

**GLENBURNIE WIND FARM  
AEI TECHNICAL APPENDIX 9.: SHADOW HABITATS  
REGULATION ASSESSMENT**

**March 2025**

## **AEI TECHNICAL APPENDIX 9.2: SHADOW HABITATS REGULATIONS ASSESSMENT**

### **INTRODUCTION**

1. This AEI Technical Appendix provides the information required under the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 (as amended), specifically related to avian nature conservation issues raised by the proposed development. The information provided here is to support the competent authority in establishing, firstly, whether the construction, operation and decommissioning of the proposed development, either alone or in combination with other plans or projects, is likely to have a significant effect on European sites, having had regard to the qualifying interests and the conservation objectives. This first stage analysis is completed without reference to mitigation.
2. Where a plan or project is not directly connected with or necessary to the management of the European site, and where it cannot be excluded, on the basis of objective information, that the plan or project will have a significant effect, the competent authority is duty bound to complete an Appropriate Assessment to determine whether the likely significant effect would have an adverse effect on the integrity of the European site(s). The integrity of the European Sites is considered with reference to the best scientific knowledge and with regards to the conservation objectives of the European Sites, specifically the species for which the sites were designated and the habitat upon which they depend. This technical appendix should be read in conjunction with the accompanying chapter and figures.
3. This AEI Technical Appendix provides information on the existing baseline for the designated populations (and that could be affected by the revised proposed development) and an assessment of the effects of the revised proposed development on those populations alone and in combination with other plans and projects in the area. The field studies, evaluation and assessment of the effects of the proposed development on the area's bird populations have been reported fully in Chapter 9: Ornithology in Volume 2 of the EIA Report October 2023 and Chapter 9 of the AEI. The information presented in this report draws on that work but focuses on the key species that are qualifying features of the Special Protection Areas (SPA) sites.

### **OBJECTIVES**

4. The purpose of this AEI Technical Appendix is:
  - To assess the potential for likely significant effects upon the European site(s) from the construction and operation of the proposed development, either alone or in combination with other plans or projects and in the absence of any mitigation (this assessment is known as the screening stage); and
  - If any likely significant effects are identified through the screening stage, to consider whether the revised proposed development has the potential to have an adverse effect on the integrity of the European site(s), having had regard to their conservation objectives and the mitigation measures proposed.

### **PARAMETERS FOR THE HRA**

5. The assessment presented here is based on the revised proposed development as described in Chapter 3: Revised Proposed Development Description of the AEI. There will be a reduction from 19 wind turbines (assessed in the EIA Report October 2023) to 12, but the locations of those remaining 12 will be unchanged. The specific of the wind turbines would also be unchanged, with up to a 170 m rotor diameter turbine and 50-220 m rotor height. Blade rotational speeds would be, on average, about 7.5 revolutions per minute. The revised proposed development will include concrete bases for the 12 wind turbine foundations, the wind turbines themselves and associated electrical transformers, substation and battery energy storage system compounds and control

buildings, freestanding wind monitoring masts and on-site infrastructure (underground cabling, access tracks, off-site road improvements, watercourse crossings and crane hardstands).

6. All of the on-site cabling will be under-grounded. Operation and minor wind farm maintenance will occur throughout the year, with additional annual servicing.

## CONSULTATION

7. NatureScot advised in their scoping comments that the proposed development has the potential to impact on pink-footed goose, a qualifying feature of the Fala Flow and Greenlaw Moor SPA/Ramsar sites, so a Habitats Regulations Assessment (HRA) will be needed. This AEI Technical Appendix provides that appraisal for the revised proposed development. Pink-footed goose is the only SPA qualifying species for which the proposed development lies within the SPA connectivity range.
8. NatureScot noted in its response of 26/1/24 to the EIAR that *"We agree with the conclusion of no impacts on Fala Flow and Greenlaw Moor SPAs associated with pink-footed geese. More generally NatureScot is not concerned about impacts on geese from this development given the robust status of pink-footed geese and resident greylags."*

## BASELINE DATA

9. A comprehensive range of bird surveys have been undertaken at the site between September 2021 and August 2023. This has included surveys over two full breeding seasons (2022 and 2023) and two winter periods (2021-22 and 2022-23). These surveys comprised:
  - year-round vantage point surveys to quantify bird flight activity;
  - breeding bird walkover mapping survey;
  - species-specific breeding bird surveys; and
  - autumn/winter walkover surveys.
10. Full details of the surveys, dates and weather conditions are given in EIA Report Technical Appendices 9.1 - 9.4.

## SPA SPECIES' BASELINE CONDITIONS

11. No SPA species was recorded during the baseline surveys within the potential disturbance zone, so Likely Significant Effect (LSE) for disturbance can be ruled out.
12. Only one SPA species was recorded at risk of collision (i.e. flying through the site at rotor height), pink-footed goose.

## HABITATS REGULATIONS APPRAISAL – SCREENING (LIKELY SIGNIFICANT EFFECTS TESTS)

13. In this section, each SPA that could be affected by the revised proposed development is considered in terms of its qualifying features to determine whether any Likely Significant Effects (LSE) under the Habitats Regulations could occur. SPAs that could be affected by the proposed development are identified and the designated species that could be affected.
14. The initial assessment for the LSE test was based on whether the revised proposed development falls within the core connectivity range of each qualifying species of each SPA (as set out in SNH 2016) and whether there was any possible pathway to a significant impact. Each SPA is considered in turn.
15. The potential connectivity of each of these SPAs to Glenburnie Wind Farm is summarised in EIA Report October 2023 Chapter 9, Table 9.5. This lists the qualifying features for each SPA, the distance from the site at its closest point and an initial assessment of whether the site falls within the core range of each (SNH 2016). As set out in this guidance, *“In most cases, the core range should be used when determining whether there is connectivity between the proposal and the qualifying interests”*, so this has been used for this assessment (though with consideration of the maximum ranges too).

### FALA FLOW SPA/RAMSAR

16. The Fala Flow SPA/Ramsar site lies 7.9 km north-west of the revised proposed development. It is designated for its wintering population of pink-footed geese. The SPA citation cites a population of 2,400 pink-footed geese (2% of the international population), though numbers have been higher in recent years.

**Table 9.2.1: Fala Flow SPA: Determining Potential for Likely Significant Effects (LSE)**

Qualifying Interest	Summary Condition	Likely Significant Effect
Pink-footed Goose	Favourable maintained.  Water management has been identified as a negative pressure.	Collision risk

### GREENLAW MOOR SPA/RAMSAR

17. The Greenlaw Moor SPA/Ramsar site lies 16 km south-east of the revised proposed development. It is designated for its wintering population of pink-footed geese and its wintering waterbird assemblage. The SPA citation cites a population of 14,200 pink-footed geese (7% of the international population).

**Table 9.2.2: Greenlaw Moor SPA: Determining Potential for Likely Significant Effects (LSE)**

Qualifying Interest	Summary Condition	Likely Significant Effect
Pink-footed Goose	Favourable maintained.	Collision risk

	No negative pressures identified.	
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## POTENTIAL IMPACTS ON PINK-FOOTED GEESE

18. The potential impacts that could lead to an LSE were identified as the following. Each is considered in turn:
- Collision risk during operation.
  - Disruption to flight lines (barrier effect).

## COLLISION RISK

19. Collision risk modelling was carried out for pink-footed goose using the NatureScot standard model (Band *et al.* 2007). The direct flight model was applied as their flights were essentially direct ones through the site. Further modelling details are given in Chapter 9 and AEI Technical Appendix 9.1.
20. The collision risk predictions from the model for pink-footed geese are summarised in Table 9.2.3, applying the NS-recommended precautionary 99.8% avoidance rate (SNH 2018). The predicted collision risk of 0.31 geese per year based on the 2012-22 data and 1.78 based on the 2022-23 data gives an overall predicted risk of 1.04 goose collisions per year. Even if all of this additional mortality were allocated to the smallest local SPA population (Fala Flow), this would still only result in a 0.2% increase over the baseline mortality.
21. The collision risk predictions have reduced for the revised proposed development, to a predicted number of 0.17 collisions per year based on 2021-22 data and 0.67 based on 2022-23 data. The overall predicted risk of goose collisions is reduced to 0.42 per year for the revised proposed development. The equivalent increase in baseline mortality is <0.1% for each year, less than the previous EIAR percentage mortality increase.
22. This would be an effect of negligible magnitude that would not result in any LSE in the context of the Fala Flow and the Greenlaw Moor SPA populations.

**Table 9.2.3: Collision Risk Modelling Predictions**

Species	Precautionary Predicted Number of Collisions per Year (NS avoidance rate)	
	2021-22	2022-23
Pink-footed Goose EIAR	0.31	1.78
Pink-footed Goose AEI	0.17	0.67

## BARRIER EFFECT

23. The revised proposed development does not lie within a regularly used pink-footed goose flight corridor, so it would pose a barrier to goose flight movements. It would not block any flight route into important feeding areas or access to the birds' roost. Any barrier effect would, at most, require only a short detour around the proposed development. As a result, it was concluded in the EIA Report October 2023 that a barrier effect would result in no LSE on any SPA pink-footed goose population, and that remains the case for the revised proposed development.

## CONCLUSIONS OF SHADOW HABITATS REGULATIONS ASSESSMENT

24. It was concluded that the original proposed development would not result in any Likely Significant Effects under the Habitats Regulations, and there would be no need for the project to be taken forward for Appropriate Assessment, in the EIA Report 2023. This remains the case for the revised proposed development, though the magnitude of effects on the one SPA species that could be affected, pink-footed goose, were further reduced in the revised layout.
25. NatureScot advised in its scoping response that it considered (based on Information available in the public domain (Mitchell 2012), which shows how the geese regularly move between their roosts and feeding areas), that the proposed development is not likely to have a significant effect on the wintering pink-footed geese interests for which the Fala Flow SPA and the Greenlaw Moor SPA are designated, despite the potential connectivity between these SPAs and the wind farm site.
26. Furthermore, NatureScot advised in its response to the EIA Report October 2023 that it agreed with the conclusion of no impacts on Fala Flow and Greenlaw Moor SPAs associated with pink-footed geese.
27. With the reduced layout of the revised proposed development, effects would be further reduced, adding more evidence to the conclusion of no adverse effect on integrity.

## REFERENCES

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