# Glentarken Wind Farm

## Outline Biodiversity Enhancement Management Plan

## Technical Appendix 7.7


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| Date: | 03 December 2024 |
| Tel: | 0141 342 5404 |
| Web: | www.macarthurgreen.com |
| Address: | 93 South Woodside Road \|Glasgow \| G20 6NT |

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# 1 INTRODUCTION

This Outline Biodiversity Enhancement Management Plan (OBEMP) describes the proposed habitat and conservation management measures in relation to Glentarken Wind Farm (hereafter referred to as the 'Proposed Development').

This OBEMP is set out in the following sections:

- Existing Conditions & Summary of the Ecological Impact Assessment;
- Biodiversity Net Gain (BNG);
- Biodiversity Enhancement Area;
- Aims, Objectives and Management Prescriptions;
- BNG Assessment;
- Monitoring;
- Reporting and BEMP Review; and
- Management and Monitoring Timetable.

## 1.1 Target Habitats and Species

The management recommendations within this OBEMP are informed by baseline ecological surveys undertaken for the Proposed Development and the findings of **Chapter 7: Ecology** (**EIAR Volume 1**) of the Environmental Impact Assessment Report (EIAR) completed for the Proposed Development. The main habitats considered in this OBEMP are priority peatland habitats (including blanket bog/modified bog) and acid grassland. The habitat enhancements proposed within this OBEMP would also generally have beneficial effects for the local upland bird assemblage (details of the bird assemblage are provided in **Chapter 6: Ornithology, EIAR Volume 1**).

The measures detailed within this OBEMP aim to achieve significant biodiversity enhancement at the Site, in line with objectives outlined in National Planning Framework 4 (NPF4) Policy 3[1]. A Biodiversity Net Gain (BNG) metric is utilised to demonstrate that the measures proposed for the creation, restoration and enhancement of habitats at the Proposed Development would fully compensate for predicted habitat and biodiversity losses, and provide further enhancement that would result in an increase and net gain for biodiversity of **+20%** over and above the baseline and pre-development value of the Site for non-irreplaceable habitats post-construction and following implementation of the OBEMP.

## 1.2 Finalisation of the BEMP and Reporting

This OBEMP is based on several identified land parcels which comprise three 'Habitat Management Areas' (HMA's) (HMA's A - C; see **Figure 7.15, EIAR Volume 2**) for each respective habitat management and biodiversity enhancement proposal. These HMA's were identified through discussions with SSE Generation Ltd (the Applicant), landowners, and relevant technical specialists

[1] Scottish Government (2023). National Planning Framework 4. Available at: https://www.gov.scot/publications/national-planning-framework-4/ [Accessed October 2024].

to create and enhance habitats of biodiversity value. The HMA's may be refined following further specialist surveys, feedback from relevant consultees and other biodiversity enhancement search areas and/or proposals may also be considered; however, the Applicant remains committed to delivering significant biodiversity enhancement at the Proposed Development.

The OBEMP will be refined and developed into a final BEMP post-consent which will include the Biodiversity Enhancement Area (BEA) encompassing all habitat management proposals and any finalised management units (i.e., the refined HMA's for specific habitat management proposals) aims, objectives and management. The final BEMP will be agreed with Perth and Kinross Council (PKC) in consultation with NatureScot prior to the commencement of construction of the Proposed Development.

## 2 EXISTING CONDITIONS & SUMMARY OF ECOLOGICAL IMPACT ASSESSMENT

The Site is set within a mixed but typical upland landscape comprising sheep grazed open moorland, heathland/grassland mosaics, and areas of young, planted forest (due to the recent Ardveich Planting Scheme). The most common and prevalent habitat types within the Site are blanket bog and acid dry dwarf shrub heath (see **Technical Appendix 7.1** (**EIAR Volume 4**) and **Figure 7.3.1 – 7.3.16** (**EIAR Volume 2**)).

There are no fences within the Site apart from a small area of inbye land which is used for tupping and lambing at certain times of the year and deer fencing surrounding the Ardveich Planting Scheme. Ewes can graze the open moorland.

As per **Chapter 7: Ecology (EIAR Volume 1)**, important ecological features (IEFs) scoped into the ecological impact assessment comprise blanket bog/wet modified bog; no significant effects are predicted as a result of the Proposed Development.

The Proposed Development could potentially directly impact up to 18.91 hectares (ha) of blanket bog/wet modified bog (9.64 ha of permanent direct loss and 9.27 ha of temporary direct loss) and potentially indirectly affect up to 10.87 ha of blanket bog/wet modified bog using indirect drainage assumptions (see **Chapter 7: Ecology (EIAR Volume 1)**).

This OBEMP proposes measures that provide appropriate compensation and enhancement in cognisance of NatureScot guidance[2] with respect to the predicted effects on blanket bog/wet modified bog habitats, as well as other proposals to provide wider biodiversity enhancement.

The local bird assemblage is described in **Chapter 6: Ornithology (EIAR Volume 1)**. Ornithological species scoped into the assessment comprise black grouse (*Tetrao tetrix*), golden eagle (*Aquila Chrysaetos*), merlin (*Falco Columbarius*), red kite (*Milvus milvus*) and curlew (*Numenius arquata*); no significant residual effects are predicted. Measures contained within this OBEMP will have primary benefits for waders through proposed wetland enhancement measures and wider secondary benefits for the local bird assemblage, through increasing available habitat, habitat quality, and its suitability for nesting and foraging via peatland and grassland restoration proposals.

[2] https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management [Accessed October 2024]

# 3 BIODIVERSITY NET GAIN

BNG is a process which follows the principal of biodiversity enhancement and leaves nature in a better condition than before development work started. No Scotland-specific biodiversity metric is yet in existence, although one is proposed for development by the Scottish Government and NatureScot. However, Scottish & Southern Energy Renewables (SSER) BNG Metric has been used here as it is considered the most appropriate available metric in the Scottish context.

The SSER BNG toolkit[3] for use in Scotland is based upon a version of the Natural England Biodiversity Metric[4] which aims to quantify biodiversity based upon the value of habitats for nature (see **Section 6**). It is a method for demonstrating whether development projects have been able to maintain or increase the biodiversity value of a development site after construction works. The SSER BNG toolkit has been utilised to undertake a preliminary BNG assessment for the Proposed Development and the measures proposed within this OBEMP.

The scope of the BNG assessment is to quantify the overall potential adverse and beneficial biodiversity impacts associated with the Proposed Development; this includes a biodiversity baseline assessment, analysis of habitat losses due to temporary works and permanent structures (e.g., tracks and hardstandings). Analysis of biodiversity gains would be completed following reinstatement of habitats in areas of temporary construction work and additional habitat enhancement and creation (whether onsite and/or offsite).

It is important to note that within the SSER and other BNG metrics, habitats which are negatively impacted and considered as 'irreplaceable' will require bespoke compensation and should be compensated for, following national legislation, policy, and guidelines[5]. However, as per SSER guidance[5], irreplaceable habitats and compensation for them should be included within the biodiversity unit calculations and included within the respective biodiversity toolkit. Inclusion of these areas within the BNG calculations and toolkit is required to provide a complete picture of all habitats present on-site. In line with SSER guidance[5] for the Proposed Development, irreplaceable habitats comprise areas of active blanket bog in good condition. Compensation and enhancement relating to blanket bog habitats on-site is considered in cognisance of NatureScot guidance[2].

The BNG assessment is based upon National Vegetation Classification (NVC) habitat surveys (converted to Phase 1 types for the purposes of the BNG toolkit) undertaken to inform the EIAR (**Technical Appendix 7.1 (EIAR Volume 4)** and **Figure 7.3.1 – 7.3.16 (EIAR Volume 2)**).

[3] https://www.sserenewables.com/sustainability/biodiversity-net-gain/ [Accessed October 2024]
[4] Natural England (2022) The Biodiversity Metric 3.1. Available at: https://nepubprod.appspot.com/publication/5850908674228224 [Accessed October 2024]
[5] https://www.sserenewables.com/media/rj2josma/sser_bng_toolkit_user_guide.pdf [Accessed October 2024]

# 4 BIODIVERSITY ENHANCEMENT AREA

## 4.1 Overview

This OBEMP proposes a BEA covering 497.7 ha, comprising three overarching HMA's (HMA's A – C; see **Figure 7.15 (EIAR Volume 2)**), each generally focussing on a particular habitat or feature type, within which management and monitoring works would be implemented. Habitat and biodiversity management and monitoring works would be undertaken within these respective HMA's. Details of each HMA are provided in **Sections 4.2 - 4.4**.

The overall goal of the BEMP is to restore, enhance and create habitats of ecological value in these HMA's, which in turn will benefit existing flora and fauna and increase overall biodiversity.

This OBEMP includes peatland restoration and enhancement measures. NatureScot guidance[2] suggests that effects on priority peatland habitats should be compensated in the order of 1:10 (lost:restored) with a further 10% restoration of the Site baseline extent of priority peatland habitats, to deliver additional enhancement. As noted in **Section 2**, the Proposed Development could directly impact up to 18.91 ha of blanket bog/wet modified bog and potentially indirectly affect up to 10.87 ha of blanket bog/wet modified bog. Using NatureScot guidance[2] the compensation and enhancement requirements for priority peatland at the Proposed Development would be in the region of 332.26 ha if accounting for the full predicted and potential direct and indirect effects stated[6]. As discussed in **Chapter 7: Ecology (EIAR Volume 1)**, indirect drainage effects are not certain, and if they do occur, are unlikely to be fully realised for various reasons (for example the presence of already drained peatland and extensive haggs and gullies). Consequently, it is considered that the 1:10 ratio should be more appropriately applied to the known direct permanent and temporary losses. In this regard, the compensation and enhancement requirements for priority peatland at the Proposed Development would be in the region of 223.56 ha[7]. Moorland and peatland restoration and enhancement measures below that will be applied to priority peatland habitats cover up to approximately 276.19 ha (N.B. the restoration/enhancement area values stated have excluded the areas of direct land take predicted for permanent and temporary infrastructure within these respective Units). Therefore, for predicted direct losses for permanent and temporary infrastructure, peatland restoration/enhancement proposals at the Proposed Development would be in exceedance of the 1:10 compensation ratio plus 10% enhancement.

The precise objectives and detailed management prescriptions for the finalised management units will depend on the current condition of the habitat and the existing factors acting upon it or contributing to current condition. To further inform the objectives and detail appropriate management prescriptions, further specific surveys and desk-based assessment may be required to develop the final BEMP. These surveys may include, but are not limited to, the following:

[6] i.e., 1:10 ratio: (18.91 ha + 10.87 ha) x 10 = 297.80 ha, plus 10% enhancement on the priority peatland baseline extent within the Site, which is 344.62 ha x 10% = 34.46 ha (344.62 ha being the baseline extent of blanket bog and wet modified bog within the Site – see **Chapter 7: Ecology**, **EIAR Volume 1**)).
[7] i.e., (18.91 ha x 10) + 34.46 ha.

- Joint Nature Conservation Committee (JNCC) Common Standards Monitoring of Upland Habitats[8] or habitat condition assessments utilising the latest Biodiversity Metric[9] condition assessment pro-forma and methodology;
- Hydrology/ecology walkover to identify opportunities and specific locations for drain blocking, erosion feature restoration/reprofiling, bare peat revegetation, and restoration of the peatland water table;
- Herbivore Impact Assessment (HIA); and
- GIS mapping exercise of bare peat, drains/moor grips, and peatland erosion features (e.g., peat haggs and gullies).

## 4.2 HMA A – Peatland Restoration/Enhancement

HMA A is 348.73 ha in area and is split across several sub-units and is comprised of predominantly blanket bog (NVC communities M17 and M19) and wet modified bog (NVC community M20) habitats, collectively covering approximately 268.51 ha (77 %) of the HMA[10]. The remainder of the area generally contains a mix of bare peat, shallow peaty-soil habitats (e.g. wet heath, marshy grassland and flushes) and non-peaty-soil habitats (e.g., dry heath and acid grassland).

As per **Figure 7.15** (**EIAR Volume 2**), the bulk of HMA A is located in the north and west of the Site in the areas around Coire an Daimh and Creag Dhubh. The remainder generally being areas of smaller peatland parcels near Creag Ruadh, Creag Ohhar and Meall Reamhar. HMA overlaps with much of the Class 1 Peatland[11] within the Site (c.f. **Figure 7.2, EIAR Volume 2**).

These areas comprising HMA A have been selected as suitable candidate areas for peatland restoration and enhancement due to the presence of systematic moor grip drains and a high density of peat erosional features such as peat haggs, gullies, bare peat, and peat pans. There are likely historical negative effects from muirburn and grazing impacts, highlighted by the presence of NVC community M20. Further information and details on the composition and character of the peatland communities present and an associated peatland condition assessment are provided within **Technical Appendix 7.1 (EIAR Volume 4).**

Within HMA A, the aim is to restore and enhance the existing and degraded peatland habitat. This aim would likely be fulfilled primarily through a scheme of peat hagg and gully reprofiling, gully blocking, drain blocking, and bare peat revegetation.

Peatlands are important for preventing and mitigating the effects of climate change, preserving biodiversity and minimising flood risk. The improvement of these habitats will also be of benefit to local flora and fauna, including the upland bird assemblage.

[8] https://jncc.gov.uk/our-work/common-standards-monitoring
[9] https://publications.naturalengland.org.uk/publication/6049804846366720
[10] Areas of permanent and temporary infrastructure excluded.
[11] https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/

## 4.3 HMA B – Bracken Control for Grassland Restoration

HMA B covers 116.09 ha of dense and continuous bracken across three areas, i.e., near the Site entrance by Ardveich, north of Creag Mecan, and the slopes south and west of Little Port Hill (as per **Figure 7.15** (**EIAR Volume 2**)). This HMA has been selected based on a combination of field surveys and desk-based studies. Further studies will likely be required when finalising the BEMP, to gain detailed field data for the full bracken understory extent and determine the most appropriate management techniques.

Within HMA B, the aim is for acid grassland restoration through bracken removal and management. There are currently large areas of dense and continuous bracken throughout HMA B (**Figure 7.3, EIAR Volume 2**); dense bracken habitats are of negligible conservation value. The aim will be to remove and control the bracken in order to allow the local acid grassland habitats to naturally regenerate and maintain this throughout the lifetime of the Proposed Development. The control of bracken will extend the amount of grassland present and improve the floral diversity of the area, with increased wildflower cover for insects and pollinators. The replacement of tall dense bracken with open grassland habitats may also create further lekking site opportunities for black grouse that are present locally (**Chapter 6: Ornithology, EIAR Volume 1**)).

## 4.4 HMA C – Wetland Enhancement

HMA C covers 32.85 ha and is comprised of predominantly marsh/marshy grassland (NVC M23), unimproved acid grassland (NVC U5 and U6) and acid/neutral flush (NVC M6) with smaller areas of wet heath (NVC M15) and modified bog (NVC M20) habitats.

Within HMA C, the aim will be to enhance the wetland habitats mosaic which will benefit waders (curlew) that have been recorded most frequently within this area; however, this should also concurrently benefit other upland breeding birds.

Curlew nest in a wide variety of upland vegetation types. They usually select relatively tall vegetation in rough grasslands, moorlands and bogs and generally require a mosaic of grassland and wetland habitats. Several factors have led to the decline in suitable breeding habitat in Scotland, such as agricultural intensification, drainage, over-grazing, commercial forestry etc. However, low intensity farming is important to maintaining the mosaic of grassland and wetland habitats that curlews require. Research has also indicated that high levels of predation on nests by mammals and birds as a likely cause of population declines, with foxes and hooded and carrion crows considered the main threats. Trampling of nests by livestock is also a significant factor in nesting failure. To breed successfully, curlew need sufficient areas of suitable habitat in which to establish territories, conceal their nests where chicks can obtain sufficient invertebrate food to successfully fledge.

Overall, HMA C has been identified as the most suitable area for curlew and general wader habitat management within the Site due the prevailing habitats and in consideration of the results of the baseline ornithological surveys (see **Chapter 6: Ornithology, EIAR Volume 1**). The boundary of HMA C has considered the mosaic of wetland habitats present and maintains a minimum 800 m buffer from any proposed turbines, this buffer distances has been applied to reduce the potential effects of disturbance and displacement from operational turbines.

# 5 AIMS AND MANAGEMENT TECHNIQUES/PRESCRIPTIONS

The aims define the general BEMP goals. The management techniques and prescriptions outline the likely indicative management works to be implemented to achieve these aims. **Annex A** provides an indicative timetable for the implementation of the associated prescriptions.

As discussed in **Section 4.1**, detailed appropriate objectives and prescriptions will be developed post-survey for the final BEMP based on additional survey findings, consultation, and in accordance with best practice. However, the experience gained from providing and delivering plans for similar sites and habitats would suggest that as an outline, the aims, techniques and prescriptions would likely include or be similar to the below.

## 5.1 Aim 1: Restore & enhance peatland habitat and improve bog condition (HMA A)

Site-specific management techniques and prescriptions likely to be appropriate for this HMA include the following:

| | |
|---|---|
| Prescription 1.1 | Peat dam, reprofile, or wave dam/zipper any active drains[12] (even if vegetated) as appropriate for the location specific drain in order that the water level is raised sufficiently and to restore natural flow paths to create conditions suitable for a range of blanket bog species. This should be carried out under the supervision of a suitably qualified Ecological Clerk of Works (ECoW). Methods as detailed within relevant guidance[12, 13, 14]. |
| Prescription 1.2 | Undertake peat hagg and gully restoration and peat surface re-profiling where appropriate with a low-pressure excavator and in line with relevant guidance[12, 14]. |
| Prescription 1.3 | Use of timber dams (for larger drains) and stone dams (in larger gullies) as appropriate to the Site-specific conditions in line with relevant guidance[12]. |
| Prescription 1.4 | Use of surface bunding as appropriate on peat pans (or large wide shallow gullies) in line with relevant guidance[12]. |
| Prescription 1.5 | Undertake stabilisation and revegetation measures on areas of bare peat (for example use of donor turves, textile applications etc[12]). |
| Prescription 1.6 | The following activities would be prohibited within the respective HMA:<br>• clearing out of existing ditches;<br>• supplementary feeding of livestock; |

[12] According to methodology detailed in: Peatland Action (2024) Technical Compendium. Available at: https://www.nature.scot/doc/peatland-action-technical-compendium [Accessed October 2024]

[13] NatureScot (2019). Peatland Action - Guidance for land managers - installing peat and plastic dams. Available at: https://www.nature.scot/doc/peatland-action-guidance-land-managers-installing-peat-and-plastic-dams [Accessed October 2024]

[14] Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman, R. & Brooks, S. (2019). Conserving Bogs: The Management Handbook. (2nd Edition). Available at: https://www.iucn-uk-peatlandprogramme.org/resources/restoration-practice/conservation-handbook [Accessed October 2024]

- application of any insecticides, fungicides or molluscicides;
- application of lime or any other substance to alter the soil acidity;
- cutting or topping of vegetation except to control injurious weed species or to improve the biodiversity of the habitat;
- burning of vegetation or other materials;
- use of roll or chain-harrow;
- planting trees;
- carrying out any earth moving activities;
- use of off-road vehicle activities with the exception of use of low scale agricultural vehicle movements (e.g., quad bike);
- construction of tracks, roads, yards, hardstandings or any new structures (not associated with the Proposed Development); and storage of materials or machinery.

## 5.2 Aim 2: Restore acid grassland habitats (HMA B)

| | |
|---|---|
| Prescription 2.1 | Remove and manage bracken in line with best practice, with ongoing control where this is necessary[15]. |

## 5.3 Aim 3: Enhance the mosaic of curlew breeding and foraging habitat (HMA C)

Suitable and Site-specific appropriate management techniques and monitoring measures for success will be confirmed and detailed in the final BEMP, and may include the following:

| | |
|---|---|
| Prescription 3.1 | No mowing or cutting of vegetation within HMA C. However, if subsequent monitoring indicates there are large areas within HMA C where the sward is considered too tall or dense then some limited cutting or mowing may be undertaken in a random pattern out with the breeding bird season to maintain a mosaic of habitats and diverse sward structure under the instruction of an ecologist. |
| Prescription 3.2 | Dam any active drains or gullies in order that the water level is raised to create patches of wetter habitat with HMA C. |
| Prescription 3.3 | Create a number of 'wader scrapes' at suitable locations within HMA C to attract and increase insect availability for foraging or chick rearing curlew and other waders. Scrapes are shallow depressions with gently sloping edges, which will hold water during spring and early |

[15] Bracken Control - A Guide to Best Practice | NatureScot (webarchive.org.uk) [Accessed October 2024]

summer when waders are nesting and rearing chicks. Each scrape will be positioned in a suitably wet hollow location and will be a minimum of 25 $m^2$ in size. The proposed locations of the scrapes will be provided in the final BEMP, exact locations may be refined on-site by an ecologist at the time of construction depending on local ground conditions and suitability.

# 6 BIODIVERSITY NET GAIN ASSESSMENT

## 6.1 Overview

The SSER biodiversity toolkit[3] was used to quantify the biodiversity value of the Site based upon the habitats present and to demonstrate the project would achieve biodiversity enhancements in line with NPF4 Policy 3 requirements. This includes:

- Quantitative assessment to determine the biodiversity baseline prior to development based on the habitats data collected for the Proposed Development (**Technical Appendix 7.1** (**EIAR Volume 4**) and **Figure 7.3.1 – 7.3.16** (**EIAR Volume 2**);
- Assessing the loss of habitat during construction; and
- Analysis of the biodiversity value following works, with retention and creation/restoration/enhancement of habitats on-site and off-site.

Habitat quality (distinctiveness, condition, strategic significance and connectivity) was determined for each Phase 1 habitat type by reviewing the habitat survey data and surveyor experience, and referring to the following guidance:

- SSER BNG Toolkit User Guide[3];
- Natural England Biodiversity Metric 4.0[16] – User Guide, Technical Supplements, and Habitat Condition Assessment; and
- JNCC Common Standards Monitoring (CSM) criteria[8] (used to aid some habitat condition assessments).

In line with SSER guidance[17], the boundary for the baseline biodiversity assessment equates to the habitats within the Site boundary affected by the Proposed Development (i.e., areas of permanent and temporary land take), including any buffer effects, where appropriate (e.g., indirect drainage effects on relevant wetland habitats), along with any areas identified for biodiversity enhancements (i.e., the proposed OBEMP Units).

## 6.2 BNG Assessment Results

### 6.2.1 Biodiversity Baseline

The biodiversity baseline for the Proposed Development includes 561.54 ha and is based upon the habitat quality scores (distinctiveness, condition, strategic significance and connectivity), the area

[16] https://publications.naturalengland.org.uk/publication/6049804846366720 [Accessed October 2024]
[17] https://www.sserenewables.com/media/vgsdoav3/sser-biodiversity-net-gain-report-nov-2022-final.pdf and SSER BNG representative *Pers. Comm* 05 September 2024.

of the habitats directly and indirectly affected by the Proposed Development[18], the area of OBEMP HMA's A – C, and the resulting number of Biodiversity Units (BU) or Irreplaceable (IRR) habitat units each area and type of habitat contributes. Habitat types of less than 0.01 ha are under the minimum mappable unit (MMU) and were not included in line with SSER metric guidance[3], as they are not large enough to be considered a viable habitat and be effectively managed to increase overall biodiversity.

Using the SSER BNG toolkit, the biodiversity value of the baseline BNG assessment area was calculated to be 7051.85 BU, with zero IRR[19].

### 6.2.2 Biodiversity Change during Construction

During the construction of the Proposed Development, habitats will be lost, either temporarily or permanently, to provide construction compounds, access tracks, and the turbine/hardstandings infrastructure footprints. The majority of habitat, and biodiversity, under the infrastructure footprint areas is therefore lost during works. There may also be some indirect drainage effects on relevant wetland habitats, with a 10 m indirect drainage buffer assumed, as discussed further in **Chapter 7: Ecology (EIAR Volume 1)**. The relevant habitats in this buffer are retained, however in line with SSER BNG guidance for affected habitats, it is assumed that the indirect effects result in a drop in habitat condition category.

The BU that will be removed to accommodate the Proposed Development are summarised in **Table** 6-1. The assessment results, as shown in **Chapter 7: Ecology (EIAR Volume 1)** predict a 16.99 ha loss of habitat for permanent infrastructure. The SSER BNG Metric user guide[3] states that in situations where habitats will be temporarily impacted by any works and will be fully restored to its baseline condition (or improved) within two years can be considered as retained habitat within the toolkit. Therefore, temporary working areas in habitats such as bracken and certain grasslands are considered to fall within this category (here covering approximately 4.40 ha). However, certain habitat types temporarily impacted at the Proposed Development will likely take more than two years to recover to their previous condition and therefore this cannot be considered a 'temporary' loss and must be recorded in the BNG calculation tool as having been permanently lost, before considering recreation or restoration. As such, a further 27.95 ha loss of habitat for temporary working areas in habitats such as marshy grasslands, wet and dry heath, blanket bog, wet modified bog, and flush is predicted, and these have been considered a loss in the BNG toolkit. Potential indirect losses or modifications to certain sensitive wetland habitats cover a further 14.58 ha, with drop in habitat condition and associated BU assumed in the BNG toolkit.

At the end of the construction phase, any temporary working areas will be restored following best practice methods and guidance. It is assumed that in general and where feasible and practicable, reinstated habitats in the temporary works areas will be 'like for like' or improved upon, compared to the baseline habitat and in line with guidance principles.

Overall, this equates to a loss of 619.02 BU during the construction phase.

[18] The predicted and potential habitat losses and modifications associated with Proposed Development for each habitat type are detailed in **Chapter 7: Ecology, EIAR Volume 1.**

[19] No irreplaceable habitats (as per SSER guidance) are predicted to be lost as a result of the Proposed Development. For instance, no ancient woodland impacts are precited, and blanket bog habitats are of no greater than Moderate condition, and as such not considered irreplaceable in the BNG toolkit.

### 6.2.3 Post Development Biodiversity Enhancement

Biodiversity enhancement and an increase in BU would be delivered through the enhancement/restoration and creation of habitat types following the construction of the Proposed Development, as proposed for the habitat types and HMA's A - C as outlined in **Section 4** above and shown in **Figure 7.15** (**EIAR Volume 2**).

The proposals within this OBEMP would result in:

- the restoration and enhancement of 268.51 ha of priority peatland blanket bog and modified bog habitats across HMA A and 2.44 ha in HMA B;
- the removal and control of 116.09 ha of dense bracken across HMA B for acid grassland restoration; and
- 32.85 ha of wetland habitat enhancement for benefits to waders across HMA C.

All of the proposals above will enhance biodiversity at and around the Proposed Development on top of the retained baseline habitats.

The value of these habitats in terms of BU, and the increased BU produced due to the enhancement and creation of habitats is summarised in **Table 6-1**.

### 6.2.4 Summary of Overall Biodiversity Change

**Table 6-1** summarises the change in BU from the baseline, during works (lost and retained habitats and Site reinstatement), and enhancement and creation of habitats following completion of construction and as set out within this OBEMP.

Following construction and Site reinstatement the Proposed Development would result in the loss of 619.02 BU. Following implementation of the BEMP as outlined here, the Proposed Development would result in the creation of 2036.03 BU. The BU created through the OBEMP would fully compensate for the BU lost during construction and then provide significant net biodiversity enhancement over and above the pre-development baseline values of +1417.01 BU (**a net gain of 20%**).

**Table 6-1: Biodiversity Unit Change at each Stage of Development**

| Stage | Biodiversity Units (BU) | BU Gained/Lost from Baseline |
|---|---|---|
| Baseline | 7051.85 | N/A |
| Construction phase and following Site reinstatement of temporary working areas | -6432.83 | -619.02 (-8.78%) |
| Post Development: OBEMP – habitat enhancement/creation | 8468.86 | +1417.01 (+20.09%) |

### 6.2.5 Limitations to the BNG Assessment

The post development biodiversity unit calculations are based on the difficulty to create habitats (delivery risk) and the time (in years) to reach their target condition (temporal risk) which are

based on published guidance[9] and previous project experience, these are generally average values and as such there may be natural variation around the time to reach target condition.

The BNG assessment has been undertaken on the data currently available, the infrastructure layout and proposals for construction of the Proposed Development as set out in **Chapter 2: Development Description (EIAR Volume 1)**, and the biodiversity enhancement proposals outlined within this OBEMP. Should any of these elements change then there may be a change in the BNG calculations for the Proposed Development. Therefore, the BNG toolkit and assessment would be refined/updated and detailed in the final BEMP post-consent/pre-construction, in line with the most up to date proposals for the Proposed Development, consultation feedback, and the final agreed BEA, HMA's and associated proposed enhancement measures.

# 7 MONITORING

Monitoring will establish whether the proposed management prescriptions are achieving the various aims and objectives, and in turn will inform adaptive management to ensure the aims and objectives are achieved through the life of the BEMP.

**Sections 7.1 - 7.3** outline the likely monitoring required for the proposals detailed in **Sections 5.1 - 5.3**, however the detailed monitoring proposals will be provided in the final BEMP to be submitted post-consent/pre-construction when the BEA, HMA's and associated proposed enhancement measures have been finalised. An indicative monitoring timetable is provided in **Annex A**.

## 7.1 Aim 1: Restore & enhance peatland habitat and improve bog condition (HMA A)

The following monitoring measures would be undertaken to evaluate and report on the success of this aim:

- Habitat/vegetation monitoring would evaluate the success of restoration and enhancement of peatland habitats. This would be achieved by recording changes to the structure and composition of the vegetation and species abundance, evenness and diversity, and extent of bare peat.
- A representative sample of permanent quadrats or line transects would be established within the respective HMA to gather sufficient data to inform future management and assess the trajectory of plant species and habitats. The respective monitoring surveys would be carried out at the most appropriate times of year (e.g., flora surveys versus browsing impact surveys). Repeat surveys would be carried out in the same month in each monitoring year (Years 1, 3, 5, 10, 15) to gather comparable data. Photographs would also be taken of each sample quadrat/line transect, as well as overview photographs of the HMA.
- Blanket bog condition assessments utilising i) the latest Biodiversity Metric[9] condition assessment pro-forma and methodology, and/or ii) a CSM[8] blanket bog site condition survey, at representative locations within the HMA.
- Any peat hagg, gully, or surface reprofiling works, and any installed surface bunds, dams or drain blocking, would be monitored (including fixed point photography) to ensure works are successful over the first three years after works are completed. Remedial measures would be undertaken if restoration works have failed.

## 7.2 Aim 2: Restore acid grassland habitats (HMA B)

Monitoring in HMA B would likely include:

- Bracken monitoring, such as walkover surveys and mapping extent and change over time.
- Grassland monitoring through the establishment of a representative sample of permanent quadrats/line transects to record changes to the composition of the vegetation and species abundance, evenness and diversity. The respective monitoring surveys would be carried out at the most appropriate times of year. Repeat surveys would be carried out in the same month in each monitoring year (Years 1, 3, 5, 7, 10, 15) to gather comparable data. Photographs would also be taken of each sample quadrat/transect, as well as overview photographs of the HMA.
- A relevant grassland condition assessment utilising i) the latest Biodiversity Metric[9] condition assessment pro-forma and methodology, and/or ii) a CSM[8] grassland site condition survey, at representative locations within the HMA.

## 7.3 Aim 3: Enhance the mosaic of curlew breeding and foraging habitat (HMA C)

The following monitoring would be undertaken to evaluate the success of this aim:

- The sward height will be monitored across HMA C using a number of transects and measured every 5 m to determine if suitable swards and mosaics exist to fulfil Aim 3. The respective monitoring surveys would be carried out at the most appropriate times of year. Repeat surveys would be carried out in the same month in each monitoring year (Years 1, 3, 5, 7, 10, 15) to gather comparable data. Notes on general observations would also be made of the sward, habitat mosaic and any large areas of tall dense vegetation (such as rushes) would also be mapped.
- Breeding Bird Survey (BBS) monitoring at the Site to record and assess changes in wader activity levels by recording numbers and distribution of breeding waders. However, all birds observed will be recorded, including ground nesting passerines, to determine whether the management for waders is also having a positive effect on all locally present ground nesting birds and the wider species assemblage. BBS will follow standard methods and guidance for upland breeding waders (Brown & Shepherd, 1993[20]), commonly adapted to include passerines (Bibby *et al*., 2000[21]). The BBS will include four survey visits between mid-April and July as per Calladine *et al*., (2009)[22] and SNH (2017)[23]. BBS surveys as detailed will be carried out in operational years 1, 2, 3, 5, 7, 10 and 15. The frequency of monitoring thereafter will be agreed with the Local Planning Authority (LPA) and NatureScot. The survey area will cover HMA C and a 500 m buffer. Any raptor activity will also be recorded.

[20] Brown, A.F. & Shepherd, K.B. (1993). *A Method for Censusing Upland Breeding Waders*. Bird Study, 40, 189-195.
21 Bibby, C.J. Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000). *Bird Census Techniques*. 2nd Edition. Academic Press, London.
[22] Calladine, J., Garner, G., Wernham, C. & Thiel, A. (2009). The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study*, 56, 381-388.
[23] SNH. (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. SNH, Battleby.

# 8 REPORTING & BEMP REVIEW

A report would be submitted by the wind farm owner to the LPA in Years 1, 3 and 5 of operation, the frequency of reporting after Year 5 would be agreed with the LPA. This report will detail:

- Management undertaken in previous year(s);
- Monitoring undertaken, results and discussion of results; and
- Management and monitoring proposed for the following year(s).

Where monitoring indicates any management objectives are not met, further management prescriptions or interventions would be agreed by the Applicant, LPA and NatureScot.

The requirement for the measures, monitoring and reporting following Year 15 of the operational phase would be dependent on the results of the monitoring which would be discussed and agreed within the Year 15 review report and agreed in writing with the LPA/NatureScot.

The purpose of the review will be to assess the effectiveness of the proposed management prescriptions at achieving the aims and objectives of the BEMP. If necessary, such measures may be amended by the Applicant, LPA and NatureScot.

# ANNEX A. MANAGEMENT AND MONITORING TIMETABLE

## Table A-1 Indicative Management and Monitoring Timetable

| Year | 0* | 1** | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Work Item** | **Year of Implementation** | | | | | | | | | | | | | | | |
| **Management Prescriptions** | | | | | | | | | | | | | | | | |
| Peat hagg/gully reprofiling, drain and gully blocking, surface bunding and bare peat stabilisation/revegetation (HMA A) | ✓ | ✓ | | | | | | | | | | | | | | |
| Bracken control & management for grassland restoration (HMA B) | | ✓ | ✓ | ✓ | Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring | | | | | | | | | | | |
| Drain damming/blocking (HMA C) | ✓ | ✓ | | | | | | | | | | | | | | |
| Creation of wader scrapes (HMA C) | ✓ | ✓ | | | | | | | | | | | | | | |
| Excluded activities as per Prescription 1.6 (HMA A & C) | | Throughout lifetime of BEMP | | | | | | | | | | | | | | |
| **Monitoring** | | | | | | | | | | | | | | | | |
| Inspection of peatland restoration areas and integrity/success of hagg/gully reprofiling, drain and gully blocking, surface bunding and bare peat stabilisation/revegetation (HMA A) | | ✓ | ✓ | ✓ | | | | | | | | | | | | |
| Fixed photography monitoring and target notes (all HMA) | | ✓ | ✓ | ✓ | | | | | | | | | | | | |
| Vegetation monitoring and bog condition assessments (HMA A) | | ✓ | | ✓ | | ✓ | | | | | ✓ | | | | | ✓ |
| Vegetation monitoring and grassland condition assessments (HMA B) | | ✓ | | ✓ | | ✓ | | ✓ | | | ✓ | | | | | ✓ |
| Bracken extent mapping/monitoring (HMA B) | | ✓ | | ✓ | | ✓ | Throughout lifetime of BEMP, as necessary and informed by BEMP monitoring | | | | | | | | | |
| Sward and wader scrape monitoring (HMA C) | | ✓ | | ✓ | | ✓ | | ✓ | | | ✓ | | | | | ✓ |
| Breeding Bird Survey (HMAC + 500 m buffer) | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | | | | | ✓ |
| **Reporting / Reviews** | | | | | | | | | | | | | | | | |
| BEMP Report | | ✓ | | ✓ | | ✓ | Reporting schedule after Year 5 to be agreed with LPA | | | | | | | | | |
| BMG 5-year review of BEMP | | | | | | ✓ | | | | | ✓ | | | | | ✓ |

* Construction Phase

**First year after final commissioning of the Proposed Development / Operational Year 1.