

**KILLEAN WIND FARM TECHNICAL APPENDIX  
7.6:**

**BIODIVERSITY ENHANCEMENT MANAGEMENT  
PLAN**

**OUTLINE DRAFT FOR CONSULTATION**

**July 2024**

# KILLEAN WIND FARM BIODIVERSITY ENHANCEMENT MANAGEMENT PLAN

## Background

1. The purpose of the proposed Biodiversity Enhancement Management Plan (BEMP) is to implement the measures needed to ensure that the proposed Kilean Wind Farm (“the Proposed Development”) delivers a biodiversity net gain, in terms of the biodiversity objectives of National Planning Framework 4 (NPF4).
2. The main biodiversity residual impacts of the Proposed Development identified in the EIA report after mitigation (Chapter 7 Ecology and Chapter 8 Ornithology) were:
  - Loss of peatland habitats - this includes the loss of 0.56 ha. of wet modified bog, 0.74 ha of blanket bog, 0.004 ha of wet heath and 0.1 ha of acid flush.
  - Disturbance to black grouse during operation (construction phase disturbance mitigated through restriction on activity during the black grouse lekking period) - could be displaced from a zone of about 500 m around the development (Pearce-Higgins et al. 2012).
  - Collision risk to red-throated diver - Proposed Development also holds breeding red-throated diver (though outside potential impact zone)
  - Collision risk to Greenland white-fronted geese (construction phase disturbance during construction mitigated through restriction on activity during goose season)
3. The site entrance turning circle construction works would also result in the loss of 80m of species-poor hedgerow.
4. None of these residual impacts were assessed as significant, but measures are proposed to deliver net benefit overall in respect of the identified impacts.
5. This Biodiversity Enhancement Management Plan (BEMP) will be implemented to deliver the measures set out in this document. This document sets out an initial outline of how this will be delivered. The BEMP is being developed in collaboration with stakeholders to deliver the required ecological benefits while also fitting with the ongoing management/use of the site. It is intended to be an evolving document. The target species/habitats for enhancement comprise:
  - Peatland habitats (blanket bog) – applying NS (2023) guidance of 1:10 ratio of loss: enhancement + 10%, a minimum of 15.4 ha. of enhancement would be required to offset the loss of 1.4 ha. of peatland to the Proposed Development.
  - Black Grouse
  - Red-throated Diver
  - Greenland White-fronted Goose
6. At this stage, this document presents outline proposals and will be updated through consultation with stakeholders, including the landowner, tenants, NatureScot and RSPB .

## EXISTING ENVIRONMENT AND MANAGEMENT

### Peatland Habitat

7. The site is currently divided into three main management units. The central part (in which most of the Proposed Development would be located) is a commercial conifer plantation, much of which has recently been harvested and restocked. The eastern area is an open moorland bog currently unused for grazing sheep. The lower western part, largely on shallower peat, is used primarily for raising sheep and is a mix of wet and dry heath, blanket bog and rush pasture. Most of the peatland habitat within the open moorland was assessed as being in favourable condition, though some smaller patches in unfavourable condition were identified, where the habitat had been degraded, mainly as a result of drainage.

### Black Grouse

8. Black grouse is a UK Biodiversity Action Plan [BAP] priority species, which is in decline nationally (Sim et al. 2008). It is also an Argyll and Bute BAP species.
9. Four black grouse lekking areas were located during the surveys, two of which held up to 2 lekking males. All four were used in 2022 but only two in 2023. The others were just single lekking males. Their locations and additional records of this species are shown in EIAR Figure 8.2. The survey area population was estimated at five lekking males in 2022 and four in 2023.

### Red-throated Diver

10. Red-throated diver is an EU Birds Directive Annex 1 and Wildlife and Countryside Act Schedule 1 species. Though it has increased nationally (Dillon *et al.* 2009), numbers in Argyll are thought to be declining (Dewar and Lawrence 2023).
11. One pair of red-throated divers was recorded nesting within the survey area in each baseline year, though on different lochs, both to the east of the proposed wind farm. They successfully fledged a chick in 2023 but failed in 2022. Their locations and associated flight lines (which show the nesting lochs) are given in the EIAR Confidential Appendix 8.8.

### Greenland White-fronted Goose

12. This species is a qualifying feature of the Kintyre Goose Roosts SPA. Though no significant impact is predicted, measures are proposed to deliver a net gain to this species (at the SPA scale).
13. Greenland white-fronted geese were widely distributed across the wider waterfowl survey area (on the lower ground to the west and north-west of the proposed development). Their flight lines were mostly over the northern part of the proposed wind farm site, so the collision risk was negligible (and not significant). They roosted occasionally on the small lochs to the north-east of the Proposed Development (850 m from the nearest proposed wind turbine).

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## BIODIVERSITY ENHANCEMENT MANAGEMENT PLAN: PROPOSED MANAGEMENT OBJECTIVES AND PRESCRIPTIONS

### Peatland Enhancement

14. The BEMP would be targeted to deliver benefits to the peatland habitats and to the breeding bird community (particularly curlew). It will include the enhancement of a target of a minimum of 15.4 ha. of peatland (to satisfy NS 2023 guidance). The overall aims of this plan would be to:
  - improve the overall quality of the degraded (Unfavourable condition) wet modified bog habitat;
  - increase the suitability of the moorland habitats for breeding grouse and waders, thus providing enhanced breeding habitat over 500 m from the proposed wind turbines. This would include:
    - Enhancement of heather moorland mosaic suitable for foraging and nesting. Continuation of low grazing levels through the lifetime of the wind farm.
    - Improvement of wetter habitats for chick-rearing: restoration of wet areas by blocking drains where feasible to improve the habitat for feeding. Wet flushes, boggy areas and damp grassland are important invertebrate-rich feeding areas, particularly for chicks.
15. The primary search area for the delivery of these measures was defined as follows:
  - Wet modified bog in Unfavourable condition
  - >500 m from proposed wind turbines, where possible, to maximise additional benefits to breeding birds.
16. The areas identified as suitable for the delivery of the proposed peatland enhancement measures is shown in Figure 7.6.1. This includes 9.5 ha. of wet modified bog on the open moorland in the eastern part of the site, plus an additional 8.1 ha. of wet modified bog, blanket bog and wet heath on the fringe of the forestry plantation. This gives a total peatland enhancement area of 17.6 ha, exceeding the NS (2023) guidance of a 1:10 ratio of peatland loss: enhancement plus 10% (which would require 15.4 ha. to offset the 1.4 ha. loss of peatland habitat).
17. The management prescription will include blocking of grip drains in areas affected by past drainage to encourage re-wetting (Fig7.6.1). This could include use of marine ply boards or plastic piling to dam the drains (Brooks and Stoneman 1997) (to avoid the need for any digging machinery to access the area, as this would likely damage the surface vegetation). This would enhance peatland habitats and provide an improved source of invertebrate food for breeding black grouse and other ground-nesting birds.
18. Additionally, the peatland within the Proposed Development is not currently managed by burning. As part of the BEMP, this would be continued through the lifetime of the Proposed Development: there would be no muir burn on peatland habitat.

### Black grouse

19. Black grouse is a moorland/forest fringe species, using both moorland and woodland habitats through the annual cycle (Pearce-Higgins *et al.* 2016). Though young forestry plantations can provide important habitats, closed-canopy conifer forests are less attractive to them. Wet grassland and marsh areas are important as an invertebrate food source for young birds, and more heavily grazed habitats are generally less-used (Cayford 1993, Hudson and Baines 1995, Baines 1996, Calladine *et al.* 2002).
20. The primary measure to deliver a net benefit for this species will be the creation of low-density native woodland edges. This will follow the RSPB-recommended prescription of planting up to 200 stems/ha. on the fringe up to 1,600 trees per ha. within the main planting, on land that has been commercial forestry. This will create biodiverse transition zones between woodland cover and open moorland habitats, and increase ecological connectivity across the conifer plantation. Figure 7.6.1 shows the initial search area for this planting (covering 19 ha.). In total, a target of at least 10 ha. would be planted. The principal species would be mixed native broadleaves including, for

example, downy and silver birch with small components of other species such as oak, rowan, hazel, gean, grey willow, goat willow, alder and woody shrubs. Planting would be completed prior to the commencement of the operation of the wind farm.

21. In addition, black grouse will benefit from the proposed peatland enhancement. This will increase chick food availability by boosting invertebrate populations, provide better cover from predators, and improve conditions for foraging and nesting.

## Red-throated Diver

22. Red-throated divers nest on small lochs in upland habitats but usually feed on larger waterbodies and often at sea (with regular flights between feeding and nesting sites). Productivity in the region can be low, as a result of human disturbance, water level fluctuation and natural predation (e.g. by fox and mink) (ap Rheinallt *et al.* 2007). Merrie (1996) showed that the provision of nesting rafts could increase breeding success. More recently, Dewar and Lawrence (2023) reported a low take-up of artificial nesting rafts in Kintyre, with no successful diver breeding recorded on the seven artificial rafts during 2016-21. They considered that this may have been because other species were using the rafts, including common and great black-backed gull, and Canada geese, but still concluded that raft provision could result in positive conservation outcomes and recommended that it “*should be considered as part of a wider suite of mitigation or enhancement measures for any future renewables development or other types of project that occur in areas where divers are present.*”
23. Three artificial nest rafts will be provided for this species as part of the BEMP (all within the Proposed Development – on Loch na Naich and on the 2022 and 2023 breeding lochs - see TA 8-8 Confidential Annex), to reduce the negative impact of water level fluctuation and reduce nest predation.
24. Monitoring of the success of these rafts will also contribute data in support of ongoing red-throated diver conservation, including the Kintyre Red-throated Diver Monitoring Programme (Dewar and Lawrence 2023). This will include monitoring of raft occupancy, productivity and condition.

## Greenland White-fronted Goose

25. Net benefit to this species will be delivered through an enhanced monitoring programme, to provide improved information for their conservation management. This will include post-construction monitoring of the wind farm but also the wider population across the Tayinloan area, including GPS-tagging of individual birds to understand their movements in more detail. The specific aims of this work will include mapping the goose feeding distribution and flight lines to compare with the pre-construction baseline and obtaining data on marked individuals to determine their feeding and roosting requirements, the linkage between feeding and roosting sites and the birds’ behaviour at night. GPS tags have recently been deployed successfully for this species on Islay (Griffin *et al.* 2020), and it is proposed to adopt a similar approach for the Tayinloan flock.

## Hedgerow Replacement

26. As 80 m of hedgerow would be lost to the site entrance turning circle construction, replacement planting will be carried out at the site entrance to deliver a net gain. A total length of 235m will be planted with a species-rich mix, including hawthorn, dog rose, hazel, rowan and goat willow. This will also help screen the site entrance from the goose feeding fields to the west.

## BEMP MONITORING

27. The BEMP will be monitored to assess the effects of the measures implemented and inform on-going management, such that management prescriptions can be fine-tuned to deliver the optimal outcomes. The proposed monitoring will include:

- Monitoring of habitats and vegetation: vegetation and peatland condition within peatland enhancement areas will be measured by regular surveys of the vegetation communities (including National Vegetation Classification (NVC) surveys and the Common Standards Monitoring Guidance for Upland Habitats). The cover of *Sphagnum* bog mosses, together with other appropriate indicator species, will be used as an indicator of bog quality. The vegetation communities in the area will be mapped and sample quadrats taken to quantify *Sphagnum* and other key indicator species in the year after commissioning of the wind farm and then at 5-yearly intervals through the lifetime of the wind farm.
  - Breeding bird surveys to assess the effect of the proposed development and the HMP on their populations: a breeding bird survey will be carried out for three years after construction. The surveys will use the standard Brown and Shepherd method with four visits per year for all species within the study area, and additional surveys for key species (red-throated diver, hen harrier, black grouse, golden eagle and white-tailed eagle) following the methods of Gilbert *et al.* (1998) and Hardey *et al.* (2013). This monitoring would be undertaken at years 1,2,3,5,10 and 15 following construction (following current SNH guidance; SNH 2009).
  - VP surveys—these will be carried out year-round to capture eagle, diver, and white-fronted goose flight activity to compare with the pre-construction baseline (and using the same two VPs). This will be undertaken for the first three years of operation, and then reviewed (and continued in years 5, 10, and 15 if there has been any significant change from the pre-construction baseline).
  - Winter geese surveys - compare with pre-construction baseline covering the same area as surveyed for the EIA baseline (see TA 8-4 Figure 1). This will be carried out for the first three years of operation, and then reviewed (and continued in years 5, 10, and 15 if there has been any significant change from the pre-construction baseline). Additionally, there will be a GPS-tagging study over the same period, with the target of tagging 10 individuals each winter (30 tags in total).
28. Results of the monitoring programme would be reported annually to the Local Authority, NatureScot and RSPB, and made publicly available on request.
29. The management prescriptions detailed above will be an adaptive process according to existing site conditions and developments over time. Details of the prescriptions will be modified as the HMP develops to adjust to any changes in environmental conditions as highlighted by the monitoring programme.

## Management Group

30. A Biodiversity Enhancement Management Group will be set up by the Applicant to manage the plan's implementation. The group would agree on the plan's details and oversee its implementation, meeting at least annually to review survey results and alter management prescriptions as necessary. Stakeholders invited to join this group will include the developer, the landowner, NatureScot, and the RSPB.

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# KILLEAN WIND FARM EIA REPORT

## FIGURE 7.6.1

### BIODIVERSITY ENHANCEMENT MANAGEMENT PLAN

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#### Legend

- Proposed Turbines (EIAR)
- Peatland Habitat Loss
- Woodland Edge Planting Search Area
- Peatland Enhancement Areas
- Site Boundary
- Hedgerow Planting



LAYOUT DWG: NA | LAYOUT NO.: PCSOkIn049

DRAWING NUMBER: **EC-SP-D007-06.1**

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