Appendix 8.3 Habitats Regulations Appraisal

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Cumberhead West Wind Farm

Habitats Regulations Appraisal
Technical Appendix 8.3

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1 INTRODUCTION

Cumberhead West Wind Farm Ltd propose to construct and operate the Cumberhead West Wind Farm (hereafter referred to as the 'Proposed Development'), approximately 4 km to the west of Coalburn, 5.6 km to the south-west of Lesmahagow, and 7.7 km north-west of Douglas, South Lanarkshire (distances to the nearest proposed wind turbine).

MacArthur Green was commissioned to complete ornithology and ecology field surveys and desk-based studies to provide information on the ornithological and ecological features present within the Proposed Development site, and assess potential impacts associated with the Proposed Development as part of the Cumberhead West Wind Farm Environmental Impact Assessment (EIA).

In Scotland, under the terms of the Habitats Regulations, a Habitats Regulations Appraisal (HRA) is required in order to establish whether the Proposed Development would have a 'likely significant effect' on any European-level Natura site[1]. From the ecology and ornithology assessments (see Chapter 7: Ecology and Chapter 8: Ornithology of the EIA Report) it was determined that there is potential connectivity between the Proposed Development and one Natura site: the Muirkirk & North Lowther Uplands Special Protection Area (SPA). In agreement with consultees, no connectivity was concluded for any other Natura sites (see summaries of consultee responses in Tables 7.1. and 8.1 of Chapters 7 and 8 respectively).

This report presents information to enable the competent authority to conclude whether the proposals would have Adverse Effects on Site Integrity (AESI) of the Muirkirk & North Lowther Uplands SPA as part of an Appropriate Assessment (AA).

This report should be read in conjunction with Chapter 8: Ornithology and Chapter 7: Ecology of the Cumberhead West Wind Farm EIA Report, and its associated appendices and figures.

2 THE HABITATS REGULATIONS PROCESS

Under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended by the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012) (The Habitats Regulations), all competent authorities must consider whether any plan or project will have a 'likely significant effect' on a Natura site. In Scotland, Special Areas of Conservation (SACs) and SPAs are Natura sites given legal protection by the Habitats Regulations.

The Habitats Regulations ensure that any plan or project that may damage a Natura site is assessed and can only go ahead if certain strict conditions are met, via an HRA.

If required, the competent authority must carry out carry out an 'Appropriate Assessment' to decide whether there is enough evidence to conclude that the proposals will not have adverse effects on a Natura site's integrity.

Regulation 48 of the Habitats Regulations indicates a number of steps to be taken by the competent authority before granting consent to a project. In order of application, the first four steps of the HRA process are:

[1] https://ec.europa.eu/environment/nature/natura2000/index_en.htm

- Step 1. Consider whether the project is directly connected to or necessary for the management of the designated site (Regulation 48 (1b)).
- If not, Step 2. Consider whether the project, alone or in combination, is likely to have a significant effect on the designated site (Regulation 48 (1a)).
- If so, Step 3. Make an AA of the implications for the designated site in view of that designated site's conservation objectives (Regulation 48 (1)).
- Step 4. Consider whether it can be ascertained that the proposal would not adversely affect the integrity of the designated site ('Integrity Test') having regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given (Regulation 48 (5 & 6)).

3 LIKELY SIGNIFICANT EFFECTS

It can be established that because the Proposed Development is not connected to, or necessary for the management of a Natura site, it does not meet the criteria for screening out at Step 1 (see above).

The Step 2 assessment of the likely significant effects on Natura sites in relation to the Proposed Development is presented in the EIA Report Chapter 7: Ecology, and Chapter 8: Ornithology. Based on the screening process carried out in EIA Report Chapter 8: Ornithology (see section 8.7 *Potential Effects, Designated Sites* subheading), one Natura site – the Muirkirk & North Lowther Uplands SPA - was identified as having a likely significant effect due to the Proposed Development, because of the proximity of the site (see EIA Report Figure 8.1) and the potential for qualifying features to be affected by the Proposed Development during the construction, operation and/or decommissioning phases. This SPA is therefore taken forward to AA (Step 4).

Chapter 7: Ecology concluded that, in agreement with consultees, there would be no likely significant effects on any SACs, and so no AA is required for any SACs.

4 MUIRKIRK & NORTH LOWTHER SPA

4.1 Qualifying Features

The qualifying features of the Muirkirk & North Lowther Uplands SPA, which require further consideration are presented in

Table 4-1.

Table 4-1 Qualifying Features of the Muirkirk & North Lowther SPA.

Species	Cited Population	Population Condition
Hen harrier (*Circus cyaneus*), breeding	Between 1994 and 1998, an average of 29.2 breeding females, 6% of the GB population.	Unfavourable Declining, July 2008
Short-eared owl (*Asio flammeus*), breeding	Between 1997 and 1998, an average of 26 pairs, 3% of the GB population.	Favourable Maintained, July 1998
Peregrine (*Falco peregrinus*)	Between 1992 and 1996, an average of 6 pairs, 0.5% of the GB population and selected as one of the most suitable sites for peregrine in GB.	Unfavourable No Change, August 2004
Golden plover (*Pluvialis apricaria*), breeding	In 1999, an estimated minimum of 154 pairs, 0.7% of the GB population and selected as one of the most suitable sites for golden plover in GB.	Favourable Maintained, June 2015
Merlin (*Falco columbarius*), breeding	Between 1989 and 1998, an average of 9 pairs, 0.7% of the GB population and selected as one of the most suitable sites for merlin in GB.	Unfavourable No Change, July 2009
Hen harrier (*Circus cyaneus*), non-breeding	Between 1991 and 1995, an average of 12 individuals, 2% of the GB population.	Unfavourable Declining, December 2004

A summary of the baseline conditions of the Proposed Development site, relating to these SPA qualifying features is presented below, as determined through field surveys and a desk study for the EIA (see EIA Report Chapter 8: Ornithology for details).

4.1.1 Hen Harrier

During baseline surveys, two hen harrier flights were recorded within the site in January and March 2020 (EIA Report Figure 8.5), but no breeding evidence was observed within the 2 km study area in 2019. Historic data were obtained from the South Strathclyde Raptor Study Group (SSRSG) which identified that hen harrier has historically bred within the Muirkirk and North Lowther Uplands SPA at distances upwards of around 1.2 km from the Proposed Development site boundary, and around 2 km from the closest proposed turbine location, up until 2011 (EIA Report, Confidential Figure 8.2.1). There are however no records of nesting hen harriers within 2 km of the site boundary in more recent years. Nearby wind farm projects such as Cumberhead, Dalquhandy and Galawhistle (EIA Report, Figure 8.2) recorded occasional flight activity during baseline surveys, and SSRSG identified that hen harrier has historically bred on high ground at distances over 1 km east from the Dungavel site between 2004 and 2005 (locations unknown); two to three pairs were reported breeding in these years. In 2010, hen harriers bred successfully at a location 2.9 km from the Auchrobert site (exact location unknown).

4.1.2 Merlin

Two sightings of merlin were recorded in 2019; one bird was recorded within 2 km of the site in July 2019 and another was recorded within 500 m of the site in September 2019 (EIA Report Figure 8.5), but no breeding evidence was recorded. SSRSG identified that merlin bred at two locations within the Muirkirk and North Lowther Uplands SPA located 1.8 km from the site boundary in 2013 (approximately 2.3 km from the closest proposed turbine) and 2 km from the site in 2010 and 2011 (approximately 2.5 km from the closest proposed turbine; (EIA Report Confidential Figure 8.2.1). There is no evidence of merlin breeding within the 2 km study area since 2013.

At the Kype Muir Extension site, merlin was reported to be breeding within the Muirkirk and North Lowther Uplands SPA in 2009 at two locations approximately 1.3 km (successful breeding) and 2.4 km (unsuccessful breeding) from the nearest turbine location. At the Dungavel site, two pairs of merlin are thought to have nested within the survey area in 2004, although nesting was not confirmed. Breeding activity was observed in one area in 2005, but the success of the nesting attempts is unknown.

Merlins have been recorded infrequently foraging over the other local wind farm sites surrounding the Proposed Development, but no breeding activity has been recorded.

4.1.3 Peregrine

Four peregrine flights (all individual birds) were recorded within 500 m of the Proposed Development site in July to August 2019 (EIA Report Figure 8.5); two of these flights were made by juvenile birds. SSRSG reported one peregrine breeding location used between 2015-19 that was located approximately 1.8 km from the site boundary and approximately 2 km from the closest proposed turbine, outside of the Muirkirk and North Lowther Uplands SPA (EIA Report, Confidential Figure 8.2.1).

Raptor surveys in 2005, undertaken for Nutberry Wind Farm, identified a peregrine breeding attempt within 2 km of the Nutberry site (location unknown), although few flights were made by this species within the Nutberry site boundary between 2005-06.

Peregrine was confirmed as breeding during surveys for the Hare Craig Wind Farm in 2016 and 2017, although the exact location of the nest was not determined during surveys due to access restrictions to the 2 km buffer surrounding the site.

Peregrine was confirmed to be breeding within the survey area for Galawhistle Wind Farm (approximately 2 km from the Proposed Development site) in 2008 and 2009, although breeding locations are unavailable.

Peregrine presence was recorded at most other wind farm sites within 2 km of the Proposed Development, although activity levels were low and no breeding evidence was recorded.

4.1.4 Short-eared Owl

The 2019-20 surveys did not record short-eared owl within 2 km of the Proposed Development.

Flight activity and behaviour recorded for the Nutberry wind farm site indicated that one pair of short-eared owls might have bred in suitable habitat within 2 km of the Nutberry site boundary in 2004 (location unknown). Two pairs of short-eared owl were recorded displaying breeding activity in moorland at least 3 km to the south-east of the Dungavel wind farm site in 2004 (location unknown).

Short-eared owls have been recorded infrequently over some other local wind farm sites surrounding the Proposed Development, but no breeding activity has been recorded.

4.1.5 Golden Plover

Five golden plover flocks were recorded flying within 500 m the Proposed Development site boundary during the autumn migration in September and October 2019 (EIA Report, Figure 8.6)

and a group of three individuals was recorded in December 2019 (EIA Report, Figure 8.7), but they did not breed within 2 km of the site.

Flocks of golden plover have been recorded flying through all of the wind farm sites within 1 km surrounding the Proposed Development during the non-breeding season, although breeding was not recorded at any site. Surveys for Nutberry Wind Farm in 2005 recorded flocks of golden plover feeding in fields around Birkenhead Farm, just to the north of the Proposed Development site.

5 INFORMATION TO INFORM AN APPROPRIATE ASSESSMENT

This section provides information for the competent authority to be able to conclude No AESI for the Muirkirk & North Lowther SPA as a consequence of the Proposed Development. The structure is as follows:

- Identification of potential impacts on qualifying features;
- The Conservation Objectives of the SPA;
- An assessment of predicted impacts on each qualifying feature;
- Any mitigation proposed;
- In-combination effects; and
- A conclusion as to whether any AESI for the SPA would occur.

5.1 Potential Impacts on Qualifying Features

Based on the impact assessment on species within EIA Report, Chapter 8: Ornithology, the following identified potential impacts on SPA qualifying features are:

- Displacement: where birds are excluded from suitable areas of habitat, caused by a number of factors, including direct loss of habitat to accommodate the infrastructure (Impact 1), disturbance through construction and decommissioning activities (Impact 2); or indirect loss of habitat if birds are displaced around the wind turbines due to their presence (Impact 3);
- Collision risk: death or injury through collision with operational turbine blades (Impact 4); and
- In-combination effects of the proposed development with other projects due to Impacts 1-4.

An assessment of the effects of operational turbine lighting was included in EIA Report, Chapter 8: Ornithology, based on a detailed literature review in Appendix 8.1, Annex F. It was concluded that no measurable adverse impacts of lighting on any species would occur. It therefore follows that there would be no effects on the SPA qualifying features, and as such this impact has been scoped out of the AA.

5.2 SPA Conservation Objectives

In order to conduct the AA under Step 3 of the HRA process, it is necessary to ascertain whether the Proposed Development would not adversely affect the integrity of a Natura site ('Integrity

Test'). NatureScot advises that "*There are no concrete rules about what constitutes 'no adverse effect on site integrity'. Each case should be judged on its own merits*"[2].

To establish the effect of the Proposed Development on the integrity of an SPA, it is necessary to consider the relevant Conservation Objectives which may be affected:

1 To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

2 To ensure for the qualifying species that the following are maintained in the long term:

a) Population of the species as a viable component of the site;

b) Distribution of the species within site;

c) Distribution and extent of habitats supporting the species;

d) Structure, function and supporting processes of habitats supporting the species; and

e) No significant disturbance of the species.

5.3 Assessment of Impacts

5.3.1 Impact 1: Habitat Loss

Habitat loss could occur due to the Proposed Development's construction, which would be both temporary (e.g. construction compounds, with equivalent requirements during decommissioning) and longer term (access tracks and turbines). This has the potential to impact on breeding, roosting or foraging individuals.

The Proposed Development site is located outside of the SPA and so no direct habitat loss to the SPA would occur. With all infrastructure located at a minimum distance of 350 m from the site boundary, no indirect habitat modifications or changes to supporting function (e.g. changes in hydrology) to the SPA (in line with conservation objective 2 (d)) due to the results of construction processes are predicted.

The Proposed Development site primarily comprises a mix of mature commercial conifer plantation, recent clear-fell and young second rotation commercial crop (see EIA Report Figure 7.3). These habitats are generally of low importance for the SPA qualifying features, although it is acknowledged that ground-nesting raptors (hen harrier and short-eared owl) may make use of young plantation for nesting (e.g. SNH, 2016[3]), and that merlin may on occasion nest in mature conifer trees. No evidence of usage within the site, or wider Cumberhead Forest, has however been recorded, either during baseline surveys in 2019-20 or from historic data provided by the desk study. As such, no supporting habitats (outside of the SPA) for SPA qualifying species would be lost due to the Proposed Development.

[2] https://www.nature.scot/professional-advice/planning-and-development/environmental-assessment/habitats-regulations-appraisal-hra/habitats-regulations-appraisal-hra

[3] Scottish Natural Heritage (2016). Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier, merlin and short-eared owl. Guidance Note.

Overall, based on the information provided above, there is considered to be **No AESI for the SPA** due to habitat loss.

5.3.2 Impact 2: Construction and Decommissioning Disturbance

The main potential impacts of construction (or decommissioning) activities are displacement and disruption of breeding, foraging or roosting birds as a result of noise and general disturbance over a short-term period (either the duration of a particular construction activity within working hours, or the duration of the whole construction period). Impacts would be confined to areas within the locality of temporary construction compounds, turbines, tracks and other infrastructure. SPA conservation objectives 1 and 2 (e) are particularly relevant for this impact.

5.3.2.1 Hen Harrier

Hen harrier activity within the site is currently low, with only two flights recorded during baseline non-breeding season surveys, in January and March 2020. No breeding evidence was recorded within the 2 km study area in 2019. No hen harrier nesting has been recorded within 2 km of the site boundary since 2011, and during the design layout process, effort was made to locate proposed turbines at least 2 km from known historic breeding records. There are no known current or historic roost sites for non-breeding hen harriers, within at least 2 km of the Proposed Development site.

Although there is some uncertainty as to the extent of effects of construction activities on foraging hen harriers, potential disturbance associated with the Proposed Development is likely to be minimal. Generally, studies and guidance (e.g. Ruddock and Whitfield, 2007[4]) suggest that disturbance may occur up to around 500 m from source for a number of raptor species including hen harrier, and so although a small proportion/duration of construction activity would be closer than 500 m from the SPA boundary, the chances of any measurable disturbance effects on foraging hen harriers is minimal. Additionally, forestry operations are regular within the site and so much of the felling and construction activity is likely to be of a reasonably similar nature to this, suggesting that any hen harriers regularly present would already be reasonably tolerant of human activities.

Considering that suitable nesting habitat appears to be at least 2 km from the nearest proposed infrastructure, it is unlikely that short-term construction activities would disturb breeding hen harriers in the context of the currently unfavourable SPA population condition, or prevent the population recovering to favourable condition by affecting any breeding territories.

It can be reasonably concluded that there is **No AESI for the SPA** due to construction disturbance to hen harrier.

5.3.2.2 Merlin

Merlin activity within 2 km of the site was rare, with only one flight recorded within 2 km in September 2019. No evidence of breeding evidence was recorded within the 2 km study area in 2019. SSRSG identified two historic nest sites in 2010 and 2013 within the Muirkirk and North

[4] Ruddock, M. & Whitfield, D. P. (2007). A Review of Disturbance Distances in Selected Bird Species, A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

Lowther Uplands SPA, over 2 km from the nearest proposed turbine location. There are no records of breeding within 2 km since 2013.

For similar reasons described for hen harrier above, considering that surveys have not recorded any merlin breeding activity within 2 km of the site since 2013, and the closest historic merlin breeding activity was recorded over 2 km from the nearest proposed turbine location, it is considered unlikely any breeding territories would be affected by construction disturbance. Any additional felling of conifer plantation associated with the Proposed Development is likely to take place within the interior of Cumberhead Forest, and so would not remove any suitable nesting or foraging habitat. Short-term construction activities would not therefore prevent the merlin SPA population from attaining favourable conservation status.

It can be reasonably concluded that there is **No AESI for the SPA** due to construction disturbance to merlin.

5.3.2.3 *Short-eared owl*

The 2019-20 surveys did not record short-eared owl within 2 km of the Proposed Development, and the SSRSG did not provide any evidence of nesting within 2 km over the last ten years. Although baseline surveys for other wind farm projects in the local area (Nutberry and Dungavel in 2004) did record breeding evidence, probably within the SPA, there is no evidence to suggest that any breeding territories would be temporarily affected by Proposed Development construction activities, even if the population is in historic favourable conservation status similar to the time of citation.

It can be reasonably concluded that there is **No AESI for the SPA** due to construction disturbance to short-eared owl.

5.3.2.4 *Peregrine*

Peregrine activity was infrequent during baseline surveys (four flights in July to August 2019, two of which were juveniles). SSRSG reported one peregrine breeding location used between 2015-19 that was located approximately 2 km from the closest proposed turbine and also over 1 km outside the Muirkirk and North Lowther Uplands SPA (EIA Report, Confidential Figure 8.2.1). No SPA nest sites within 2 km of the Proposed Development site are known.

Activity recorded within the Proposed Development site is therefore likely to be associated with birds from the nearest breeding territory, which is not part of the SPA population. No SPA individuals are therefore likely to be affected.

Based on this, it can be reasonably concluded that there is **No AESI for the SPA** due to construction disturbance to peregrine.

5.3.2.5 *Golden Plover*

During baseline surveys, golden plovers were recorded infrequently during the migration and winter periods only, with no evidence of breeding taking place within 2 km of the Proposed Development site. The area of the SPA closest to the Proposed Development site is unlikely to be regularly used by breeding or non-breeding golden plovers in any years, as most waders are known

to avoid forest edge habitats (e.g. Wilson et al. 2014[5], who recorded suppressed numbers within 700 m of forestry). Construction disturbance to golden plover is therefore very unlikely to be significant in terms of impacts on individual fitness or survival.

It can therefore be reasonably concluded that there is **No AESI for the SPA** due to construction disturbance to golden plover.

5.3.3 Impact 3: Operational Displacement

The displacement of nesting, foraging or roosting birds from the site has the potential to extend beyond the construction phase, as described above, and to occur during the operational phase.

5.3.3.1 Hen Harrier

No hen harrier breeding evidence was recorded within the 2 km study area in 2019, and no hen harrier nesting has been recorded within 2 km of the site boundary since 2011, and during the design layout process, effort was made to locate proposed turbines at least 2 km from known historic breeding records.

Even if nesting were to take place within 2 km of any proposed wind turbine location, there is evidence from a number of wind farms (e.g. Cruach Mhor (Robson 2012[6]), Edinbane (Haworth & Fielding 2012[7]) and Paul's Hill (Robinson & Lye 2012[8])) that hen harrier can exist alongside turbines, with anecdotal evidence of birds flying and nesting in proximity to turbines. No displacement/disturbance impacts have been noted at those wind farms, and the likelihood of any such impacts on foraging birds within proximity of the Proposed Development site, comprising largely of unsuitable habitat, is therefore considered to be low.

It can therefore be reasonably concluded that there is **No AESI for the SPA** due to operational displacement of hen harrier.

5.3.3.2 Merlin

No breeding evidence was recorded during the 2019-20 baseline surveys at the site, and merlin activity was very low with only one flight recorded within 2 km of the site, in September 2019. SSRSG identified two historic nest sites in 2010 and 2013 within the Muirkirk and North Lowther Uplands SPA, both over 2 km from the nearest proposed turbine location. There are no records of breeding within 2 km since 2013.

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[5] Wilson, J.D., Anderson, R., Bailey, S., Chetcuti, J., Cowie, N.R., Hancock, M.H., Quine, C.P., Russell, N., Stephen, L. and Thompson, D.B.A. (2014). Modelling edge effects of mature forest plantations on peatland waders informs landscape-scale conservation. Journal of Applied Ecology Vol 51. pp204-213.

[6] Robson, P. (2012). Hen Harrier activity at Cruach Mhor windfarm. Review of monitoring data 2001-2011. SNH Sharing Good Practice Workshop - Assessing the impact of windfarms on birds, 3 April 2012. https://www.yumpu.com/en/document/view/8045986/hen-harrier-activity-at-cruach-mhor-windfarm-peter-robson-spr.

[7] Haworth, P. & Fielding, A. (2012). A review of the impacts of terrestrial wind farms on breeding and wintering hen harriers. Haworth Conservation. http://www.alanfielding.co.uk/fielding/pdfs/Hen%20harriers%20and%20Windfarms.pdf

[8] Robinson, C. & Lye, G. (2012). Paul's Hill Wind Farm: Flight Activity & Breeding Success of Hen Harrier. Presentation at Sharing Good Practice: Assessing the Impact of Windfarms on Birds Battleby, April 2012.

Merlin feed predominantly on small birds, preferentially feeding on skylark and meadow pipit (Sale, 2015[9]) which inhabit open ground areas. So, although potentially suitable breeding habitat theoretically exists within and surrounding the site, considering that there is little current activity, and no evidence to show that merlin have bred in the local area since 2013 (and when they did breed the nest locations were located at 2.3 to 2.5 km from the nearest proposed turbine location), it is very unlikely that breeding merlin would be displaced or disturbed during operation.

It can therefore be reasonably concluded that there is **No AESI for the SPA** due to operational displacement of merlin.

5.3.3.3 *Peregrine*

No SPA breeding territory is likely to overlap with the Proposed Development site, with any individuals present most likely to originate from the nearest breeding location, around 2 km from the nearest proposed turbine location, and at least 1 km from the SPA. Peregrines forage widely throughout the year, and with the site likely to provide limited foraging opportunities, no individuals, either belonging to the SPA or non-SPA birds, are likely to be affected by displacement.

It can therefore be reasonably concluded that there is **No AESI for the SPA** due to operational displacement of peregrine.

5.3.3.4 *Short-eared owl*

A lack of breeding records within 2 km of the site, and the species' absence during 2019-20 baseline surveys suggests that displacement of any individuals would be very unlikely. Short-eared owls that may on occasion use the site or surrounding area during the non-breeding season are unlikely to be affected in any way by any displacement around wind turbines, with birds often ranging widely during winter months.

It can therefore be reasonably concluded that there is **No AESI for the SPA** due to operational displacement of short-eared owl.

5.3.3.5 *Golden Plover*

No breeding golden plovers have been recorded in proximity to the site and so no operational displacement of nesting birds would occur. The species has been recorded on occasion in flight during the non-breeding season, and historically feeding nearby at Birkenhead Farm. This activity is unlikely to be related to SPA birds, but even if it were, the presence of wind turbines would unlikely prevent birds from continuing these activities and impact on individuals' survival.

It can therefore be reasonably concluded that there is **No AESI for the SPA** due to operational displacement of golden plover.

5.3.4 Impact 4: Collision Risk

Additional mortality to an SPA qualifying feature as a result of collisions with wind turbines may compromise SPA conservation objective 2 (a) in particular, should the level of increase impact at a population level.

[9] Sale, R. (2015). The Merlin. Snowfinch publishing.

Collision risk modelling was undertaken for all target species recorded during baseline flight activity surveys in 2019-20, using the standard model advocated by NatureScot (see EIA Report, Technical Appendix 8.1, Annex E for details). Only two SPA qualifying species were recorded in flight that may be 'at-risk' of collisions with turbines: golden plover and peregrine (Table 5-1). For all other qualifying features, it can therefore be reasonably concluded that the risk of collisions is negligible, even if on-site conditions were to change as a result of the Proposed Development, e.g. due to key-holing of turbines within forestry.

Table 5-1 Collision Risk Modelling Results (collision rate per season) for SPA qualifying interests.

Species	2019 Breeding Season	2019-20 Non-breeding Season	Annual	One every *X* years
Golden plover	0	0.0016	0.0016	626.02
Peregrine	0.0091	0	0.0091	110.13

Peregrine flight activity was rare across the site during flight activity surveys in 2019-20, and as a result the predicted collision rates were low, with an estimated mean annual rate of 0.0091, or one collision every 110 years. This is similarly the case with golden plover, with a predicted collision rate of one every 626 years.

It can therefore be concluded that for all SPA qualifying features, a collision event is very unlikely and that there is **No AESI for the SPA** as a result.

6 MITIGATION

No unmitigated AESI for the SPA was predicted during the construction, operation or decommissioning phases. No specific mitigation is therefore required. To minimise the possibility of an adverse effects, the following embedded mitigation and enhancement would be in place:

- A Breeding Bird Protection Plan to be implemented during the construction and decommissioning phases which would require the services of an Ecological Clerk of Works to oversee all construction activities and ensure that no SPA qualifying features (or other species) would have any breeding activity disrupted.
- For ecological enhancement of the site, an Outline Habitat Management Plan (OHMP) is described in Appendix 7.6, which aims to restore and enhance blanket bog and increase native woodland coverage. This would provide improved habitat quality for Muirkirk and North Lowther Uplands SPA qualifying features, either directly within the site, or indirectly within the SPA itself by removing forest edge effects which may suppress breeding numbers close to the site boundary.

7 IN-COMBINATION EFFECTS

The assessment of ornithological effects associated with the Proposed Development alone predicted No AESI for the SPA for every qualifying feature, due to the low suitability of habitat within the Proposed Development site, lack of SPA breeding records in proximity to the Proposed Development site, and/or the low activity levels of qualifying features recorded during baseline surveys. Consequently, no breeding or foraging activity of any SPA qualifying features is likely to be affected, and collision rates are likely to be trivial within a population context.

It is therefore considered that the impacts associated with the Proposed Development on SPA qualifying features would contribute nothing, or very little to the overall in-combination effect for each potential impact at an SPA population level. A detailed SPA-level in-combination assessment is therefore not considered necessary.

8 SUMMARY AND CONCLUSIONS

This report has considered the potential likely significant effects on Natura sites as a result of the construction, operation and decommissioning of the Proposed Development. Stage 2 of the HRA process (screening) identified one SPA where likely significant effects were predicted: the Muirkirk and North Lowther Uplands SPA. Information to inform the subsequent AA stage of the HRA process was provided in relation to the SPA's qualifying features, and habitat loss, disturbance, displacement and collision risk impacts.

Based on the evidence presented it can be reasonably concluded that the conservation objectives of the Muirkirk and North Lowther Uplands SPA (or any Natura site) would not be compromised by the Proposed Development, and therefore No AESI for the SPA is predicted, either alone or in-combination with other developments.