1	3	76.5
Flimby	41.0	3	115.0
Robin Rigg	43.0	60	121.0
Consented			
Little Hartfell	20.7	9	160.0
Plascow Farm Extension	39.0	1	99.5
Application / Appeal			
Little Hartfell Resub	20.7	9	190.0

- 9.172 All potential effects of wind farms (direct habitat loss and disturbance during construction; and collision risk and disturbance during operation) have the potential to contribute to the cumulative ornithological impacts, therefore have been considered in the cumulative assessment. Consideration of the cumulative collision risk was carried out to determine whether the Proposed Development could materially contribute to a potentially significant cumulative collision risk.

- 9.173 This cumulative assessment has scoped in all species with potential ecological linkage to SPAs, and all other key NS target species with non-negligible residual effects predicted. This included cumulative collision risk to pink-footed goose and common gull
- 9.174 This is considered below, using the information available from other developments that could contribute to the cumulative impacts, but given that full information from all developments is not available, a precautionary approach has been adopted to this cumulative assessment.
- 9.175 For all other species, the predicted residual effects of the Proposed Development, with regard to habitat loss, disturbance and collision risk are so low (negligible magnitude) that it was considered that these would not make any material contribution to any potentially significant cumulative impact at the NHZ level.

Pink-footed Goose Cumulative Collision Risk

- 9.176 Two wind farm sites within the NHZ were identified where pink-footed goose collision was identified as a potentially significant risk and could contribute to a significant cumulative collision risk: Beck Burn (Solway Moss) and Hellrigg. Both are located on the English side of the SPA/Ramsar site, and both are operational.
- 9.177 At Beck Burn, the predicted pink-footed goose collision risk, applying the NS-recommended 99.8% avoidance rate, was 9.8 collisions per year. At Hellrigg, it was predicted to be 4.4 collisions per year.
- 9.178 Taking these two sites together with the predicted collision risk for West Scales would give a cumulative risk of 21.7 collisions per year. This would be equivalent to a 1.1% increase over the baseline mortality (a low magnitude change). However, the actual magnitude would be expected to be considerably less than this (and hence negligible), particularly given the results of the post-construction monitoring at Hellrigg (where no goose collisions at all were recorded over four winters, Percival *et al.* 2015), and similar results from studies elsewhere (Percival *et al.* 2018, Percival *et al.* 2025, Drachman *et al.* 2021). As a result, the cumulative collision risk to pink-footed geese would be of low significance and **not significant** in EIA terms.

Common Gull Cumulative Collision Risk

- 9.179 There are no other sites identified within the NHZ or in the SPA hinterland where common gull collision risk has been quantified, so this species has been taken forward for any cumulative collision risk assessment.

Statement of Significance

- 9.180 **Table 9-18** provides a summary of the effects of the Proposed Development on features of ornithological interest detailed within this chapter.
- 9.181 Overall, there would not be any significant effects on ornithology as a result of the Proposed Development. In relation to the key NS wider countryside test, the Proposed Development would not affect the favourable conservation status of any bird species of conservation importance within the NHZ, either alone or in combination with other schemes. It would also not contribute to any Likely Significant Effect on any SPA qualifying interests. No effects would result in any breach of the Habitats Regulations.

Table 9-18. Summary of the effects of the Proposed Development on features of ornithological interest.

Project Phase	Summary of Impact	Value	Magnitude	+/-	Permanent/temporary	Reversible	Mitigation Measure	Residual Significance
Construction	Habitat loss: construction of infrastructure including wind turbine foundations, Solar PV modules and access tracks	Low/negligible	Negligible	Negative	Temporary	Reversible	Avoidance of more sensitive habitats in design process	Not significant
	Disturbance to Schedule 1 and Annex 1 breeding species	Up to high	Negligible	Negative	Temporary	Reversible	Development and implementation of OHMP and BBPP to include pre-construction survey checks; if present avoid disturbing activity in proximity with species-specific buffer zone implemented.	Not significant
	Disturbance to other breeding species	Up to medium	Negligible	Negative	Temporary	Reversible	Pre-construction survey and	Not significant

ORNITHOLOGY 9

Project Phase	Summary of Impact	Value	Magnitude	+/-	Permanent/temporary	Reversible	Mitigation Measure	Residual Significance
							active nests avoided.	
	Disturbance to wintering birds	Up to very high	Negligible	Negative	Temporary	Reversible	None required	Not significant
Operation	Displacement of breeding birds from zone around wind turbines	Up to high	Negligible	Negative	Temporary	Reversible	OHMP will offset potential losses	Not significant
	Disturbance to Schedule 1 and Annex 1 breeding species	Up to high	Negligible	Negative	Temporary	Reversible	None required.	Not significant
	Disturbance to other breeding species	Up to medium	Negligible	Negative	Temporary	Reversible	None required	Not significant
	Disturbance to wintering birds	Up to very high	Negligible	Negative	Temporary	Reversible	None required	Not significant
	Mortality through bird collision with wind turbines	Up to very high	Low/negligible	Negative	Temporary	Reversible	None required	Not significant

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