Chapter 8: Ornithology

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Chapter 8: Ornithology

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8 Ornithology

8.1 Executive Summary

8.1.1 An assessment has been undertaken to determine potential effects of Appin Wind Farm (hereafter referred to as 'the Proposed Development') on ornithological features (bird species and designated areas with ornithological qualifying interests). The assessment has been undertaken using data gathered through field surveys and collation of third party data, with the assessment completed following best practice guidance and informed by consultee comments.

8.1.2 Potential impacts on ornithological features have been assessed for all phases of the Proposed Development: construction, operation and decommissioning. Based on the data gathered, bird species determined as being sensitive to the potential impacts of the Proposed Development have been identified as 'Important Ornithological Features' (IOFs) and have received full assessment. These comprised golden eagle, goshawk, red kite and whooper swan. Potential impacts relevant to these species have been assessed for the Proposed Development on its own and cumulatively with other wind farm projects. The approach to identifying IOFs and how the assessments were undertaken is set out in the chapter.

8.1.3 Impacts on all IOFs have been assessed as being negligible, with the exception of cumulative displacement impacts on goshawk which have been determined as having a potential minor adverse impact. No significant effects have been predicted and no additional mitigation (beyond embedded mitigation and best practice measures) has been proposed.

8.2 Introduction

8.2.1 This chapter of the Environmental Impact Assessment (EIA) Report assesses the potential for significant effects upon ornithological features in relation to the construction, operation and decommissioning of the Proposed Development.

8.2.2 The assessment is based upon comprehensive baseline data, compiled through ornithological field surveys, desk study and consultation with nature conservation bodies. The assessment has been written in reference to guidelines authored by the Chartered Institute of Ecology and Environment Management (CIEEM, 2018).

8.2.3 The chapter should be read in conjunction with the following Technical Appendices presented in **Volume 4**:

- Technical Appendix 8.1: Ornithology – which provides further details of data gathering methods and results which have informed the impact assessment; and
- Technical Appendix 8.2: Collision Risk Model Analysis – which provides details of the methods of analysis and parameters used in the Collision Risk Model (CRM).

8.2.4 Information considered sensitive, for example details of the nesting locations of specially protected species, is provided separately. Such information will be made available only to relevant consultees. This sensitive information is provided in the following supporting document:

- Technical Appendix 8.3: Confidential Ornithology.

8.2.5 The chapter is also supported by the following figures, which are available in **Volume 2**:

- Figure 8.1: Ornithological statutory designated sites;
- Figure 8.2: Vantage point and viewshed location plan;
- Figure 8.3: Breeding bird study areas;
- Figure 8.4a: Target species flights – raptor species;
- Figure 8.4b: Target species flights – other species; and
- Figure 8.5: Moorland breeding bird survey results.

8.2.6 In addition, the following **confidential** figures are provided in support of Technical Appendix 8.3:

- Figure 8.6a: Desk study results – Royal Society for the Protection of Birds (RSPB);
- Figure 8.6b: Desk study results – Dumfries and Galloway Raptor Study Group (DGRSG);
- Figure 8.6c: Desk study results – Restoring Upland Nature (RUN);

- Figure 8.6d: Desk study results – South West Scotland Environmental Information Centre (SWSEIC); and
- Figure 8.7: Breeding raptor and owl survey results.

8.2.7 Information contained in other chapters and appendices is not repeated within this chapter unless beneficial for understanding, with cross references provided to other relevant chapters as appropriate.

8.2.8 Information to inform a Habitats Regulations Appraisal (HRA) is also provided in **Technical Appendix 8.4**. This considers internationally designated sites with ornithological listed features which are located within an appropriate Zone of Influence (ZoI) of the Proposed Development.

8.2.9 Only common bird species names are referred to within the main body of this chapter. A summary of the bird species is provided in **Technical Appendix 8.1**, and includes common names, scientific (Latin) names and relevant conservation status.

8.2.10 Non-avian ecological features are assessed in **Chapter 7: Ecology**.

8.2.11 The following terminology is referred to in the chapter:

- The Proposed Development: the physical infrastructure of the proposed wind farm project, as set out in **Chapter 4,** and which in this chapter is typically used in reference to proposed turbines (unless otherwise stated);
- The Site: the application red line boundary in which the Proposed Development would be located, as shown on **Figure 4.1** and on relevant figures associated with this chapter. This does not include the Access Route, which is treated separately;
- Access Route: the road connecting the Site to the public highway and which would mostly comprise an upgraded existing track to the south-west of the Site (**Figure 4.1**); and
- Study Area(s): these are survey-specific areas that cover the Proposed Development and an appropriate surrounding buffer, as illustrated on **Figure 8.2** and **Figure 8.3** and described in **Appendix 8.1**, and which covered the Site and surrounding buffer in 2022/21 and the Access Route and surrounding buffer in 2025.

8.3 Legislation, Policy and Guidelines

8.3.1 Legislation, policy and guidance of specific relevance to ornithology, and taken into account in the assessment presented within this chapter, are outlined below.

Legislation

- Conservation (Natural Habitats, &c.) Regulations 1994, as amended in Scotland by the Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 (collectively 'the Habitats Regulations');
- European Council Directive 2009/147/EC on the conservation of wild birds ('the Birds Directive');
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011; and
- The Nature Conservation (Scotland) Act 2004.

Planning Policy

- Scottish Government (2008) Scottish Government Planning Advice Note 60: Planning for Natural Heritage 2008;
- Scottish Government (2022a) The Scottish Biodiversity Strategy to 2045;
- Scottish Government (2022b) Onshore Wind Policy Statement;
- Scottish Government (2023) National Planning Framework (NPF) 4;
- Dumfries and Galloway Local Development Plan (LDP) 2; and
- Dumfries and Galloway Local Biodiversity Action Plan.

Guidance

8.3.2 The following best practice guidelines, guidance and associated sources have informed the baseline studies and subsequent assessment presented within this chapter:

- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018);

- Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH, 2017[1]);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH, 2016);
- Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas (NatureScot, 2025b);
- Assessing the cumulative impact of onshore wind farms on birds (NatureScot, 2025c);
- Natural Heritage Zones (NHZ) bird population estimates (Wilson *et al*., 2015);
- Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al*., 2007);
- Windfarms and birds - calculating a theoretical collision risk (SNH, 2000);
- Avoidance rates for the onshore SNH wind farm collision risk model (SNH, 2018);
- Scottish Biodiversity List (SBL) (NatureScot, 2022);
- Birds of Conservation Concern (BoCC) (Stanbury *et al*., 2021);
- Disturbance distances in selected Scottish bird species (Goodship and Furness, 2022); and
- Pre-application guidance for onshore wind farms (NatureScot, 2024a).

8.4 Consultation

8.4.1 Formal consultation took place via the submission of an EIA Scoping Report in March 2022; a Scoping Opinion was received in June 2022.

8.4.2 Additionally, informal consultation with NatureScot was undertaken during the baseline survey period to agree the scope of data gathering methods.

8.4.3 It should be noted that the design of the Proposed Development has evolved since the Scoping Report was submitted and the number of proposed turbines is now fewer than that for which opinion was originally sought. Details of the design process are set out in **Chapter 3: Site Selection and Design Evolution**.

8.4.4 A summary of the responses relevant to ornithology which were obtained through consultation is presented in **Table 8.1**.

Table 8.1 – Consultation

Consultee and Date	Scoping / Other Consultation	Consultation Response	Applicant Response
NatureScot (April 2022)	Scoping Opinion	Muirkirk and North Lowther Uplands Special Protection Area (SPA) should be included within the EIA Report as although it lies beyond 10 km from the Site there is potential connectivity with peregrine (a qualifying feature), which has a maximum range of 18 km.	NatureScot guidance (2016) states that in most cases core range should be used when determining connectivity and the same guidance states peregrine has a core range of 2 km; hence why this SPA was not proposed for inclusion. Muirkirk and North Lowther Uplands SPA has now been scoped in as requested and is assessed in **Technical Appendix 8.4**.
		A standalone HRA document should be appended to the EIA Report and should include Muirkirk and North Lowther Uplands SPA and Loch Ken and River Dee Marshes SPA.	Muirkirk & North Lowther Uplands SPA and Loch Ken & River Dee Marshes SPA are included in the Information to Inform HRA, provided in **Technical Appendix 8.4**. Screening for Appropriate Assessment is undertaken to determine the potential for a likely significant effect (LSE) on the qualifying features of the two SPAs.
		All SPAs within 20 km should be included in the EIA and HRA, not, as stated, just those within 10 km and extended to 20 km for those with migratory waterfowl listed features only; in order to avoid confusion.	The search area that has been used in the assessment for identifying internationally designated areas with ornithological interests with potential connectivity to the Site is now 20 km, irrespective of the qualifying species.

[1] A new revision of this guidance (NatureScot, 2025a) was released in March 2025, with minor changes. However, it is the 2017 version that informed the baseline surveys.

Consultee and Date	Scoping / Other Consultation	Consultation Response	Applicant Response
		Barn owl should not be scoped out from inclusion in the EIA Report.	Barn owl is included as an ornithological feature within the EIA Report but has not been taken forward for full assessment. Justification for this approach is provided.
		The range of desk study sources and ornithology surveys considered is appropriate.	Acknowledged. The results of this data gathering are presented in **Technical Appendix 8.1** and inform the assessment.
		Consideration should be given to increases in habitat suitability to breeding birds as a result of forestry felling. Measures should be proposed to reduce habitat suitability in clearfelled areas.	NatureScot guidance has now changed (since the writing of the Scoping Opinon) and measures to prevent ground-nesting raptors moving into turbine areas following clearfelling of forestry are no longer required. However, the rotational felling of forestry on Site (which would occur irrespective of the Proposed Development) is discussed where relevant in the impact assessment.
		Pink-footed goose and greylag goose should not be scoped out from the EIA.	Pink-footed goose and greylag goose are included as ornithological features within the EIA Report but neither has been taken forward for full assessment. Justification for this approach is provided.
		The scope of the cumulative impact assessment (CIA) (projects with more than three turbines within 20 km of the Site) is appropriate	This approach has been followed for the CIA, with full details of assessment methods set out in that section of the chapter (paragraph 8.13.61).
RSPB (April 2022)	Scoping Opinion	Confirmed RSPB have no comment to make regarding the Proposed Development.	None required.
Tynron Communtiy Council (May 2022)	Scoping Opinion	Further studies should be considered which draw upon local Citizen Science projects and local observations.	The data gathered includes information provided by SWSEIC, which comprises records of 46 bird species taken from amateur recording sources such as country bird records, upland breeding bird surveys and the *iRecord* scheme.
		The area is important for migrating swans and geese and should be an important consideration. Migration tracking studies by Wildfowl and Wetlands Trust (WWT) should be included in the ornithology surveys.	Additional literature that has been sourced for migratory swan and goose data is set out in **Technical Apppendix 8.1**.
		The observations are “snapshots” and are not representative.	The baseline surveys undertaken were in accordance with, or exceeded, standard guidance (SNH, 2017) and in agreement with NatureScot. It is acknowledged that no bird monitoring will ever record everything, but the data is considered representative. Additional data has been gathered by desk study to further inform the assessment. The data gathered is sufficient to identify those species which are regularly present in the vicinity of the Site and hence those that have potential to be significantly affected by the Proposed Development.
		Golden eagles have been observed in the area and should be included in the impact assessment.	An impact assessment for golden eagle is included. Considerable information regarding the status of golden eagle in the local area has been gathered and informs the impact assessment.
		Consultees to be contacted with respect to ornithology should include eco-tourism businesses.	Data has been sourced from organisations including DGRSG, that have local bird knowledge. Impacts on tourism are scoped out of the EIA Report (refer to **Chapter 2: Approach to EIA).**

Consultee and Date	Scoping / Other Consultation	Consultation Response	Applicant Response
		Do not agree that ornithological features which have not been recorded during survey or through data gathering should be scoped out as "*absence of evidence is not evidence of absence*".	Species recorded occasionally or in very low numbers can reasonbly be considered as not being at risk of significant effects from the Proposed Development. The assessment follows the accepted recommendation that EIA should be proportionate (CIEEM, 2018) and only ornithological features at risk of significant effects at a defined population level be considered.
		The CIA should be undertaken at the NHZ scale.	The CIA has been undertaken following the method agreed with NatureScot, which uses a 20 km search area around the Site.
NatureScot (October 2020)	Informal survey scoping	Confirmed agreement with the scope of baseline surveys proposed and relevant ornithological features identified for consideration.	Baseline surveys were undertaken as agreed.
NatureScot (October 2021)	Informal survey scoping	Confirmation provided that one year of baseline ornithology surveys would be sufficient to inform the assessment based on the survey effort and survey results from Year 1 and the supplementary data sourced.	One year of baseline survey data, as well as third party information sources, have been used and allow for a robust impact assessment.

8.5 Assessment Methodology and Significance Criteria

Scope of Assessment

8.5.1 The assessment presented within this chapter has been undertaken in accordance with CIEEM guidelines (2018) and considers potential impacts upon ornithological features from the Proposed Development throughout the lifetime of the project, i.e., the construction, operation and decommissioning phases.

8.5.2 To ensure proportionality and, in accordance with guidance (e.g. NatureScot, 2025b, and CIEEM, 2018), the focus of the assessment is those species considered potentially sensitive to the Proposed Development, and which are classed in this assessment as "Important Ornithological Features" (IOFs). The identification of IOFs has been determined based upon baseline information, relevant guidance and literature, professional judgement of the author and, where relevant, the opinions of statutory advisory bodies provided through consultation.

8.5.3 A detailed assessment of impacts is not included for all ornithological features identified as being present in the vicinity of the Site, e.g., those with populations that are sufficiently widespread, unthreatened or resilient, or species which were only recorded occasionally in very small numbers, do not receive full assessment as a significant effect on the population of these features (at any population scale) can reasonably be dismissed. Where ornithological features are unlikely to be significantly affected, as evidenced by baseline information, these features are "scoped out" from full assessment, with justification provided.

8.5.4 Following the principle of proportionate EIA, embedded mitigation is considered at the outset, including standard best practice and construction management measures that would be a core part of the Proposed Development irrespective of the IOFs identified.

8.5.5 Where potential impacts of the Proposed Development are fully assessed, this is undertaken for the Proposed Development alone as well as assessing the potential cumulative impacts with other relevant projects.

Data Gathering Methods

<u>Desk Study</u>

8.5.6 A desk study has been undertaken to identify the presence of any designated area for nature conservation with ornithological interests in the vicinity of the Site. The search investigated statutory sites within 20 km of the Site. Additionally, locally designated (non-statutory) sites were searched for within 5 km of the Site.

8.5.7 The desk study also included data requests to relevant third parties for existing records of notable bird species within an appropriate ZoI of the Site. The organisations contacted comprised RSPB (Royal Society for the Protection of Birds), DGRSG (Dumfries and Galloway Raptor Study Group), RUN (Restoring Upland Nature) and SWEIC (Southwest Scotland Environmental Information Centre).

8.5.8 Details of the desk study undertaken are presented in **Technical Appendix 8.1**.

8.5.9 Other data sources that have informed the impact assessment are referred to where relevant in this chapter.

Field Surveys

8.5.10 The following ornithological surveys were completed during the baseline survey period:

- Vantage Point (VP) flight activity surveys (September 2020 to August 2021);
- Moorland Breeding Bird Survey (MBBS) (2021);
- Breeding Annex 1 and Schedule 1 raptor and owl searches (2021);
- Breeding black grouse searches (2021);
- Nightjar survey (2021); and
- Access Route breeding bird surveys (2025).

8.5.11 Survey areas are illustrated on **Figure 8.2** (VP locations and viewsheds) and **Figure 8.3** (breeding bird survey areas).

8.5.12 All surveys have been undertaken by suitably competent and experienced field ornithologists, who were in possession of a Schedule 1 licence where required, and were based on survey methods set out in NatureScot guidance (SNH, 2017).

8.5.13 Survey methods were agreed through informal consultation with NatureScot (**Table 8.1**).

8.5.14 Full survey methodologies and results are presented in **Technical Appendix 8.1**.

Collision Risk Modelling

8.5.15 The results of the VP flight activity surveys were used to undertake CRM analysis for relevant species. Full details of the CRM undertaken are presented in **Technical Appendix 8.2**.

8.5.16 In accordance with the principle of proportionate EIA, only those ornithological features for which there was judged to be a potential significant effect as a result of collision impacts underwent CRM analysis.

8.5.17 It should be noted that CRM analysis was set up before NatureScot guidance (NatureScot, 2024b) was updated, in accordance with the revised CRM (Band, 2024). However, the main aim of the updated guidance is to standardise the approach to CRM and the previous approach is still considered valid. Band (2024) states that the methods are "*mathematically equivalent*" and that the estimates produced "*should not differ substantially from those deriving from… earlier SNH [now NatureScot] guidance*".

Assessment Methods

8.5.18 The assessment comprises the following stages:

- determination and evaluation of IOFs;
- identification and characterisation of impacts;
- outline of mitigation measures to avoid and reduce significant effects (where required);
- identification of appropriate compensation and enhancement measures; and
- assessment of the significance of any residual effects following mitigation (where applied).

Characterising Important Ornithological Features

8.5.19 The 'importance' of ornithological features has been determined with reference to current guidance (CIEEM, 2018 and NatureScot, 2025b), taking into account the results of baseline field surveys and desk study findings.

8.5.20 In determining importance, the level of legal protection that a feature receives is considered but this is not the sole criterion, as ornithological features may be important for a variety of reasons such as their connectivity to a designated site, their rarity, or where the geographical location of a population is unusual relative to their known range.

8.5.21 In addition, the value of the Site itself is also considered. For example, a species associated with a nearby internationally designated area will not automatically be given "international" importance if it is only rarely recorded within the vicinity of the Site. In this case, the number of individuals that may potentially be impacted is also taken into account in determining the importance of an ornithological feature.

8.5.22 The value of ornithological features is considered using the criteria set out in **Table 8.2.** However, the criteria should not be seen as definitive as professional judgement has also been applied with justification, where appropriate.

Table 8.2 – Criteria for Determining the Importance of Ornithological Features

Importance	Description
Very High (International)	An internationally designated site, e.g. SPA and/or Ramsar Site or proposed site (pSPA). A regularly occurring species present in internationally important numbers (>1% of its biogeographic population) listed under Annex 1 of the Birds Directive, or regularly occurring migratory species listed under Annex 2 of the Birds Directive connected to an internationally designated site for this species.
High (National)	A nationally designated site, e.g. Site of Special Scientific Interest (SSSI), or area meeting criteria for national level designations. A regularly occurring species present in nationally important numbers (>1% of its Scottish population) and that is a priority species (e.g. listed on the SBL), a red-listed Bird of Conservation Concern (BoCC) (Stanbury *et al*., 2021) and listed under Schedule 1 of the Wildlife & Countryside Act or Annex 1 of the Birds Directive.
Medium (Regional)	A regularly occurring species present in regionally important numbers (>1% of its relevant Natural Heritage Zone (NHZ) population or appropriate alternative) and that is a priority species (e.g. listed on the SBL), a red-listed BoCC (Stanbury *et al*., 2021) or listed under Schedule 1 of the Wildlife & Countryside Act or Annex 1 of the Birds Directive.
Low (Local)	All other species that are widespread and common and which are not present in regionally or nationally important numbers, but which contribute to the breeding/wintering bird assemblage of the Site and immediate surrounding area.

Characterising Impacts

8.5.23 Potential impacts upon ornithological features are described with reference to their magnitude, their direction (adverse or beneficial) and duration, where this is relevant to understanding the nature of an effect and determining its significance.

8.5.24 For the purposes of the ornithological assessment, the temporal nature of potential impacts (i.e., their duration) has been defined as follows, and refers to the time for which an impact is expected to last before recovery to baseline conditions:

- negligible: of inconsequential duration;
- short-term: 1-2 years;
- medium-term: for 3-15 years;
- long-term: for 16-50 years; and
- permanent: >50 years (a period longer than the life-time of the Proposed Development).

8.5.25 The geographical scale of an impact is also taken into consideration, using the following definitions:

- local: impacting the population of the Site or that found immediately adjacent to the Site;
- regional: impacting the regional population (typically the NHZ population) (see below);
- national: impacting the Great Britain or UK population; and
- international: impacting the appropriate transboundary population, such as the northwestern European population or East Atlantic flyway population.

8.5.26 In accordance with NatureScot guidance (NatureScot, 2025b), the assessment of impacts has generally been undertaken at a “regional” scale with regards to species populations, unless an alternative geographical scale is considered appropriate on the basis of best available information, or where data regarding regional population status is not available or outdated. In most cases the NHZ is the default regional scale. NHZs are biogeographic zones with characteristic biological and landscape qualities, with Scotland split into 21 NHZs.

8.5.27 The Site is located centrally within NHZ 19: Western Southern Uplands and Inner Solway.

8.5.28 Where reference is made to population level impacts, the most up to date population estimates available have been used in the assessment. In some cases, accurate contemporary population estimates may not be available. Where this is the case, this is highlighted and the approach to assessment justified.

8.5.29 The magnitude of change refers to the size of the impact and is determined on a quantitative basis, where possible, for example the predicted loss of individuals from a population. The criteria used to determine magnitude of change is presented in **Table 8.3**.

8.5.30 It should be noted that it is not always possible to equate an impact to actual population loss, for example, where birds may be displaced from a wind farm site as a result of construction or operational activities, such a loss may be temporary or may result simply in the relocation of birds to suitable habitats elsewhere within the immediate or wider area. Where uncertainty arises, professional judgement is used on the basis of best available evidence, whilst taking a precautionary approach.

Table 8.3 – Criteria for Determining Level of Impacts

Magnitude	Summary
Major	The impact (either on its own or cumulatively with other projects) may adversely affect the conservation status of a site and/or species population, in terms of the coherence of its ecological structure and function (integrity), across its whole area, that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest. For example, affecting 26-100% of the NHZ population.
Moderate	The impact (either on its own or cumulatively with other projects) would not adversely affect the conservation status of a site and/or species, but some element of the functioning might be affected, and impacts could potentially affect its ability to sustain some part of itself in the long term. For example, affecting 6-25% of the NHZ population.
Minor	The impact (either on its own or cumulatively with other projects) would not result in a loss of function to the conservation status of a site and/or species, but some adverse impact to species abundance would be observable, although this may only be temporary. For example, affecting 1%-5% of an NHZ population, or short-term impacts to 6-25% of the NHZ population.
Negligible	A very slight (indiscernible) reduction in a site and/or species status or productivity and/or no observable impact. For example, affecting <1% of the NHZ population, or short-term impacts to <5% of the NHZ population.

8.5.31 Sensitivity to change varies between species and between populations of the same species, for example, a bird may be more sensitive to disturbance when nesting than during the non-breeding season, and birds that live in an area with pre-existing human activity may be more tolerant to disturbance than those which are not. The sensitivity of ornithological features is taken into account during the assessment where this information exists.

Assessing Significance of Effects

8.5.32 CIEEM guidance (2018) defines a “significant” effect as an effect that either supports or undermines conservation objectives for IOFs, or for biodiversity in general.

8.5.33 CIEEM guidance (2018) states that for the ecological disciplines of an EIA (which includes ornithology), a matrix approach and the production of a 'significance score' (as is often used in EIA Reports) should be avoided, as this would require creating artificial values that are not easily quantified. Instead, CIEEM guidance uses only two categories to classify effects: 'significant' or 'non-significant'. It is this approach that has been used in this chapter.

8.5.34 Significance is determined by considering the importance of the ornithological feature and the magnitude of the impact (as set out above) and by applying professional judgement as to whether the integrity of the feature will be affected at the relevant geographic scale.

8.5.35 The term 'integrity' is used here to refer to the maintenance of the conservation status of a population of a species at a specific location or geographical scale.

8.5.36 Professional judgement takes into consideration bird species ecology, population trends and evidence from studies of bird and wind farm interactions, where such evidence exists. Relevant data sources are referenced within the assessment, as appropriate.

8.5.37 Effects are more likely to be considered significant where the ornithological feature affected is of higher conservation importance or where the magnitude of the impact is high. Effects not considered to be significant would be those where the integrity of the feature is not threatened, those affecting features of low conservation importance, or where the magnitude of the impact is low. Justification for the conclusions made is provided within the assessment.

8.5.38 Note that the scale of significance does not necessarily relate to the importance of an ornithological feature. For example, an effect on a species which is considered of national importance, may not have a significant effect upon its national population.

8.5.39 In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect is assumed as a precautionary approach. Where uncertainty exists, this is acknowledged.

8.5.40 Finally, it should be noted that CIEEM guidelines (2018) state: "*A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission… many projects with significant negative ecological effects have been lawfully permitted following EIA procedures*".

Approach to Mitigation in the Assessment

8.5.41 Embedded mitigation is built into the Proposed Development to minimise the potential for any adverse impacts associated with the Proposed Development, to ensure adherence to good practice guidance and compliance with the Wildlife and Countryside Act 1981. Such measures will be followed irrespective of the ornithological features present or the conclusions of the impact assessment. For clarity the term 'embedded mitigation' in this chapter includes mitigation by design and measures required by law or good construction or operational practice.

8.5.42 Where embedded mitigation is considered sufficient to prevent significant adverse effects on ornithological features, this has been taken into consideration to ensure the assessment is proportionate to the risks posed by the Proposed Development.

8.5.43 The mitigation hierarchy has been adopted to avoid, mitigate and compensate for impacts upon ornithological features where a significant effect as a result of the Proposed Development has been predicted:

- avoidance is used where an impact has been circumvented, for example through changes in the design of the Proposed Development;
- mitigation is used to refer to specific additional measures required to reduce or remedy a specific adverse impact in situ; and
- compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible.

8.5.44 The significance of residual effects on ornithological features after the implementation of additional mitigation measures is considered and presented as part of the impact assessment (where applied).

8.5.45 In addition to mitigation measures, “enhancement” measures are also included as an integral part of the Proposed Development. Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures (although they can be complementary). Details of these enhancement measures are provided in **Chapter 7** and in **Technical Appendix 7.6: Outline Nature Enhancement Management Plan**; however, specific measures relevant to ornithological features are described within this chapter.

Cumulative Assessment

8.5.46 As well as presenting an assessment of potential impacts as a result of the Proposed Development on its own, a CIA is also presented in which other relevant projects are also considered. The CIA has been carried out with reference to NatureScot guidance (2025c).

8.5.47 Full details of how projects have been identified for inclusion in the CIA are provided within **Section 8.13.61**.

Limitations to Assessment

8.5.48 Potential limitations in the data gathered to inform the assessment are considered in **Technical Appendix 8.1**. It is concluded that there are no substantive limitations with the data and so the resulting impact assessment, as set out in this chapter, is considered appropriate and robust.

8.6 Baseline Conditions

Results of Desk Study

Designated Areas

8.6.1 The Site does not form part of any statutory designated area for nature conservation with qualifying ornithological interests. However, several designated areas have been identified within the 20 km search area around the Site as detailed in **Table 8.4**. It should be noted that for Ramsar sites only ornithological qualifying interests are listed. The locations of these designated areas in relation to the Site are illustrated on **Figure 8.1**.

Table 8.4 – Designated Areas with Ornithological Interests within 20 km of the Site

Designated Site	Distance from Site	Ornithological Qualifying Interests
Muirkirk and North Lowther Uplands SPA	14.3 km to north	Breeding: – Golden plover; – Hen harrier; – Merlin; – Peregrine; and – Short-eared owl. Non-breeding:

Designated Site	Distance from Site	Ornithological Qualifying Interests
		– Hen harrier.
North Lowther Uplands SSSI	14.3 km to north	Breeding: – Hen harrier; and – Bird assemblage (hen harrier, short-eared owl, merlin, peregrine, golden plover, red grouse, raven, dunlin, snipe, teal, curlew, redshank, whinchat and wheatear).
Muirkirk Uplands SSSI	16.6 km to north	Breeding: – Hen harrier; – Short-eared owl; and – Bird assemblage (teal, hen harrier, buzzard, merlin, peregrine, short-eared owl, golden plover, red grouse, dunlin, snipe, curlew, redshank, whinchat, stonechat, wheatear and ring ouzel). Non-breeding: – Hen harrier.
Loch Ken and River Dee Marshes SPA	16.3 km to south-west	Non-breeding: – Greylag goose; and – Greenland white-fronted goose.
Loch Ken and River Dee Marshes Ramsar site	16.3 km to south-west	Non-breeding: – Greylag goose; and – Greenland white-fronted goose.

Third Party Species Records

8.6.2 Details of species records returned from the data requests are provided in **Technical Appendix 8.1**, with sensitive records provided in **Technical Appendix 8.3** (confidential). Associated figures illustrating the species records are also provided (**Figures 8.6a-8.6d** (confidential)). A summary of the main interests identified is provided below.

Breeding Schedule 1 Raptors and Owls

8.6.3 The DGRSG and RSPB data highlighted a red kite breeding location within 2 km of the Site. Another two nest sites are present over 4 km and 5 km from the Site. An occupied goshawk territory is present close to the Site and may overlap with the Site, with another territory located more than 3 km distant (DGRSG data). The location of goshawk nest sites within the territories has been noted as moving, subject to clear-felling operations in the forestry. The locations of four barn owl nest sites within 3 km of the Site were also provided by DGRSG.

8.6.4 RUN data established that a pair of golden eagles breed within the 10 km search area around the Site. Tagging data was supplied which provides a comprehensive dataset of how the home range is used. The plantation forestry in the vicinity of the Site is mostly avoided.

Black Grouse

8.6.5 RSPB and SWSEIC data included records of black grouse, however, there were no records that post-date 2019. None of the historic lekking locations highlighted were within 2 km of the Site.

Migratory Waterfowl

8.6.6 Literature searches were undertaken, which included Mitchell (2012)'s paper that mapped habitat use by wintering pink-footed geese and greylag geese associated with SPAs designated for these species. This showed that the Site is not located in well-used foraging areas and that the Site is not located in an area where regular commuting flights for migratory geese would be expected.

8.6.7 Further literature sources relevant to specific ornithological features are presented, where appropriate, within the impact assessment section of this chapter.

Results of Field Surveys

Vantage Point Flight Activity Surveys

8.6.8 The VP flight activity surveys have determined the level of flight activity across the Proposed Development for target species, following the survey methods set out in **Technical Appendix 8.1**. Full details of all target species flights recorded during the flight activity surveys are also provided in **Technical Appendix 8.1**.

8.6.9 The target species flights recorded are illustrated on **Figure 8.4a** and **Figure 8.4b**.

8.6.10 On completion of surveys, the data were examined to determine which flights were at potential collision risk, following the methods set out in **Technical Appendix 8.2**.

8.6.11 The only species taken forward for CRM were those for which there were three or more flights (or ten or more individuals where fewer than three flights) recorded within the 'collision risk zone' (CRZ) (a single, continuous area covering the proposed turbines and a 300 m buffer around the outermost turbine locations) and at 'potential collision height' (PCH) (between potential minimum and maximum rotor swept height (38 m to 200 m)) over the course of the 12 months of baseline surveys.

8.6.12 Ornithological features which were rarely present and for which the number of qualifying flights was insufficient to meet these criteria were considered as being highly unlikely to experience significant population level effects as a result of collisions associated with the Proposed Development, and these species were excluded from CRM in the interests of proportional EIA.

8.6.13 All target species flights with at least some time recorded in a height band that overlapped with rotor swept height were considered to have been at PCH (see **Technical Appendix 8.2**). Due to the height bands used during survey, flights in the lowest two height bands (covering 0-25 m) and the highest height band (>225 m) could be removed from the analysis as these do not represent flights that would be at PCH.

8.6.14 **Table 8.5** lists all the target species recorded during the VP flight activity surveys, combined for the full one-year survey period. The table presents the number of flights (and the constituent number of individuals) that were recorded during VP surveys in total, irrespective of actual collision risk, as well as presenting the totals for at-risk flights only (those within the CRZ at PCH). The species highlighted in bold were those with sufficient at-risk flights to qualify for CRM.

Table 8.5 – Summary of Vantage Point Flight Activity Survey Results

Species	All Flights		At Collision Risk Only	
	No. of Flights	No. of Individuals	No. of Flights	No. of Individuals
Goosander	3	4	-	-
Goshawk	19	20	4	4
Greylag goose	4	9	2	5
Hen harrier	3	3	2	2
Pink-footed goose	3	91	-	-
Red kite	30	40	13	16
Whooper swan	2	96	1	42

8.6.15 The outputs of the CRM analysis for those ornithological features assessed are presented in **Table 8.6**. Where estimates have been calculated by season, the (species-specific) breeding and non-breeding estimates have been summed to produce an annual collision estimate. Where a species is not present in a particular season this is greyed out in the table.

8.6.16 Further details as to how the CRM was undertaken are presented in **Technical Appendix 8.2**.

Table 8.6 - Estimated Collision Mortality Risks

Species	Season	Mortality Estimate
Goshawk	Breeding	0.000
	Non-breeding	0.042
	Annual	**0.042**
Red kite	Breeding	0.091
	Non-breeding	0.036
	Annual	**0.127**
Whooper swan	Breeding	
	Non-breeding	0.157
	Annual	**0.157**

Moorland Breeding Bird Survey

8.6.17 **Table 8.7** summarises the results of the MBBS for target species within the Study Area (Site plus 500 m). Only two species of wader were recorded, which reflects the forested nature of the majority of the Study Area. The table includes regional population estimates for context, as stated in Wilson *et al*. (2015), although it is acknowledged that the decline in the curlew population may mean that the contemporary population for this species is now less than that stated.

Table 8.7 – Moorland Breeding Bird Survey Results

Species	Estimated No. of Territories	NHZ 19 Breeding Population Estimate
Curlew	1	4,284 pairs
Snipe	3	1,252 pairs

Breeding Annex 1 and Schedule 1 Raptor and Owl Searches

8.6.18 One probable barn owl nesting location was identified during the field surveys. This lies within 1 km of the Site. A territorial flight was recorded for goshawk within the northern edge of the Site and red kite was also relatively regularly recorded during baseline surveys. Nest sites for goshawk and red kite were not recorded during the field surveys but the recorded activity is considered to represent birds from territories identified by DGRSG.

Breeding Black Grouse Searches

8.6.19 No black grouse were recorded during the dedicated searches nor during the course of undertaking the other baseline surveys.

Nightjar Survey

8.6.20 No nightjars were recorded during the dedicated survey nor during the course of undertaking the other baseline surveys.

8.7 Implications of Climate Change for Existing Conditions

8.7.1 A summary of the relevant climate change projections using the UK Climate Change Projections 2018 (UKCP18) is:

- temperatures are projected to increase, particularly in summer;
- winter rainfall is projected to increase and summer rainfall is most likely to decrease;
- heavy rain days (rainfall greater than 25mm) are projected to increase, particularly in winter;
- near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant effects of winds; however, the increase in wind speeds is projected to be modest; and
- an increase in frequency of winter storms over the UK.

8.7.2 The impact of climate change on avian species will vary depending on factors such as the availability of suitable habitat and the extent to which such habitats might change as a result of climatic factors, and the adaptability of a species to cope with such changes.

8.7.3 Additionally, some species are more susceptible to climatic changes, for example golden eagle productivity is significantly impacted by high rainfall totals during the breeding season (Fielding and Haworth, 2014).

8.7.4 For some species, impacts are likely to be felt at a population scale across a species' range. For example, there may be species for which Scotland currently lies outside their usual breeding range and which may colonise if this range shifts north. Alternatively, non-breeding species may winter further north than currently, leading to a shift in wintering range and a local population decline, as is already being shown by Icelandic greylag geese.

8.7.5 An increase in days with heavy rainfall or strong winds in the breeding season could lead to reduced productivity due to the potential for nest damage or increased chick fatality and these impacts could be felt at a local scale.

8.7.6 In terms of the impact assessment for the Proposed Development, the potential impacts of climate change are noted but would not be expected to have more than a minor impact on the ornithological features identified during baseline data gathering.

8.8 Future Baseline in the Absence of the Proposed Development

8.8.1 In the absence of the Proposed Development, the habitats within the Site would be expected to remain under the existing regime, with large areas of the plantation forestry on Site continuing to be managed through thinning, rotational felling and replanting in accordance with existing management plans. Thus, there are parts of the Site that are currently forested that would be thinned or clearfelled, and parts of the Site that were recently felled or replanted during the baseline period which would develop over time into mature forestry. The breeding bird community on Site would, therefore, be required to adapt to these localised changes in habitat, irrespective of the Proposed Development.

8.8.2 Despite these localised changes in bird distributions, and notwithstanding the typical inter-annual variability that occurs naturally in bird populations, it can be expected that the baseline ornithological conditions on Site would remain similar to those recorded during the baseline survey campaign for most bird species in the medium and long term.

8.8.3 For certain species, population trends could result in changes to their status. For example, the population of red kites in NHZ 19 is increasing (Wilson *et al*., 2022). Where regional population trends are known, this is referenced in the impact assessments.

8.8.4 It should be acknowledged that even where local populations remain similar to baseline conditions in future, a species' overall conservation status could still change, i.e., becoming more or less favourable. However, where such changes can be anticipated, these changes would be unlikely to qualitatively alter the conclusions of the impact assessment.

8.8.5 The use of a precautionary approach in this impact assessment and the application of standard embedded mitigation and good practice measures (as detailed herein) allows for small changes in ornithological populations, without altering the conclusions of the assessment.

8.9 Embedded Mitigation

8.9.1 Embedded mitigation is built into the project to minimise the potential for any adverse impacts associated with the Proposed Development, to ensure adherence to good practice guidance and compliance with the Wildlife and Countryside Act 1981; with such measures being followed irrespective of the impact assessment's conclusions.

8.9.2 Where embedded mitigation measures are sufficient to prevent significant adverse effects on ornithological features, this has been taken into consideration in the assessment, in order to produce an EIA which is proportionate to the risks posed by the Proposed Development.

Design Considerations

8.9.3 No specific modifications were taken into account when designing the Proposed Development to address potential impacts on ornithological features. However, the nine-turbine project is smaller than that originally proposed in Scoping (up to 25 turbines), with much of the eastern part of the Site no longer being developed. The location and smaller size of the Proposed Development has reduced the potential collision impact for species such as red kite and goshawk, as well as potential displacement impacts on the latter species.

8.10 Good Practice Measures

8.10.1 For the purposes of the impact assessment good practice measures are considered from the outset, alongside embedded mitigation, as they are a fundamental part of the project and will be followed irrespective of the ornithological features recorded or the outcomes of the impact assessment.

Outline Construction Environmental Management Plan

8.10.2 A Outline Construction Environmental Management Plan (OCEMP) will be prepared for the Proposed Development in consultation with Dumfries and Galloway Council (DGC), NatureScot and other relevant stakeholders as per the Standard Conditions. The CEMP will be finalised and implemented in agreement with relevant stakeholders by way of a suitably worded planning condition. An outline CEMP is provided as **Technical Appendix 4.1**.

8.10.3 The CEMP, once finalised, will include for all standard measures to ensure the Proposed Development (covering all permanent and temporary infrastructure) is constructed in accordance with industry good practice applicable at the time of commencement. The CEMP will also include for habitat restoration measures following the completion of construction works, including replanting of forestry in agreed areas as per the Standard Conditions.

8.10.4 The CEMP will include for the appointment of an Ecological Clerk of Works (ECoW) during construction, whose role would be to see that works are undertaken in accordance with environmental legislation, good practice and relevant planning conditions, including making contractors aware of any ornithological sensitivities and restrictions.

8.10.5 Additionally, the CEMP will include for a Breeding Bird Protection Plan (BBPP) as per the Standard Conditions to be prepared for agreement through consultation with Dumfries and Galloway Council and NatureScot. Once finalised, the plan would provide details of survey methods and protocols to protect breeding birds and nests over the course of construction works and, if required, during operational maintenance works. This would include carrying out preconstruction checks ahead of tree clearance, vegetation stripping or excavation works in the breeding season, to identify any active nests. Should a nest be found, it would be protected by a buffer of appropriate distance (Goodship and Furness (2022) and/or in consultation with NatureScot, where required) in which works would be restricted, until the nesting attempt comes to a natural end. These checks would be carried out by the ECoW or other suitably qualified Environmental Manager.

8.10.6 These measures will ensure that works are carried out in accordance with the Wildlife and Countryside Act 1981. The Wildlife and Countryside Act makes it an offence to intentionally or recklessly kill or injure any wild bird, or to damage or destroy their nest whilst it is in use. In addition, all wild birds listed on Schedule 1 of the Act receive additional legal protection, which make it an offence to intentionally or recklessly disturb these species whilst they are building a nest, or whilst the nest is active.

Nature Enhancement Management Plan

8.10.7 The Proposed Development will include for a Nature Enhancement Management Plan (NEMP) which will be prepared in consultation with DGC, NatureScot and other relevant stakeholders. The Outline NEMP is discussed in **Chapter 7** and is provided as **Technical Appendix 7.6**.

8.10.8 The primary aims of the Outline NEMP include enhancement of carbon-rich soils through ditch-blocking, creation of new areas of broadleaf and riparian woodland, pond creation and retention of dead wood. Additional measures specifically aimed at benefiting birds include planting of native tree and shrub cover, for the benefit of species such as black grouse, and the erection of bird nesting boxes suitable for a range of species. The broad enhancement aims will also indirectly benefit ornithological features, as better quality habitats and more habitat diversity is expected to lead to an associated increase in the number and diversity of bird species. Retention of deadwood would provide additional nesting opportunities as well as increasing prey resource for insectivorous species. The broadleaf tree planting would be of benefit to passerine species, which may include Red-listed species such as tree pipit and redpoll, and any increase in the number of passerines would also be beneficial for passerine-eating species such as goshawk.

8.11 Micrositing

8.11.1 There is an allowance for micrositing of proposed infrastructure of up to 100 m. Incorporation of minor shifts in the layout have been taken into account during the baseline surveys, which surveyed appropriate buffers that extended beyond the Proposed Development, and in the CRM analysis, which used an additional buffer that extended more than 200 m beyond blade tips. Therefore, any future micrositing would not undermine the conclusions of the impact assessment.

8.12 Scope of the Assessment

Identification of Potential Impacts

8.12.1 The following potential risks to ornithological features have been identified for wind farm projects. Impacts applicable to the Proposed Development and associated ornithological features are assessed in **Section 8.13**.

Construction Phase

Habitat Loss

8.12.2 The construction of turbine bases, new access tracks and associated infrastructure would lead to temporary losses and changes to habitat as well as direct and permanent habitat losses, as set out in **Chapter 7: Ecology**. The impact of habitat loss upon ornithological features depends on the extent of the land-take, the type of habitat affected, the bird species identified as using these areas and the way in which these birds use the habitat (e.g., for breeding or foraging).

8.12.3 Where a development is constructed on habitats that are prevalent in the wider area (as is the case for the Proposed Development), the area of direct habitat loss would be proportionately low compared to the available habitat in the surrounding area and so the losses would have a local impact only. Additionally, the extent of forestry clearance required for the Proposed Development (and which would be partly offset on site by replanting) can be considered as being within the "normal" level of rotational felling that is already occurring, and which would continue to occur, irrespective of the Proposed Development.

8.12.4 Habitat loss is only likely to have a significant impact where the loss of favourable habitat within a territory is sufficient for a territory to no longer be viable. This is most likely for species with small territories (e.g. passerines) in the direct vicinity of the Proposed Development footprint; however, such localised losses would not result in a noticeable change to a species' regional population for the ornithological features impacted.

8.12.5 The main risk from direct habitat loss during construction is the inadvertent destruction or damage to nesting attempts that are active at the time of construction. However embedded mitigation measures would prevent such damage (for example pre-construction nest checks).

8.12.6 The impact of direct habitat loss on ornithological features as a result of the Proposed Development is included in the assessment, where relevant.

8.12.7 The area lost indirectly to ornithological features through potential avoidance and displacement is considered separately.

Disturbance and Displacement

8.12.8 Noise and visual disturbance associated with construction activity will be greatly increased during this period compared to baseline conditions, and this may lead to the short-term disturbance or displacement of breeding and foraging birds within the vicinity of the activity. The level of impact

depends on the timing of activities (breeding or non-breeding season), the duration and spatial extent of the activity, the sensitivity of the bird species, and the availability of alternative and equivalent habitats in the surrounding area.

8.12.9 The potential disturbance impacts associated with the construction phase are only likely to occur for as long as activities are taking place and are, thus, short-term in duration. If necessary, additional mitigation can be provided, for example by timing construction activities to avoid periods where sensitive species are present.

8.12.10 Disturbance and displacement impacts on ornithological features as a result of construction of the Proposed Development are fully assessed for relevant ornithological features.

Operational Phase

Disturbance and Displacement

8.12.11 The level of human activity on Site during the operational phase of the Proposed Development would be considerably lower than during the construction phase. Forestry operations are assumed to continue at a similar level to baseline conditions. Human presence associated with the Proposed Development has the potential to cause disturbance around the area of activity but this would be at a very localised level and temporary. Embedded mitigation measures would ensure the protection of any sensitive nest sites in the vicinity of the Proposed Development. Therefore, disturbance during the operational phase is not considered further in the assessment.

8.12.12 However, displacement close to infrastructure may affect some ornithological features, particularly around turbines. This may occur throughout the operational period and thus be a long-term impact. This could result in potential indirect habitat loss.

8.12.13 The area in which birds may be affected by displacement impacts depends on the sensitivity of the bird species in question; and may itself change over time if birds become habituated. A number of studies into displacement impacts as a result of wind farms have been undertaken and have found them to vary between species. Relevant literature, where available, informs the impact assessment.

8.12.14 Displacement impacts on ornithological features as a result of operation of the Proposed Development are fully assessed for relevant ornithological features.

Barrier Effect

8.12.15 The presence of turbines may create a barrier to movement, if birds avoid passing through the Proposed Development. For birds that have to regularly fly over or around obstacles this may lead to greater energy expenditure, which could potentially lead to reduced survival. Such regular movements of birds along a particular flight path are most associated with daily movements between roosting and foraging sites for non-breeding birds (e.g. wintering geese), or for birds moving between nest sites and specific favoured feeding areas in the breeding season (e.g. osprey).

8.12.16 The data gathered has shown that the Proposed Development is not located on the daily commuting flightpath of susceptible species. Barrier impacts to ornithological features as a result of operation of the Proposed Development therefore do not require detailed assessment and this impact is not considered further.

Lighting

8.12.17 NatureScot guidance (2020) states that the main risk of artificial lighting on turbines to ornithological receptors is that of phototaxis (attraction to the lights), which has potential to result in collision with the structures if sufficiently attracted to the light source.

8.12.18 Two types of bird are considered to be at risk from phototaxis: burrow-nesting seabird species and nocturnally migrating passerines. Species that are considered at particular risk of collision with turbines, for example raptor and waterbird species, are not susceptible to phototaxis. There is no route to impact for burrow-nesting seabirds, as such species are highly tied to the marine environment. The Proposed Development is not located in a position that would filter migrating passerines, such as a coastal headland, with any migrating passerines likely to be passing over on a very broad front. Such migrations would pass over innumerable sources of artificial light during the course of their migration and so apportioning risk to the Proposed Development is not considered appropriate.

8.12.19 The impact of turbine lighting on ornithological receptors is therefore not considered further in the assessment.

Collision

8.12.20 The erection of tall structures with moving parts could result in flying birds colliding with these structures. Additionally, any associated infrastructure of the Proposed Development, such as overhead lines or fences, could provide a collision risk for susceptible species such as black grouse. Collisions with structures is considered fatal.

8.12.21 The likelihood of a collision occurring depends on a number of factors, including aspects of the size and behaviour of the bird species, the nature of the surrounding environment, the structure and layout of turbines, and weather conditions. Collision risk is perceived as being higher for birds that spend much of the time in the air, such as certain large raptors and species which have low manoeuvrability, especially those with regular flight paths, such as swans and geese.

8.12.22 Collision risk impacts and operational phase displacement can be considered as being mutually exclusive in a spatial sense, as a bird that avoids the wind farm area cannot be at risk of collision with the turbine rotors at the same time. However, they are not mutually exclusive in a temporal sense, for example a bird may initially avoid the wind farm but later habituate to it, putting the bird at potential risk of collision.

8.12.23 Collision impacts on ornithological features as a result of operation of the Proposed Development are fully assessed for relevant ornithological features.

Decommissioning Phase

Disturbance and Displacement

8.12.24 Noise and visual disturbance associated with human activity may occur during the decommissioning phase. However, the level of impact is considered to be of a similar scope and magnitude, or lower, than would occur during the construction phase. As such, a separate assessment of decommissioning phase impacts of the Proposed Development is not undertaken. Decommissioning phase impacts on ornithological features are taken to be the same as for the construction phase, both in terms of magnitude of impact and significance of effect.

Identification of Important Ornithological Features

8.12.25 There are a number of ornithological features for which it can reasonably be predicted there would be no significant effect (following embedded mitigation) without the need for full assessment. These ornithological features are "scoped out", in order that the impact assessment is proportionate (in accordance with guidance (CIEEM, 2018)) and focuses solely on those features for which there is potential for a significant effect as a result of the Proposed Development.

8.12.26 This section of the chapter identifies which ornithological features are scoped in or scoped out for assessment. Sites and species identified through the data gathering process, as set out above (**Section 8.6**), are listed and justification provided as to whether these features are scoped in for full assessment or whether they can safely be scoped out and given no further consideration within the chapter.

Ornithological Features Taken Through for Full Assessment

8.12.27 Those species and designated sites that are scoped into the assessment are detailed in **Table 8.8**. These features are referred to hereafter as being IOFs in the context of the Proposed Development. For each IOF, the relevant potential impact(s) that require assessment are listed in the table.

Table 8.8 – Important Ornithological Features and Impacts Identified for Assessment

IOF	Status and Justification	Impact	Phase
Golden eagle	Although not recorded during baseline surveys, the desk study has highlighted that a golden eagle pair has become established in the wider area, with a nest site within 10 km. However, the nest is well beyond the distance in which disturbance impacts may be felt (Goodship and Furness, 2022). Impacts that require assessment are displacement (as a result of avoidance of turbines) and collision, which is assessed qualitatively using satellite tag data.	Displacement Collision	Operation
Goshawk	A goshawk territory overlaps with the Site and may have a nest within the Site boundary. Goshawk was recorded relatively frequently during VP flight activity surveys and qualified for CRM. Impacts that require assessment are habitat loss (construction phase), disturbance and displacement (construction and operational phases) and collision (operational phase).	Habitat Loss Disturbance and Displacement Collision	Construction Operation
Red kite	A pair of red kite breed within 2 km of the Site, whilst two further pairs breed within (or just beyond) 5 km from the Site. No disturbance impacts would be felt by nesting birds based on the separation distance from the Proposed Development (Goodship and Furness, 2022). Red kite was recorded relatively frequently during VP flight activity surveys and qualified for CRM. Impacts that require assessment	Displacement Collision	Operation

IOF	Status and Justification	Impact	Phase
	are displacement (as a result of avoidance of turbines) and collision.		
Whooper swan	The Site does not support habitat suitable for roosting or foraging whooper swans. Although few flights were recorded of birds passing over the Site during VP flight activity surveys, the number of individuals meant that whooper swan qualified for CRM.	Collision	Operation

Ornithological Features Scoped Out

8.12.28 **Table 8.9** lists the ornithological features that are scoped out from further assessment.

Table 8.9 – Ornithological Features Scoped Out From Further Assessment

Ornithological Feature	Status and Justification
Barn owl	Comprehensive data regarding breeding locations have been obtained and none are located within the Site, which does not provide suitable nesting structures. The nearest nesting location is more than 150 m from the Site boundary, which is beyond the distance at which disturbance would occur (50-100 m (Goodship and Furness, 2022)) and well beyond this distance to the nearest turbine (1.5 km). Barn owl is known to successly breed close to wind farms and its low altitude flight behaviour means it is at negligible risk of collision (Barn Owl Trust, 2014). A non-significant effect can be concluded without full assessment.
Black grouse	No black grouse were recorded during the baseline surveys. The desk study data highlights that the wider area used to hold black grouse lek sites (more than 1.5 km from the Site and 1 km from the Access Route) but the data suggests the species is now absent and therefore there is no route to impact.
Common crossbill	Common crossbill is a common and widespread species, with a population that is irruptive and varies in numbers and locations year to year. In accordance with NatureScot guidance (SNH, 2025a) common crossbill, as a Schedule 1 species, would be protected through species protection plans but does not require survey pre-consent. Following embedded mitigation, a non-significant effect can be concluded.
Curlew	Curlews avoid forested areas and breeding close to forest edge and so areas within the Site are unfavourable to this species. One breeding territory was recorded, which overlapped with the 500 m buffer around the Site. One territory is 0.02% of the stated NHZ 19 breeding population (Wilson *et al*., 2015). It is unlikely that the territory would be lost as a result of the Proposed Development given the territory lies more than 1 km from the nearest proposed turbine. No at-risk flights were recorded for curlew. A non-significant effect can be concluded without full assessment.
Goosander	No at-risk flights and no evidence of breeding were recorded for goosander, with habitat in the vicinity of the Site considered to be of low suitability. A non-significant effect can be concluded without full assessment.
Greylag goose	Two at-risk flights (five individuals) were recorded during baseline surveys, which indicates a negligible collision risk and a non-significant effect at a regional population level. Records came from the breeding season, suggesting the birds recorded were from the Scottish feral population. The Site and surrounding area do not hold favourable habitat for greylag goose. A non-significant effect can be concluded without full assessment.
Hen harrier	Two at-risk flights (two individuals) were recorded, which indicates a negligible collision risk and a non-significant effect at a regional population level. Records came from the post-breeding period (August) with no evidence of breeding within the vicinity of the Site. The infrequency of records indicates that the Site is not an important foraging area for hen harrier and the data from the surrounding open areas does not suggest this would change following plantation clearance. A non-significant effect can be concluded without full assessment.
Nightjar	No nightjars were recorded during the baseline surveys and no desk study data were returned that indicated their presence within the Site. Based on the available data there is considered to be no route to impact. Should nightjar colonise clearfelled areas within the Site, embedded mitigation would protect nesting birds, as with all other ornithological features. A non-significant effect can be concluded without full assessment.
Peregrine	The data search highlighted a breeding location for peregrine, however this is located well beyond the distance at which disturbance would occur (500-750 m (Goodship and Furness, 2022)) and beyond core foraging range (2 km (SNH, 2016)). Peregrine was not recorded in the vicinity of the Site during the baseline surveys. A non-significant effect can be concluded without full assessment.
Pink-footed goose	Three flights were recorded (October and March) but all were recorded above potential at-risk height. This suggests birds pass over on migration (spring and autumn) but do not cross the Site as part of local commuting flights. The data suggests a negligible collision risk to pink-footed goose, which has a large population that is increasing despite the growing number of wind farms that lie on their migration routes. The Site and surrounding area do not hold favourable habitat for pink-footed goose. A non-significant effect can be concluded without full assessment.

Ornithological Feature	Status and Justification
Snipe	Three breeding territories were recorded that overlapped with the MBBS Study Area (Site plus 500 m buffer). Three territories are equal to 0.2% of the NHZ 19 breeding population (Wilson *et al*., 2015). All territories were located outside the Site and more than 1 km from the nearest turbine, with no territories recorded in clearfelled areas within the Site. Given the territory locations, it is unlikely that they would be lost as a result of the Proposed Development. No at-risk flights were recorded for snipe. A non-significant effect can be concluded without full assessment.
Secondary Species	Secondary species are abundant and widespread species for which a significant effect at a regional population scale is highly unlikely. As with all species in the vicinity of the Proposed Development, breeding attempts would be protected through pre-construction nest checks. Although gulls were treated as secondary species during baseline surveys and are now recommended for recording as targets (NatureScot, 2025a) gull activity was very low across the Site and a negligible impact from collision can be inferred. A non-significant effect can be concluded for all secondary species without full assessment.
Other passerine species	Wind farms are generally considered not to have a significant effect on passerine species, due to their short lifespans, high productivity and small territories. As with all species in the vicinity of the Proposed Development, breeding attempts would be protected through pre-construction nest checks. A non-significant effect on the regional population of all passerine species can be concluded without full assessment.
Muirkirk and North Lowther Uplands SPA North Lowther Uplands SSSI Muirkirk Uplands SSSI	The SPA and associated SSSIs are a minimum of 14.3 km from the Site, which is greater than the core foraging range for all listed ornithological features (golden plover, hen harrier, merlin, peregrine, short-eared owl and associated breeding bird assemblages as set out in **Table 8.4**) and which therefore suggests a lack of potential connectivity based on NatureScot guidance (SNH, 2016). The Muirkirk and North Lowther Uplands SPA is considered in the information for HRA provided in **Technical Appendix 8.4**.
Loch Ken and River Dee Marshes SPA Loch Ken and River Dee Ramsar site	The SPA and Ramsar site are a minimum of 19.9 km from the Site (16.3 km from the Access Route), which is greater than the core range of Greenland white-fronted goose (5-8 km) and, for the Site, close to the maximum foraging range for greylag goose (15-20 km). The Site and Access Route are not located in known foraging areas used by greylag geese and do not support habitat suitable for wintering geese. No connectivity is suggested in the data. The Loch Ken and River Dee Marshes SPA and Ramsar site are considered in the information for HRA provided in **Technical Appendix 8.4**.

8.13 Assessment of Effects

8.13.1 The IOFs and associated potential impacts, as set out in **Table 8.8**, are assessed in turn below.

Golden Eagle

8.13.2 For golden eagle the potential impacts scoped in for assessment are displacement and collision impacts during the operational phase.

Status

8.13.3 Golden eagle is listed on Annex 1 of the Birds Directive and Schedule 1 of the WCA and is listed on the SBL. Golden eagle has a favourable conservation status with an increasing population and is green-listed on BoCC (Stanbury *et al*., 2021). The most recent national survey (2015) gave a Scotland-wide population estimate of 508 breeding pairs (Hayhow *et al*., 2017).

8.13.4 In the south of Scotland the status of golden eagle has changed in recent years. Since 2018, the South of Scotland Golden Eagle Project (SSGEP) has undertaken a programme of translocating birds and releasing them in the Southern Uplands to boost the breeding population in this area. Golden eagles in south Scotland now number approximately 50, with new territories being set up as birds mature and begin to breed. Due to the reintroduction scheme, the number of golden eagles in NHZ 19 as cited in Wilson *et al.* (2015), of two occupied territories, is clearly no longer accurate. Contemporary data as to the number of breeding pairs in NHZ 19 or in Dumfries and Galloway could not be located to inform this assessment.

8.13.5 However, it has been hypothesised by Fielding and Haworth (2014) that the south of Scotland could support 14-16 pairs of golden eagle, with the hills in NHZ 19 (Galloway Hills, Carsphairn Hills and Lowther Hills) potentially able to support seven to eight pairs. The Carsphairn Hills area is suggested as having habitat suitable for supporting one to two pairs, with the "hills south of Sanquhar" considered to have space for one potential range due to a combination of forestry and existing wind farms.

8.13.6 The desk study data confirmed that a new territory became established in 2023 in the wider area around the Site. The Site is located within core foraging range of the nesting location (used 2024 and 2025); core range being 6 km, with maximum range being 10 km (SNH, 2016). However, the nearest proposed turbine to the nest site is located outside core foraging range.

8.13.7 The female of the territorial pair is satellite-tagged, and this provides detailed data regarding usage of the home range. This shows that the Site is not an important part of their range, with only one fix

obtained from within the Site boundary compared to 1,385 location fixes outside the Site boundary during the period in which this bird has been present in this area and for which data was obtained (September 2023 to January 2025).

8.13.8 The tagging data also reveals that the Site is little used by dispersing non-breeding golden eagles. A couple of clusters of records within the vicinity of the Site are noted, however. There are records from a discrete location close to the edge of the Site boundary, but which is approximately 750 m from the nearest proposed turbine. There is also another cluster of records from a discrete location on the Access Route, less than 200 m from an existing forestry road (confidential **Figure 8.6c**).

8.13.9 The presence of a breeding pair with a core range that overlaps with the Site means that golden eagle is given medium (regional) importance.

Displacement (operational phase)

8.13.10 The primary response of golden eagles to turbines is one of avoidance, with the comprehensive data gathered through satellite-tagging studies in Scotland clearly showing high avoidance of wind farm sites (e.g. Fielding *et al*., 2021 and Fielding *et al*., 2024a).

8.13.11 The potential consequence of high avoidance is displacement, with the area within 300 m of turbines considered as being effectively lost to golden eagles; meaning this habitat would no longer be available. Where a wind farm is located within the home range of a pair of golden eagles, this would lead to the loss of part of their range. The impact of this displacement is dependent on whether the habitat lost is "good" eagle habitat, the availability of good habitat elsewhere in the home range, and the ability of the pair to extend the home range to compensate for this loss.

8.13.12 In the case of the Proposed Development, the Site is located in an area of extensive plantation forestry. Such habitats are avoided by golden eagles and this is evident in the tagging data for the female of the local territorial pair (the "settled" bird records illustrated on confidential Figure 8.6c). Note that male and female golden eagles use their home range in similar ways (Fielding *et al*., 2024b), so the tagging data for the female is considered as being appropriate for also determining site usage for the untagged male. The tagging data shows a near absence of records from the Site (<0.1% of location fixes). In this context, the Proposed Development would not lead to habitat loss, as the baseline habitat is already avoided.

8.13.13 The Site is sufficiently distant from the nesting location that no disturbance or displacement from the existing nest site would occur as a result of the Proposed Development.

8.13.14 Based on the modelling undertaken by Fielding and Haworth (2014), the Carsphairn Hills may not accommodate another golden eagle home range. In the event that another pair does set up a home range adjacent to the existing pair, the existing home range may become less extensive, or part of the Site could be incorporated into this second range, depending on how the range boundaries align. In either scenario, the presence of the Proposed Development would not be an important factor given eagles would continue to avoid the extensive plantation forestry in which the Proposed Development sits; and any future ranges would be set up in this context (unless all plantation in the area was to be removed, which is not a realistic scenario).

8.13.15 The tagging data shows the locations of dispersing tagged birds, in addition to data for the territorial female (confidential **Figure 8.6c**). The Site itself has been shown to be very rarely used by dispersing (non-breeding and immature) birds, with less than 2% of the location fixes within the 10 km search area recorded within the Site and less than 3% of records when including the Access Route. The location of the small cluster of records noted close to the Site and more than 750 m from the nearest proposed turbine would not be impacted by the Proposed Development based on a non-breeding disturbance buffer of 250-500 m (Goodship and Furness, 2022). The location of this area and the small cluster of records within the Access Route have been examined and this does not indicate the presence of any geographical features that would make these locations particularly attractive to golden eagles compared to similar habitat elsewhere. Therefore, these highlighted locations are not considered to be important for the dispersal of immature birds. The area of habitat lost around the Proposed Development and Access Route is very small in the context of habitat available to dispersing birds within the wider area.

8.13.16 The Proposed Development would have a **negligible** displacement impact on the existing golden eagle pair and on dispersing birds and would not prevent the establishment of future home ranges in the region.

Collision (operational phase)

8.13.17 As described above, avoidance of turbines is the main impact posed by wind farm developments to golden eagles. This is not believed to change over time, with high avoidance expected throughout the lifetime of the Proposed Development. It can, therefore, be anticipated that collision risk will be low for golden eagles as clearly birds that avoid turbines would not be at risk of colliding with them. Although occasional collision fatalities have been recorded in Scotland for golden eagle, such events remain incredibly rare and lower than has been predicted by cumulative CRM analyses.

8.13.18 No golden eagles were recorded during baseline VP flight activity surveys, with the territorial pair only becoming established in 2023. However, the availability of the tagging data allows a qualitative assessment of potential collision risk to be undertaken, even though a CRM output has not been produced for golden eagle.

8.13.19 The satellite-tagging data obtained typically shows the location of the tagged bird five times a day, and covers the period September 2023 to January 2025 (16 months). Thus, this is a comprehensive dataset that presents a reliable representation of how the home range is used. The locations indicate that the settled birds typically use the open hill ground that creates a large arc to the north of the Site. Although occasional flights may pass over the proposed turbine locations, the data indicates that this is an extremely rare event.

8.13.20 Coupled with the high avoidance of turbines that would be expected, a **negligible** impact on golden eagle as a result of collision during the operational phase can be concluded for the Proposed Development.

Conclusion

8.13.21 The Proposed Development (displacement and collision impacts during the operational phase) would have a **negligible** impact on golden eagle and a **non-significant** effect is concluded.

Goshawk

8.13.22 For goshawk the potential impacts scoped in for assessment are habitat loss and disturbance impacts during the construction phase, and displacement and collision impacts during the operational phase.

Status

8.13.23 Goshawk is a Schedule 1 species, but has a favourable conservation status and is Green-listed on BoCC (Stanbury *et al*., 2021). Goshawk is a secretive species that is under-recorded and so population estimates should be considered as minimum numbers. The Scottish breeding population has been estimated at 165 pairs (2017) (Challis *et al*., 2020). The breeding population for NHZ 19, as provided by Wilson *et al*. (2015), is of an estimated 31 breeding pairs. A more contemporary regional population estimate could not be located to inform the assessment.

8.13.24 The DGRSG data highlighted the presence of a goshawk territory that may overlap with the Site. The current nesting location is unknown as the previous nesting site (located approximately 500 m from the Site) moved following clear-felling. The pair was confirmed as still being in this area in 2024, and this occupied territory likely refers to the birds recorded during field surveys. A second goshawk pair has been noted (as recently as 2024) centred on a location a minimum of 3 km from the Site, although a nest site for this territory is not known. This part of the forest is also subject to planned clear-felling operations. Given the two pairs of goshawk identified within this relatively small search area, and the extent of similar plantation forestry in Dumfries and Galloway, this supports the evidence that the 31 pairs stated for NHZ 19 is an under-estimate.

8.13.25 Goshawk was recorded relatively frequently during the VP flight activity surveys. However, only four flights (four individuals) were recorded at-risk of collision, which is to be expected as the majority of flight activity for goshawk is generally below the forest canopy (and below turbine swept height). All at-risk flights were recorded in the non-breeding season. CRM gave an estimated mortality risk for goshawk of 0.042 birds per year (equivalent to less than one bird every 23 years).

8.13.26 In Scotland, goshawk is typically found in extensive areas of conifer plantation similar to that found in the vicinity of the Site. Therefore, this species is adaptable to the rotational felling and planting that occurs in these forests, and their favourable population status has been achieved against these background conditions. Therefore, any felling undertaken for the Proposed Development should be regarded in this context.

8.13.27 As a goshawk territory is present in the vicinity of the Site, goshawk is classed as having medium (regional) importance.

Habitat Loss and Disturbance (construction phase)

8.13.28 The occupied territory that overlaps with the Site may have nesting locations found within the Site boundary. It is therefore possible that such a nest could be located within potential disturbance distance of the Proposed Development (300-500 m (Goodship and Furness, 2022)). However, most proposed turbines are to be sited on open ground and the area of mature plantation habitat within 500 m of the proposed turbines is relatively small, which suggests this scenario is unlikely.

8.13.29 Embedded mitigation, which will include pre-construction nest checks, will identify and protect any active nests during the construction phase of the Proposed Development.

8.13.30 The total area of forest to be lost in the vicinity of the Proposed Development, after on-Site restocking following construction, is approximately 22.03 ha. Goshawks have a core range of 3 km (SNH, 2016) which, if one assumes a home range with a central point, would equate to a territory of approximately

2,827 ha in area. Therefore, this small reduction in tree cover within core range would not result in the loss of this territory.

8.13.31 The territory located in the vicinity of the Site has already been shown to have remained occupied despite removal of the original nest site as part of normal forestry management operations. Goshawks have been shown to have up to four nesting areas within their nesting range (Petty and Anderson, 1996) which allows them to shift nest site when required, and so it can be expected that nest sites would remain available to this pair following construction of the Proposed Development.

8.13.32 The Proposed Development would have a **negligible** impact on the goshawk territory, as a result of direct habitat loss or from disturbance during the construction phase.

Displacement (operational phase)

8.13.33 There is potential for displacement of goshawk from around turbines, although relevant literature for this species could not be found. Based on potential disturbance distance it might be expected that displacement could occur if a turbine was positioned within 500 m of a nest site (Goodship and Furness, 2022), although this may depend on other factors such as visual shielding by standing trees and availability of other suitable nest habitat. Using the location of the previous nest site (750 m to 3 km from proposed turbinesi) as an indicator of the core location of the nesting territory, and the size and location of the Proposed Development, it is considered unlikely that any displacement from the immediate area around turbines would result in territory loss given the availability of suitable habitat in the wider area.

8.13.34 Apart from the occupied territory that overlaps with the Site no other goshawk territories would be impacted by the Proposed Development, with the nearest known such territory located at least 3 km from the Site and beyond core range.

8.13.35 As there is not predicted to be loss of any territories, displacement during the operational phase of the Proposed Development is concluded as having a **negligible** impact.

Collision (operational phase)

8.13.36 Goshawk was determined by the CRM as having a low collision risk, with a mortality estimate of 0.042 birds per annum. This would be equivalent to 0.07% of the NHZ 19 breeding population of 31 pairs (62 adult birds).

8.13.37 The additional mortality potentially impacting the regional population as a result of the Proposed Development would be indiscernible at this level.

8.13.38 A **negligible** impact on goshawk as a result of collision during the operational phase can be concluded for the Proposed Development.

Conclusion

8.13.39 The Proposed Development (habitat loss and disturbance during the construction phase, and displacement and collision impacts during the operational phase) would have a **negligible** impact on goshawk and a **non-significant** effect is concluded.

Red Kite

8.13.40 For red kite the potential impacts scoped in for assessment are displacement and collision impacts during the operational phase.

Status

8.13.41 Red kite is a Schedule 1 and Annex 1 listed species and is listed on the SBL. Red kite has a favourable conservation status (Green-listed on BoCC (Stanbury *et al*., 2021)) due to the continued growth and expansion in its breeding population. The Scottish red kite population is estimated at 300-350 breeding pairs (Scottish Environmental Link, 2025). Wilson *et al*. (2015) gave the breeding population for NHZ 19 as 83 pairs (based on Scottish Raptor Monitoring Scheme (SRMS) data from 2013). Due to the continued growth in the population, the NHZ population estimates are considered to be outdated now for red kite. Using more up-to-date SRMS data (Challis *et al*., 2023), the red kite population in Dumfries and Galloway (which broadly aligns with NHZ 19 (plus NHZ 18)) was a minimum of 124 pairs in 2022, based on the number of breeding attempts monitored that year.

8.13.42 The data returned by RSPB and DGRSG confirmed that a pair of red kite has a regular nesting location within 2 km of the Site, but well beyond the maximum disturbance buffer stated in guidance of 300 m, or 600 m for activities with the potential for high visual or audial disturbance (Goodship and Furness, 2022). Two other nests were reported within the search area, with these being over 4 km from the Site. Flight activity was relatively high, as recorded during the baseline VP flight activity surveys, with 13 at-risk flights (16 individuals) recorded, with most activity recorded in the breeding season. CRM gave an estimated mortality risk of 0.127 birds per year (equivalent to less than one bird every seven years).

8.13.43 As red kite does not breed within the Site and only one pair is known to breed within 4 km of the Site (core range (SNH, 2016)), this ornithological feature is classed as having low (local) importance.

Displacement (operational phase)

8.13.44 There could be displacement of foraging birds around the Proposed Development if birds avoid turbines during the operational phase.

8.13.45 Red kites have a core foraging range of 4 km and a maximum foraging range of up to 6 km (SNH, 2016). Only one pair of red kite breed within core foraging range of the Site, which is the distance used to determine potential connectivity. The distance from the nest site to the nearest turbine is over 3.5 km and only two proposed turbines are located within 4 km of the nest site. Therefore, the Proposed Development is at the edge of the core foraging range for this pair and if an area around turbines is "lost" due to displacement this would be a very small part of their home range.

8.13.46 Available literature suggests that red kite would not be displaced from the Site in any case. Research into the impacts of wind farms on red kite include monitoring at Braes of Doune Wind Farm (Stirlingshire), which found that flight activity continued within the operational wind farm including between turbines (Duffy and Urquhart, 2014), and a multisite project in Germany concluded that red kites do not avoid wind farm areas where habitat remains favourable post-construction (Mammen *et al*., 2011).

8.13.47 A **negligible** impact on red kite as a result of displacement during the operational phase can be concluded for the Proposed Development.

Collision (operational phase)

8.13.48 If the NHZ 19 breeding population estimate, as stated in Wilson *et al*. (2015), is used in the assessment the collision mortality estimate of 0.127 birds per year is equivalent to 0.08% of this population (83 pairs, or 166 breeding adults). If the more contemporary estimate for Dumfries and Galloway is used (124 pairs, or 248 breeding adults (Challis *et al*., 2023)), the estimated mortality is equivalent to 0.05% of the regional breeding population. This is precautionary, as in reality there will be immature and non-breeding birds within the population that would account for at least some of the flight activity over the Site but which are not included in the regional population estimates.

8.13.49 The additional mortality potentially impacting the regional population as a result of the Proposed Development would be indiscernible. This would not affect the population trend for red kite, which would be expected to continue to increase regardless of the Proposed Development, and which is occurring against a background increase in the number of wind farm developments in south-west Scotland.

8.13.50 A **negligible** impact on red kite as a result of collision during the operational phase can be concluded for the Proposed Development.

Conclusion

8.13.51 The Proposed Development (displacement and collision impacts during the operational phase) would have a **negligible** impact on red kite and a **non-significant** effect is concluded.

Whooper Swan

8.13.52 For whooper swan the potential impact scoped in for assessment is collision impact during the operational phase.

Status

8.13.53 Whooper swan is almost exclusively a non-breeding bird in the UK. The wintering population, which comprises Icelandic breeding birds, is an estimated 5,052 individuals in Scotland (Brides *et al*., 2021), with the NHZ 19 population given as 1,188 (estimated peak abundance based on 2013 data (Wilson *et al*., 2015)). Whooper swan has an increasing population but is Amber listed on BoCC (Stanbury *et al*., 2021) and is Annex 1 and SBL listed.

8.13.54 During the baseline VP flight activity surveys for the Proposed Development, two whooper swan flights were recorded, both coming from the same date in early April. However, only one flight was at-risk, with the flight comprising 42 individuals. The resultant CRM estimate was of 0.157 bird collisions per year (equivalent to less than one bird every six years).

8.13.55 The Site itself offers no suitable habitat for whooper swan, with birds recorded passing over the Site on migration only. Two flights in the 12-month survey period is evidence of such migratory flights only occurring occasionally. Migratory flights are more likely to follow the corridors provided by the Nith valley (east of the Site) and The Glenkens (west of the Site) rather than over the hill ground on which the Site is located. Although whooper swan cannot be regarded as occurring regularly in the vicinity of the Site, due to the numbers recorded and the species SBL and Annex 1 status, whooper swan is given medium (regional) importance.

Collision (operational phase)

8.13.56 The collision mortality estimate of 0.157 birds per year is equivalent to 0.01% of the NHZ 19 wintering population (Wilson *et al*., 2015). Such a small additional impact to mortality would be indiscernible in the regional population. It should also be noted that the whooper swan population is increasing (27% increase between 2015 and 2022 (Brides *et al*., 2021)), despite the increasing numbers of wind farm developments along their migration flyway.

8.13.57 A **negligible** impact on whooper swan as a result of collision during the operational phase can be concluded for the Proposed Development.

Conclusion

8.13.58 The Proposed Development (collision impacts during the operational phase) would have a **negligible** impact on whooper swan and a **non-significant** effect is concluded.

Committed Additional Mitigation

8.13.59 Negligible magnitude impacts are predicted for all IOFs and no likely significant effects are concluded as a result of the Proposed Development. Therefore, no additional mitigation measures are proposed that are supplementary to the embedded mitigation measures described above and which would ensure compliance with legislation and standard protections.

Residual Effects

8.13.60 As no additional mitigation is proposed, the scale of impacts and significance of effects upon IOFs remain unchanged.

8.13.61 For all IOFs assessed, negligible impacts have been predicted for the Proposed Development, and non-significant effects are concluded.

8.14 Cumulative Assessment

8.14.1 This section presents a CIA, in which other relevant projects are considered alongside the Proposed Development. The CIA has been carried out with reference to NatureScot guidance (2025c) and Scoping Opinion (**Table 8.1**).

Identification of Relevant Projects

8.14.2 The spatial extent used to identify relevant projects for inclusion in the cumulative assessment is a search area of 20 km around the Site, as agreed with NatureScot (**Table 8.1**). This is considered to be proportionate to the level of impact predicted by the Proposed Development, whilst taking account of the large number of wind farms in this area.

8.14.3 Relevant projects included in the CIA are wind farm projects only, excluding those with three or fewer turbines, as agreed through Scoping (**Table 8.1**).

8.14.4 In accordance with NatureScot guidance (NatureScot, 2025c), the CIA includes consideration of:

- existing wind farm developments, either operational or under construction;
- consented wind farm developments (unless consented more than eight years ago without implementation); and
- wind farm applications that have been formally submitted and are awaiting determination (noting that such projects may be subject to change in design).

8.14.5 A cumulative spreadsheet of collision risk was provided by NatureScot in March 2025 for NHZ 19, from which relevant data has been extracted. However, it is acknowledged that the spreadsheet provided provides incomplete data and so extra information has been sought to fill these data gaps.

8.14.6 Where necessary, further relevant information was sought from project EIA Reports/ Environmental Statements, which were searched for using the website of the Scottish Government's Energy Consents Unit (ECU)[2] or using the Local Planning Authorities planning portal.

8.14.7 Based on the search criteria set out above, the projects identified for inclusion in the CIA are listed in **Table 8.10**. Information was found for the majority of projects.

Table 8.10 – Projects Included in the Cumulative Impact Assessment

Wind Farm	No. of Turbines	Project Stage	Year of Planning Submission	Distance from the Site	Relevant Data Available?
Euchanhead	21	In Planning	2020	0.5 km	Yes
Lorg	10	In Planning	2022	1.6 km	Yes
Sanquhar II	44	Consented	2019	1.9 km	Yes

[2] Available from: https://www.energyconsents.scot/ApplicationSearch.aspx (Accessed 30 April 2025)

Wind Farm	No. of Turbines	Project Stage	Year of Planning Submission	Distance from the Site	Relevant Data Available?
Manquhill	8	Consented	2023	3.4 km	Yes
Cornharrow	7	Consented	2022	3.5 km	Yes
Wether Hill	14	Operational	2005	3.5 km	Yes
Whiteside Hill	10	Operational	2006	5.8 km	No
Cloud Hill	11	In Planning	2023	6.2 km	Yes
Troston Loch	14	Consented	2020	6.9 km	Yes
Afton	27	Operational	2004	7.7 km	No
Windy Rig	12	Operational	2017	7.8 km	Yes
Sanquhar	9	Operational	2013	8.2 km	Limited
Twentyshilling Hill	9	Operational	2018	8.3 km	Yes
Windy Standard I	36	Operational	2002	8.4 km	No
Rowancraig	6	In Planning	2024	8.7 km	Yes
Windy Standard I (Repower)	8	In Planning	2022	8.8 km	Yes
Margree	9	Consented	2019	8.8 km	Yes
Hare Hill	39	Operational	1994	9.4 km	Yes
Hare Hill Extension	35	Operational	2007	9.7 km	Yes
Divot Hill	9	Consented	2023	9.9 km	Yes
Glenshimmeroch (variation)	10	In Planning	2025	10.0 km	Yes
Brockloch Rig/ Windy Standard II	30	Operational	2007	10.1 km	Yes
Sandy Knowe	24	Operational	2018	10.8 km	Yes
Sandy Knowe Extension	6	In Planning	2022	10.9 km	Yes
Fell	8	In Planning	2025	10.9 km	Yes
Brockloch Rig III/ Windy Standard III	20	Consented	2021	11.0 km	Yes
South Kyle	50	Operational	2013	12.3 km	Limited
Blackcraig Hill	23	Operational	2017	12.9 km	Yes
Glenmuckloch Farm	8	Operational	2016	14.3 km	Yes
Dalswinton	15	Operational	2003	19.6 km	No

Ornithological Features and Impacts for Inclusion

8.14.8 Not all of the IOFs and impacts assessed for the Proposed Development on its own are included in the CIA.

8.14.9 For displacement impacts, the Proposed Development would only contribute to cumulative impacts where the Proposed Development impacts the same territory as other projects, leading to the loss of that territory where it would not be lost as a result of the Proposed Development on its own. This is potentially the case for goshawk, with one proposed wind farm (Euchanhead) identified as potentially impacting the same territory as that impacted by the Proposed Development. Therefore, for this ornithological feature, cumulative habitat loss/ displacement impacts are assessed but consider this one additional project only.

8.14.10 For red kite, the nest of the pair located within 2 km of the Site is not subject to disturbance or displacement by the Proposed Development, or any other of the identified projects. The evidence provided (paragraph 8.13.46) suggests that red kites are not displaced by operational wind farms in any case. The conclusion of the impact assessment for the Proposed Development on its own (negligible displacement impact) remains valid irrespective of other projects, so displacement impacts on red kite are not included in the CIA.

8.14.11 For golden eagle, the Site has been shown to be almost completely unused by the territorial pair that has theoretical connectivity with the Site. Therefore, it is not considered appropriate to assess the Proposed Development cumulatively with other projects; given that the Proposed Development itself would not contribute to any loss of favoured habitat within this home range. Note that only one other consented wind farm project is located in an area that is considered to have a potential impact on the golden eagle home range: Sanquhar II Wind Farm, which is to be located on open hill ground and has turbines within 6 km of the nest (core range); but for the reasons stated, the Proposed Development would not have a displacement impact that would be felt cumulatively alongside this project.

8.14.12 Collision impacts are considered in the CIA, as although only negligible impacts have been predicted for the Proposed Development alone, it is possible that cumulatively this could increase the magnitude of this impact on IOFs. Collision impacts are therefore included for those IOFs for which CRM was undertaken: goshawk, red kite and whooper swan.

8.14.13 As a CRM output was not calculated for golden eagle for the Proposed Development, it would not contribute to a cumulative collision estimate, which is based on summing the CRM outputs of all relevant projects. However, golden eagle has been shown to have a very small mortality risk (likely close to zero) from the Proposed Development, as predicted by the tagging data. Additionally, the large

majority of other projects have assessments based on baseline data that precedes the establishment of new golden eagle territories in the region, such that the CIA would have little relevance.

Cumulative Effects

8.14.14 The data compiled for the CIA are presented in **Table 8.11**. Values are estimated mortality risk (bird collisions per year).

8.14.15 The information stated for other projects is presented without prejudice, noting that CRM analysis for other projects may have been undertaken in a way that may not be consistent with that completed for the Proposed Development.

8.14.16 A collision estimate of 0.000 has been used in the table either where an ornithological feature was not recorded during baseline surveys or flight activity was sufficiently low that CRM was not undertaken.

Table 8.11 – Cumulative Impact Assessment (Annual Collision Risk) for Relevant Ornithological Features

Wind Farm	Goshawk	Red kite	Whooper swan
Appin Wind Farm (the Proposed Development)	0.042	0.127	0.157
Euchanhead	0.016	0.000	0.000
Lorg	0.044	0.330	0.000
Sanquhar II	0.021	0.377	0.000
Manquhill	0.000	0.000	0.000
Cornharrow	0.118	0.089	0.000
Wether Hill	0.000	0.000	0.000
Cloud Hill	0.000	0.020	0.000
Troston Loch	0.080	0.140	0.045
Windy Rig	0.000	0.006	0.000
Sanquhar	0.000	No data	No data
Twentyshilling Hill	0.000	0.000	0.000
Rowancraig	0.000	0.010	0.000
Windy Standard I (Repower)	0.000	0.000	0.000
Margree	0.000	0.000	0.000
Hare Hill	0.000	0.000	0.000
Hare Hill Extension	0.000	0.000	0.000
Divot Hill	0.000	0.000	0.000
Glenshimmeroch (variation)	0.000	0.140	0.000
Brockloch Rig/ Windy Standard II	0.000	0.000	0.000
Sandy Knowe	0.000	0.000	0.000
Sandy Knowe Extension	0.000	0.000	0.000
Fell	0.000	0.147	0.000
Brockloch Rig III/ Windy Standard III	0.000	0.000	0.000
South Kyle	0.010	0.000	No data
Blackcraig Hill	0.000	0.000	0.000
Glenmuckloch	0.012	0.000	0.508
TOTAL	**0.343**	**1.386**	**0.710**

Goshawk

8.14.17 Euchanhead Wind Farm, which would be located adjacent to the Site, identified a goshawk territory which likely refers to the same territory that overlaps with the Proposed Development. Neither project has predicted loss of this territory as a result of the project on its own. However, the presence of both projects could reduce options for relocating a nest site (if lost) and, in combination with standard forestry operations, could lead to a decline in suitable forestry cover that is sufficient to impair the integrity of the territory.

8.14.18 As a worst-case scenario, the cumulative impact could be the loss of this territory. No more than one territory would be expected to be displaced, however. The displacement of this pair would only lead to the loss of a breeding pair from the regional population if the pair were unable to relocate into suitable habitat elsewhere in the wider area. Using the NHZ 19 breeding population estimate (31 pairs), the loss of one pair would be equivalent to 3.23% of the regional population, Although, as stated above, the regional population figure is likely to be an under-estimate. It should also be noted that all commercial forests occupied by goshawks are subject to rotational felling irrespective of wind farm projects.

8.14.19 The cumulative impact on goshawk (habitat loss during construction, and displacement during the operational phase) would be of **minor** adverse magnitude and result in a **non-significant** effect.

8.14.20 The cumulative collision impact for goshawk has been calculated at 0.343 birds per annum. This would be equivalent to 0.55% of the NHZ 19 breeding population of 31 pairs (62 adult birds). This low level of additional mortality would not be sufficient to change the favourable conservation status of this species.

8.14.21 The cumulative collision impact (operational phase) for goshawk would be of **negligible** magnitude and result in a **non-significant** effect.

Red Kite

8.14.22 The cumulative collision impact for red kite has been calculated at 1.386 birds per annum (compared to 0.127 for the Proposed Development alone). The cumulative estimate is equal to 0.83% of the stated NHZ 19 population (83 pairs/ 166 breeding adults (Wilson *et al*., 2015)), or, if using the more contemporary estimate for Dumfries and Galloway (124 pairs/ 248 breeding adults (Challis *et al*., 2023)) the cumulative estimate is equal to 0.56% of this population estimate.

8.14.23 This is a low level of additional mortality that would not be sufficient to change the favourable conservation status of red kite.

8.14.24 The cumulative collision impact (operational phase) for red kite would be of **negligible** magnitude and result in a **non-significant** effect.

Whooper Swan

8.14.25 The cumulative collision impact for whooper swan has been calculated at 0.71 birds per annum. This would be equivalent to 0.06% of the NHZ 19 wintering population of 1,188 individuals (Wilson *et al*., 2015). Even if there is additional mortality from projects not included in the CIA (e.g. impacts from overhead powerlines), it can still be concluded that the level of collision mortality would be extremely small at a regional population scale. The low level of additional mortality would not be sufficient to change the favourable conservation status of whooper swan.

8.14.26 The cumulative collision impact (operational phase) for whooper swan would be of **negligible** magnitude and result in a **non-significant** effect.

8.15 Interrelationship Between Effects

8.15.1 For further information regarding changes to habitats on Site, including habitat loss calculations, see **Chapter 7: Ecology**. For ornithological features it has been determined that the primary impact of habitat changes in the vicinity of the Proposed Development relate to felling of mature plantation forestry and the potential impact on breeding goshawk.

8.16 Further Survey Requirements and Monitoring

8.16.1 As set out in **Section 8.9**, good practice measures that are fundamental to the Proposed Development will include pre-felling checks for nesting birds. Details of the surveys required will be fully detailed in a BBPP.

8.16.2 Surveys during the operational phase of the Proposed Development are not proposed.

8.17 Summary of Effects

8.17.1 Using a comprehensive data set combining baseline ornithological survey data supplemented by desk study data, an assessment has been made as to the potential impacts of the Proposed Development on ornithological features.

8.17.2 IOFs have been identified, with full assessment undertaken for golden eagle, goshawk, red kite and whooper swan. Potential impacts have been assessed as a result of the Proposed Development both on its own and cumulatively with other relevant projects.

8.17.3 The Proposed Development has been identified as having low sensitivity for ornithological features and no additional mitigation measure have been proposed (i.e. no measures in addition to the embedded mitigation and best practice measures that would be carried out irrespective of the species recorded on Site).

8.17.4 For all IOFs, the impacts of the Proposed Development on its own (construction, operational and decommissioning phases) have been concluded as being negligible. For cumulative impacts of the Proposed Development, alongside other wind farm projects, all impacts have been concluded as being **negligible**, with the exception of habitat loss/ displacement impacts on goshawk which have been determined as having a **minor** adverse impact.

8.17.5 No significant effects have been predicted.

8.17.6 **Table 8.12** provides a summary of the impact assessment's conclusions.

Table 8.12 – Summary of Effects

Predicted Effects	Significance	Committed Additional Mitigation	Significance of Residual Effect
Impacts of the Proposed Development			
Construction Phase: Habitat Loss – goshawk	Non-significant	None	Non-significant

Predicted Effects	Significance	Committed Additional Mitigation	Significance of Residual Effect
Construction and Decommissioning Phases: Disturbance – goshawk	Non-significant	None	Non-significant
Operational Phase: Displacement – golden eagle – goshawk – red kite	Non-significant	None	Non-significant
Operational Phase: Collision – golden eagle – goshawk – red kite – whooper swan	Non-significant	None	Non-significant
Cumulative Impacts			
Construction Phase: Habitat Loss – goshawk	Non-significant	None	Non-significant
Construction and Decommissioning Phases: Disturbance – goshawk	Non-significant	None	Non-significant
Operational Phase: Displacement – golden eagle – goshawk – red kite	Non-significant	None	Non-significant
Operational Phase: Collision – golden eagle – goshawk – red kite – whooper swan	Non-significant	None	Non-significant

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