

Environmental Impact Assessment

Sandy Knowe Wind Farm Extension

Chapter 7: Ornithology

ERG UK Holding Ltd



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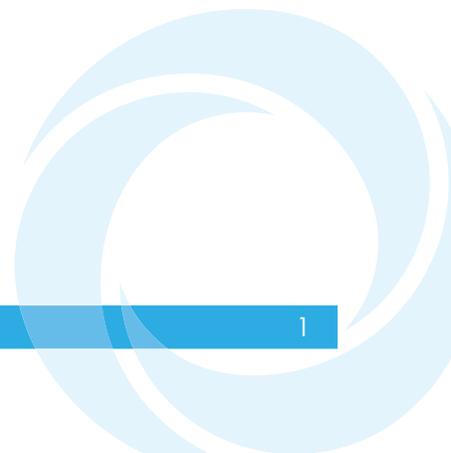
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Glossary of Terms

Term	Definition
The Applicant	ERG UK Holding Limited
The Agent	Atmos Consulting Limited
CIEEM guidelines	The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018)
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations
The Proposed Development	The Sandy Knowe Wind Farm Extension
The Proposed Development Footprint	The area within which the Proposed Development will be located
The Proposed Development Site	The full application boundary including Sandy Knowe Wind Farm and Sandy Knowe Wind Farm Extension

List of Abbreviations

Abbreviation	Description
BoCC	Birds of Conservation Concern
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ECU	Energy Consents Unit
RSG	Raptor Study Group
NS	NatureScot
RSPB	Royal Society for the Protection of Birds
VP	Vantage point
SBL	Scottish Biodiversity List
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
NHZ	Natural Heritage Zone



7 Ornithology

7.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of Sandy Knowe Wind Farm Extension (the Proposed Development) on the ornithological receptors on and in the vicinity of the Proposed Development and the Proposed Development Site.

This Chapter has been prepared by Jenny Bell, Technical Director Ornithology and Habitats Regulations Appraisal for Atmos Consulting. Jenny has more than 25 years' experience in ornithology. This has included both carrying out and managing ornithology surveys in support of wind farm developments as well as other development types. She has also undertaken a large number of impact assessments and produced EIA chapters for wind farms and other development types. She is experienced in the subject matter and in the species regularly encountered in the area.

7.2 Methodology and Approach

7.2.1 Desktop and Field Survey

Details of the desktop study and data searches and field survey methodologies are described in Technical Appendix 7.1: Ornithology.

7.2.2 Assessment

The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) (henceforth referred to as the CIEEM guidelines) form the basis of the impact assessment presented in this Chapter. These guidelines set out a process of identifying the value of each ecological receptor and then characterising the "impacts" that are predicted, before discussing the "effects" on the integrity or conservation status of the receptor, proposed mitigation and residual impacts.

The initial stage for assessment of impacts is to determine which features should be subject to detailed assessment. The ornithological receptors to be the subject of more detailed impact assessment should be of sufficient value that impacts upon them may be significant in EIA terms. This typically means receptors which have a nature conservation value of greater than local, although where receptors have special legal protection (i.e. listed on Schedule 1 of the WCA) then further consideration may also be given to ensure protection is in place to prevent unlawful acts such as disturbance arising from the Proposed Development. The receptors should also be vulnerable to significant impacts arising from the development.

All designated nature conservation sites, bird species and communities that occur within the "zone of impact" of the Proposed Development are defined as potential ornithological features (as described below). The zone of impact is defined for individual receptors based upon the potential effects and if there is any research showing the range of those effects and also NatureScot guidance such as (NatureScot, 2018).

Determining Value

The CIEEM guidelines recommend that the value of ornithological features is determined based on a geographic frame of reference. For this project the following geographic frame of reference is used:

- International (nature conservation designation, habitat or populations of species of international importance, e.g. a Special Protection Area (SPA) or significant numbers of a designated population outside the designated site);
- National (nature conservation designation, habitat or populations of species of Scottish importance, e.g. a Site of Special Scientific Interest (SSSI) or a National Nature Reserve (NNR), a nationally important population/assemblage of a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 or Annex 1 of the Birds Directive);
- Regional (a regionally (i.e. within Natural Heritage Zone (NHZ 19 Western Southern Uplands and Inner Solway) important population of birds which have a high conservation value (e.g. Schedule 1, Annex 1, Scottish Biodiversity List (SBL) or Birds of Conservation Concern (BoCC) amber or red species);
- County (i.e. Dumfries and Galloway) (a population of high conservation birds which represent an important part of the county population of that species);
- Local (i.e. within 5 km) (a population of any species which is important at the local level); and
- Less than local (a population of birds which has little or no intrinsic nature conservation value).

Valuing Species

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Rarity is an important consideration because of its relationship with threat and vulnerability although, because some species are inherently rare, it is necessary to look at rarity in the context of status. A species that is rare and declining should be assigned a higher level of importance than one that is rare with a stable population. Reference is made to a number of categorisations of ornithology conservation status, including;

- Annex I: Annex I of Directive 2009/147/EC on the conservation of wild birds (the Birds Directive) lists species that are of conservation importance at a European level;
- Schedule 1: Rare breeding species in the UK, and / or species under threat of human persecution are listed on Schedule 1 of the Wildlife and Countryside Act (WCA) 1981 (as amended), which provides additional legal protection for such species at or around their nests;
- Schedule 1A: Certain Schedule 1 species are also listed on Schedule 1A of the WCA, which protects them from harassment all year round;
- Schedule A1: Certain Schedule 1 species are also listed on Schedule A1 of the WCA, which protects their nests all year round;
- UK Birds of Conservation Concern (BoCC): A national classification that categorises breeding bird populations in the UK using a traffic light system to indicate an increasing level of conservation concern. Species are assessed against objective criteria such as population and distribution trends; those that have a declining range and / or population, or that are vulnerable to population effects due to their

small population size are categorised as Red or Amber listed species, depending on the extent of the decline or vulnerability; and

- Scottish Biodiversity List (SBL): species which are identified as being important from a conservation viewpoint within a Scottish context are listed on the SBL.

Predicting and Characterising Impacts

In accordance with the CIEEM guidelines, when describing impacts, reference is made to the following, where appropriate:

- Confidence in predictions - the level of certainty that an impact will occur as predicted, based on professional judgement and where possible evidence from other schemes – this is based on a four point scale: certain/near certain; probable; unlikely; and extremely unlikely;
- Magnitude – the size of an impact in quantitative terms where possible;
- Extent – the area over which an impact occurs;
- Duration – the time for which an impact is expected to last;
- Reversibility – a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – i.e. whether impacts occur during critical life stages or seasons.

Both direct and indirect impacts are considered. Direct ornithological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ornithological impacts are attributable to an action which affect ornithological resources through effects on an intermediary ecosystem, process or receptor.

Significance Criteria

In accordance with the CIEEM guidelines, a significant impact, in ornithological terms, is defined as;

“an impact (whether negative or positive) on the integrity of a defined site or ecosystem and / or the conservation status of habitats or species within a given geographical area, including cumulative and in-combination impacts”.

The approach adopted here aims to determine an impact to be significant or not on the basis of a discussion of the factors that characterise it, i.e. the ornithological significance of an impact is not dependent on the value of the feature in question. The value of a feature that will be significantly affected is used to determine the geographical scale at which the impact is significant, e.g. an ornithologically significant impact on a feature of local importance would be considered to represent a significant impact at a local area level. This in turn is used to determine the implications in terms of legislation, policy and/or development control.

Any significant impacts remaining after mitigation (the residual impacts), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development control when determining the application.

Assessment Areas

The bird surveys cover a wide area (Figure 7-2), therefore impacts have been assessed within the zone of impact appropriate for each receptor. Additionally, the search area for historic data was larger again and this has been used to inform the understanding of the wider area for key species. Data was also available from the adjacent Sandy Knowe Windfarm.

7.2.3 Legislation and Guidance

A summary of legislation and guidance is provided in Appendix 7-1: Ornithology.

7.2.4 Consultation

The assessment process has been informed by consultation with the ECU including the Scoping Opinion (October 2021). A summary of the key consultation responses is described in Table 7-1.

Table 7-1: Consultation Responses

Consultee	Summary of Response	Where addressed within this Report
NatureScot (October 2020)	Were unable to state if one year of data would be sufficient; suggested obtaining raptor study group (RSG) data as well as Royal Society Protection of Birds (RSPB) data as background data	A second year of data was gathered (see Appendix 7-1) and all data sources suggested by NatureScot have been used to inform the assessment.
Dumfries and Galloway Council (Scoping opinion)	No response received	
John Muir Trust (Scoping opinion)	Responded but did not intend on making comment on the scoping opinion	
Kirkconnel and Kelloholm CC (Scoping opinion)	No response received	
NatureScot (Scoping opinion)	Noted that for the two northern turbines, only six months of data would be available. Suggested this would be acceptable if data from 2012 and DGRSG and RSPB data was also used to inform the assessment	All data sources suggested by NatureScot have been used to inform the assessment.
Royal Burgh of Sanquhar and District CC (Scoping opinion)	No response received	
RSPB Scotland (Scoping opinion)	Considered scope was appropriate and did not have any further suggestions for in-combination assessment	Noted.
Scottish Wildlife Trust (Scoping)	No response received	

Consultee	Summary of Response	Where addressed within this Report
Upper Nithsdale Community Trust (Scoping opinion)	No response received	

7.3 Baseline Conditions

Full results of surveys and the desk search results are provided in Appendix 7-1: Ornithology and Appendix 7-2: Confidential Annex. This section instead describes the occurrence of sensitive receptors recorded on or in the vicinity of the Proposed Development.

7.3.1 Designated Sites

Within 10km of the Proposed Development the following statutory designated sites were identified which have been designated for ornithological receptors. Sites designated for ecological receptors are described in Chapter 6: Ecology.

- Muirkirk and North Lowther Uplands SPA. This borders the Proposed Development Site c. 5km to the north (Figure 7-3). This is underlain by two Sites of Special Scientific Interest (SSSI):
 - North Lowther Uplands SSSI; and
 - Muirkirk Uplands SSSI.

Table 7-2 summarises the qualifying species of the SPA.

Table 7-2: Qualifying features of the Muirkirk and North Lowther Uplands SPA

Species	Scientific name	Population	Population Estimate	Current condition
Hen harrier	<i>Circus cyaneus</i>	Breeding	1996-1998 – 29.2 females	Unfavourable declining
		Wintering	1991-1995 – 12 individuals	Unfavourable declining
Peregrine	<i>Falco peregrinus</i>	Breeding	1992-1996 – 6 pairs	Unfavourable no change
Merlin	<i>Falco columbarius</i>	Breeding	1989-1998 – 9 pairs	Unfavourable no change
Short-eared owl	<i>Asio flammeus</i>	Breeding	1997-1998 – 26 pairs	Favourable maintained
Golden plover	<i>Pluvialis apricaria</i>	Breeding	1999 Estimated minimum 154 pairs	Unfavourable declining

Muirkirk Uplands SSSI, which lies approximately 5km to the north west of the Proposed Development is designated for a number of features including Hen harrier (both breeding and wintering), Short-eared owl (breeding) and an upland breeding bird assemblage.

The breeding bird assemblage is listed as including Teal *Anas crecca*, Buzzard *Buteo buteo*, Merlin, Peregrine, Red grouse *Lagopus lagopus*, Dunlin *Calidris alpina*, Snipe *Gallinago gallinago*, Curlew *Numenius arquata*, Redshank *Tringa totanus*, Whinchat

Saxicola rubetra, Stonechat *Saxicola rubicola*, Wheatear *Oenanthe oenanthe* and Ring ouzel *Turdus torquatus*.

North Lowther Uplands SSSI, which lies approximately 5km to the north east of the Proposed Development is designated for breeding Hen harrier and also an upland breeding bird assemblage.

The breeding bird assemblage includes Hen harrier, Short-eared owl, Merlin, Peregrine, Golden plover, Red grouse, Raven *Corvus corax*, Dunlin, Snipe, Teal, Curlew, Redshank, Whinchat and Wheatear.

The Muirkirk and North Lowther Uplands SPA would therefore be assessed as having international importance while both the Muirkirk Uplands SSSI and the Norther Lowther Uplands would be assessed as having national importance.

7.3.2 Species Accounts

Hen harrier

Hen harrier are a qualifying species of the Muirkirk and North Lowther Uplands SPA, as well as being listed as an Annex I species as well as a Schedule 1 and 1A species on WCA 1981. They are red-listed on BoCC and are also a SBL species.

The SPA population at time of designation was a mean of 29.2 females¹. The most recent estimate for the Natural Heritage Zone (NHZ – NHZ 19 Western Southern Uplands and Inner Solway) population is 18 females/pairs, although it is considered this is a likely underestimate (Wilson, 2015).

Hen harrier were recorded during vantage point surveys in 2011/12 (Table 7-3), with a smaller number of observations in 2019/20 and no observations during VPs in 2020/21. There was however no evidence of breeding in the survey area. In 2019/20 all records came from outwith the breeding season and indeed most came from one day with eight of nine flights involving three individuals recorded on one day in late September.

Table 7-3: Flight activity of Hen harrier

Year	Max no. of birds	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2011/2012	2	17	7470	0
2019/2020	2	9	755	130
2020/2021	0	0	0	0

As such it seems likely that the Proposed Development Site can provide some occasional foraging for Hen harrier. The use of it may have declined since the initial surveys occurred, but the decline may be related to reducing numbers of Hen harrier, both associated with the SPA population but also the wider population.

¹ Females are provided as the estimate of breeding population size as Hen harriers can be polygamous with one male provisioning more than one nest; as such, the estimation of the population is more accurate by detailing the number of females. However, in this locale, polygamy can be rare.

Given the current reduced SPA breeding population is it not likely birds from that population are using the Proposed Development. There may however have been previous use of the Proposed Development when the SPA population was greater. The Proposed Development Site does lie within foraging distance of the SPA (Pendlebury, et al., 2011).

Therefore, there is potential for the Proposed Development Site to have been used in the past, but also in the future when the SPA population recovers.

However, the distance from the SPA could also limit use by this species. Therefore the factors which have been considered is the potential for use by an internationally important population of this species, as well as likely use by non SPA birds in the wider environment as well as the level of use observed.

It would therefore be considered that the Proposed Development Site is of regional importance for this species because of the potential for use by an internationally important population.

Merlin

Merlin are a qualifying species of the Muirkirk and North Lowther Uplands SPA, as well as being listed as an Annex I species as well as a Schedule 1 species on WCA 1981. They are also red-listed on BoCC as well as being a SBL species. The population at time of designation of the SPA was nine breeding pairs.

The current estimate for the NHZ is twelve pairs (Wilson 2015).

Merlin was recorded on one occasion during 2011/12 surveys and has not been recorded since that time. Although the species is a qualifying feature of the SPA, the Proposed Development Site sits at the limit of the foraging range for Merlin.

Therefore, when combined with the very limited use of the Proposed Development Site by this species which would suggest that it is not currently present in the vicinity of the Proposed Development, the Proposed Development Site is considered to be of Less than local importance for this species.

Peregrine

Peregrine are a qualifying species of the Muirkirk and North Lowther Uplands SPA, as well as being listed as an Annex I species as well as a Schedule 1 species on WCA 1981. They are also a SBL species. The population at time of designation of the SPA was six breeding pairs.

The current estimate for the NHZ is 34 pairs (Wilson 2015).

There was one Peregrine flight recorded in 2011/12 on vantage point surveys with no further sightings on more recent surveys. However, there were some observations of activity during the 2020 raptor surveys which, although no breeding was identified within the survey area, did mean that breeding at that time or in the future could not be ruled out, particularly if outwith the survey area.

If breeding did occur, the birds would not form part of the SPA population and there was no evidence of use of the Proposed Development Site, despite it being within foraging range of Peregrine.

As a result, the importance of the Proposed Development Site is considered to be of Less than local value for this species.

Golden plover

Golden plover are a qualifying species for the SPA, with an estimated breeding population at time of designation of 154 breeding pairs.

The NHZ population is estimated at 774 breeding pairs (Wilson, 2015); in addition to this breeding population, larger numbers migrate through the area during spring and autumn. Migrants are typically distinguished by the occurrence of flocks instead of individuals or groups of a small number of individuals.

There was no evidence for Golden plover breeding on or around the Proposed Development; most sightings related to birds observed during vantage point surveys. Table 7-4 shows the records for each year surveys were carried out.

Table 7-4: Flight activity of Golden plover

Year	Max no. of birds	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2011/2012	53	10	23100	21455
2019/2020	25	4	7850	4100
2020/2021	42	1	1638	1638

Birds observed were predominantly seen outwith the breeding season, or were seen in April; those in April were typically small flocks of up to approximately 50 birds, suggesting that they were migrant rather than breeding birds.

There was no evidence of breeding birds feeding on or around the Proposed Development during the breeding season. Small numbers were also recorded during the winter walkover surveys in 2019/20.

As a result, it would appear that although this species is a qualifying species for the SPA, the birds recorded on or around the Proposed Development Site did not form part of the SPA population, due to the evidence suggesting they were wintering or passing through on migration.

As a result, and given the relatively small numbers involved, the Proposed Development would be assessed as being of Local importance for this species.

Red kite

Red kite are listed on both Annex I of the Birds Directive and Schedule 1 of the WCA. They are listed on the SBL.

After a successful re-introduction, they are expanding their range from the original introduction areas in southern Dumfries and Galloway; the Scottish population is currently expanding relatively quickly. The Scottish population is estimated to be greater than 273 pairs (Challis, et al., 2022), with 145 home ranges checked in Dumfries and Galloway in 2020; this is despite the fact that Covid restrictions disrupted monitoring in 2020.

There was one sighting of Red kite during surveys; one bird was observed flying north over the survey area in 2021.

Given the limited evidence for this species' occurrence on or in the vicinity of the Proposed Development Site, the value of the Proposed Development Site for this species is assessed as Less than local.

Whooper swan

Whooper swan are listed on Annex I of the Birds Directive and Schedule 1 of the WCA. They are a species which breeds in small numbers, mainly in the north of Scotland, and winter in larger numbers, using predominantly lochs for roosting and feeding on grassland and agricultural land around the roost.

There is no suitable habitat for this species on the Proposed Development. All records relate to birds observed in flight during vantage point surveys in 2020/21. One flight was observed in December and three flights were observed in March, all on the same day with movements of 14, 22 and 28 birds respectively (Table 7-5).

Table 7-5: Flight activity of Whooper swan

Year	Max no. of birds	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2011/2012	n/a	n/a	n/a	n/a
2019/2020	0	0	0	0
2020/2021	28	3	4,142	3,932

Given the absence of habitat and the limited activity observed during the surveys, the Proposed Development Site is considered to be of Less than local importance for this species.

Goshawk

Goshawk are listed on Schedule 1 of the WCA. They are a forest specialist with an expanding population in Scotland; the current population estimate is 281 pairs (Challis, et al., 2022).

No Goshawk were recorded during surveys; however as described in Technical Appendix 7.2, there were records of this species received from DGRSG.

Given the distance between those records and the Proposed Development and the absence of any sightings of this species in the survey area, then the Proposed Development Site is considered to be of less than local importance for this species.

Black grouse

The NHZ population for Black grouse is estimated at 121 displaying males (Wilson 2015) although across southern Scotland the population is in decline and the range is restricting.

Leks were identified during surveys in 2012 and 2019. All observations were of single males, and there was no consistency in site locations; similarly data provided by RSPB Scotland provided additional lek locations which did not correspond with any other locations.

Despite this, there were observations of Black grouse through other surveys on the Proposed Development Site, including during VPs and breeding bird surveys. While no lek site has been identified which has been used consistently, there is a population of Black grouse on and around the Proposed Development Site.

Because of the sensitivity of the species, the Proposed Development Site would therefore be assessed as being of Regional importance.

Curlew

Curlew are an SBL species, which are also red-listed under BoCC. They are assessed as at risk from wind farms, as research has identified that breeding birds within 600 m may be displaced by construction of wind farms and also by operational wind farms (Pearce-Higgins, 2012).

The NHZ population is estimated at 4284 pairs (Wilson, 2015) although given the population trend of this species, it may have declined since this estimate was made.

Small numbers of breeding Curlew were recorded during each of the breeding bird surveys; two likely territories in 2011, one territory in 2020 and two territories in 2021, one possible and one probable. The territory in 2020 was north of the A76. In 2021, the probable territory was on the northern edge of the eastern survey area while the possible territory was outwith the survey area, but within the envelope of the consented Sandy Knowe wind farm which lies within the Proposed Development Site.

Curlew were also recorded during VP surveys (Table 7-6); they were not recorded as a target species in 2011/12 and so full data is not available, although it is known 26 flights were recorded.

Table 7-6: Flight activity of Curlew

Year	Max no. of birds	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2011/2012	n/a	n/a	n/a	n/a
2019/2020	1	1	65	30
2020/2021	3	11	456	449

Curlew are a sensitive species and the Proposed Development Site has a small number of territories associated with it. At the same time, although the population of this species is in decline, there still remains a relatively robust population across the NHZ.

As such, the Proposed Development Site is assessed as being locally important to this species.

Pink-footed goose

Pink-footed goose are amber listed on BoCC, and are considered to be at risk from wind farms (NatureScot, 2018).

Table 7-7 shows the occurrence of Pink-footed goose flights across the Proposed Development Site. Most flights were observed along an east/west axis, but the number of flights in any one winter was limited and most flights were above collision risk height.

Table 7-7: Flight activity of Pink-footed goose

Year	Max no. of birds	No. of Flights	Total Flight Time (bird secs)	Total Flight Time at Risk Height (bird secs)
2011/2012	51	4	29840	28970
2019/2020	71	7	15330	750
2020/2021	82	6	27,299	0

There is no suitable habitat for this species within the Proposed Development Site and only birds flying over the Proposed Development Site have been observed. The number

present both of individuals and flights has not been sufficient to suggest that this flyway is important for this species.

As a result, the Proposed Development Site is considered to be of Less than local importance for this species.

Greylag goose

One flight of Greylag goose was recorded, consisting of two birds. Given the low level of activity recorded, the Proposed Development Site is of less than local importance for this species.

7.3.3 Receptors Brought Forward for Further Assessment

The following applies to all ornithological receptors brought forward to the detailed ornithological impact assessment stage:

- Their value is assessed as being important at a county or higher level; and
- They are potentially vulnerable to significant impacts from the Proposed Development.

As a result of this, the following receptors have been brought forward for further assessment:

- Muirkirk and North Lowther Uplands SPA;
- Hen harrier; and
- Black grouse.

While North Lowther Uplands SSSI and Muirkirk Uplands SSSI have been assessed as being of national valuation, the features for which there is potential impacts are shared with the overlying SPA. Given the distance between the Proposed Development and the SSSIs, and the composition of the breeding bird assemblages, it is not considered there is potential to have significant impacts on those features of both SSSIs. As such, impacts on the SPA will be considered only.

Consideration will also be given to the impacts of collision risk on Whooper swan due to the amount of activity which occurred at collision risk height.

7.4 Mitigation Measures

In line with CIEEM guidance, the impact assessment carried out in this Chapter is done on the basis that mitigation measures will be applied during the construction and operational phases of the project. This section therefore describes the ornithological receptors already taken account of during the design process and identifies mitigation and good practice measures which will be adopted during the construction and operational phases.

7.4.1 Design

Potential impacts on Black grouse lek locations were considered during wind farm design to maintain spacing between the turbines and leks recorded during the 2012 and 2019 surveys to reduce disturbance/displacement effects.

7.4.2 Construction Phase

Before construction commences, species management plans (SMP) will be developed for Hen harrier and Black grouse in particular and a generic 'birds' plan which will identify the measures to be put in place to ensure birds will be protected during construction. These management plans, to be agreed with NatureScot and ECU/DGC, would include a monitoring regime prior to and during construction to ensure breeding attempts within distances in which disturbance would occur (Ruddock, 2007) would be detected and protection, identified within the SMP but based upon buffering breeding attempts in line with the disturbance distances in Ruddock, put in place.

No work would be undertaken within the disturbance zone of any breeding Schedule 1 species while the nest remains active and until an Environmental Clerk of Works (EnvCoW) has cleared it as no longer being active.

Prior to construction commencing (and depending upon when it starts), pre-construction breeding bird surveys will be carried out to determine the current situation with respect to Black grouse leks, as well as sensitive bird species, particularly raptors and waders at the time of construction and to further inform the SMP.

No tree felling or removal of ground vegetation will occur within the period mid-March - August (inclusive). If vegetation removal is required then it would be searched by an experienced ecologist.

An EnvCoW will be appointed who will oversee the on-site monitoring and ensure compliance with the SMP.

With respect to the Black grouse leks, because of the fact there is no single main lek location identified, mitigation will involve weekly monitoring to search for leks between mid March – mid May to establish lek locations and suitable buffering. However, on the construction area for turbines T29 and T30 no works will commence in this area before 08:30 between mid March – mid May, to avoid disturbance to any birds which may be lekking in this area.

7.4.3 Operational Phase

Given the population of Black grouse present on and in the vicinity of the Proposed Development Site measures to enhance the habitat for Black grouse have been included in the Habitat Management Plan (HMP) (Appendix 14-2).

7.5 Assessment of Effects

7.5.1 Construction Effects

The following impacts may arise during construction:

- Direct and/or indirect habitat loss during the construction stage - This is likely to be a continuous process, with impacts carrying over into the operational phase as well; and
- Disturbance and displacement as a result of human activity on the Proposed Development.

Muirkirk and North Lowther Uplands SPA

There will be no direct habitat loss on the SPA, as a result of the distance from the Proposed Development to the SPA. Similarly, there would also be no indirect habitat loss as a result of construction on the SPA. There would therefore be no significant impacts of habitat loss upon the SPA. Confidence in this prediction is near certain.

Site works would also cause no disturbance or displacement within the SPA, given the distance between the Proposed Development and the SPA. There would be potential for disturbance or displacement to occur for qualifying features of the SPA if outwith the SPA and in the vicinity of the SPA. However, there was no indication of use by the SPA populations of Golden plover, Peregrine, or Merlin.

It is possible that Hen harriers observed within the survey area could form part of the SPA population. However, Hen harrier have been demonstrated to show only limited avoidance of wind turbines at distances much closer to nest territories and no reduction in overall use of the area associated with a wind farm (Fielding, 2015), while bird activity may be reduced within 500 m of turbines (Pearce-Higgins, 2009).

As a result, the distance between the SPA and the Proposed Development, combined with the limited use of the area by this species mean that both displacement/disturbance is unlikely to occur and that if it does, any effects would be limited by the small proportion of time the Proposed Development Site is used by Hen harrier in total.

Additionally, not all Hen harrier may be from the SPA population. As a result, any effects upon the SPA population would be negligible and not significant on the Hen harrier population. Confidence in this prediction is near certain.

Hen harrier

The scale of habitat loss associated with the Proposed Development would have only a negligible effect on Hen harrier, given their foraging behaviour and as a result would be not significant. Confidence in this prediction is near certain.

Monitoring will be carried out to ensure that any breeding activity on or within the vicinity of the Proposed Development would be identified and protected by the use of buffer distances to prevent disturbance on this Schedule 1 species.

There may be some localised displacement in the vicinity of construction areas during construction; this will be short term, lasting only the duration of construction.

Given the low level of activity observed and short term nature, this would be considered negligible and not significant. Confidence in this prediction is near certain.

Black grouse

The scale of habitat lost is too limited and spread over a much larger area to have a significant impact upon this species. Additionally, habitat enhancement for this species will be carried out under the auspices of the HMP. Habitat loss will therefore be offset by improving habitat for this species within the Proposed Development Site.

Measures have been put in place to ensure that disturbance on the area known to have previously held Black grouse leks is removed by limiting working activity to times when grouse will not be lekking during the spring lekking season. Additionally, monitoring of this species will be undertaken because of the apparent use of the area,

with no one site being preferred for leks, meaning leks could potentially be found closer to infrastructure than predicted.

Should leks be detected then additional measures, likely to include control of start times within 500m of leks would be employed via the SPP to protect this species.

Confidence in the prediction of no significant impact upon Black grouse is near certain.

7.5.2 Operational Effects

The following impacts are considered for the operational phase:

- Disturbance/displacement including barrier effects; and
- Additional mortality as a result of collision risk.

Muirkirk and North Lowther Uplands SPA

As described in section 7.6.1 the distance between the Proposed Development Site and the SPA means there are very limited opportunities for disturbance displacement effects to impact on the SPA. Therefore, as for operational effects, there will be no significant effects on the SPA as a result of operational disturbance/displacement. There was no evidence of birds from the SPA flying over the Proposed Development Site and so no opportunity for barrier effects to occur.

Given the limited flight activity of SPA populations over the Proposed Development Site, such that no qualifying species has sufficient flight activity to warrant carrying out collision risk modelling for (bearing in mind that Golden plover activity is made up of wintering and passage birds) there would be negligible and therefore not significant impact on SPA populations of collision risk.

Hen harrier

Disturbance/displacement effects on Hen harrier have been researched on a number of sites, but only very limited effects have been identified, and a number of studies have found no detectable effects. Flight activity can show a reduction within 500m of wind turbines (Pearce-Higgins, 2009) although these results have not been found in all studies (Haworth, 2013) and where they have been seen in detailed single site studies the reduction in use was not significant (Fielding, 2015).

As such, given the current occurrence of Hen harrier, impacts of disturbance/displacement during operation would be negligible, and would remain so for the lifetime of the Proposed Development.

There would therefore be no significant effects upon this species. Confidence in this prediction is near certain.

There were only 130 bird flights seconds of activity at collision risk height during two years of surveys.

As such, collision risk modelling has not been carried out for such a low level of flight activity as it can be stated with near certain confidence that the mortality due to such a low level of activity would be negligible and not significant.

Black grouse

Operationally if displacement of leks were to occur, given the mobility of leks for this species around the survey area, the effect would be negligible. However, any impact should be reduced by the consideration of existing leks during design as indicated in evidence from other wind farms sites where leks have persisted after wind farm construction (e.g. Carcant wind farm in Scottish Borders where a lek has persisted within 500 m of the turbines of Carcant (survey results reported in (EnergieKontour, 2019)).

There were only 41 bird flights seconds of activity at collision risk height during two years of surveys. As such, collision risk modelling has not been carried out for such a low level of flight activity as it can be stated with near certain confidence that the mortality due to such a low level of activity would be negligible and not significant.

Whooper swan

All activity for Whooper swan involved birds overflying the Proposed Development Site and as such, there would be no operational disturbance. Given the activity at collision risk height, even although there was a relatively small amount of flights it was decided to carry out collision risk modelling for this species. Table 7-8 shows the results of the collision risk modelling carried out for this species; the methodology is provided in Technical Appendix 7.1 Ornithology which also includes a worked example of collision risk modelling for this species.

Table 7-8: Collision risk modelling results for Whooper swan

Year	Corrected Annual Risk	No. of years per collision	Number of birds colliding over 25 years
2019/2020	0	n/a	0
2020/2021	0.238	4.2	5.944
Mean	0.119	8.4	2.975

Because there was no activity from this species in the first year of surveys, the mean annual predicted collision loss is 0.119, equating to nearly three birds lost over 25 years.

The proposed lifespan of the Proposed Development is 40 years; 25 years has been presented in Table 7-8 for comparability, given the large number of developments which have used 25 years as an estimate for overall mortality. Over a 40 year period, the predicted mortality would equate to 4.76 birds.

Given that the mortality effect would be low, and not on any identified local population but likely to be distributed across the wider area, and given the limited flight activity observed which occurred over a short period of time, this level of collision risk is not considered to be significant. Confidence in this prediction is near certain.

7.6 Assessment of Cumulative Effects

The strongest influence of cumulative effects would be the presence of the Sandy Knowe Wind Farm, currently under construction. The addition of the Proposed Development is likely to exacerbate effects, particularly of displacement or disturbance and also of increased mortality. However, both Sandy Knowe Wind Farm and the Proposed Development predicted negligible levels of collision risk; as such, even in combination there would be no significant effects on bird populations as a result of collision risk.

Construction periods for Sandy Knowe Wind Farm and the Proposed Development will not run concurrently. They will also not run consecutively which means cumulative construction effects of both wind farms will be no greater than either wind farm in isolation; therefore not significant.

Beyond Sandy Knowe Wind Farm, due to the low levels of flight activity of sensitive species recorded, which means collision risk for most species is considered negligible and highly unlikely to result in any additional mortality, there would therefore also be no increased cumulative collision risk effects.

Likewise on a broader level, there would be no significant effects of cumulative disturbance/displacement due to the very low levels of displacement/disturbance predicted.

7.7 Residual Effects

Table 7-9 summarises the residual effects of the impact assessment.

Table 7-9: Summary of residual effects

Receptor	Evaluation	Assessment carried out	Construction		Operational	
			Habitat loss	Disturbance	Disturbance	Collision risk
Muirkirk and North Lowther Uplands SPA	International	Yes	Negligible - not significant			
North Lowther Uplands SSSI	National	Considered Under SPA				
Muirkirk Uplands SSSI	National	Considered Under SPA				
Hen harrier	Regional	Yes	Negligible - not significant			
Merlin	Less than local	No				
Peregrine	Less than local	No				
Golden plover	Local	No				
Red kite	Less than local	No				
Whooper swan	Less than local	Collision risk only				Negligible - not significant
Goshawk	Less than local	No				
Black grouse	Regional	Yes	Negligible - not	Negligible - not	Minor – not significant	Negligible - not

Receptor	Evaluation	Assessment carried out	Construction		Operational	
			significant	significant		significant
Curlew	Local	No				
Pink-footed goose	Less than local	No				
Greylag goose	Less than local	No				

7.8 Summary and Statement of Significance

The ornithological receptors on and in the vicinity of the Proposed Development have been identified and described. Nature conservation evaluations were carried out and three receptors – Muirkirk and North Lowther Uplands, Hen harrier and Black grouse taken forward for impact assessment.

Mitigation was identified; including mitigation applied during the design phase as well as setting out pre-construction and during construction measures and post-construction enhancements.

Effects considered were habitat loss, construction and operational disturbance/displacement and additional mortality as a result of collision risk.

No significant effects have been identified as a result of this process and thus the Proposed Development could proceed without significant adverse impact on ornithological receptors.

7.9 References

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