Orkney's Community Wind Farm Project-Hoy

Outline Habitat Management Plan

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Contents

1. Introduction

1.1 Background

This Outline Habitat Management Plan (HMP) sets out the key principles for the use of peat excavated for the proposed Orkney Community Wind Farm Project - Hoy site and taken to an off-site location for use in peatland habitat restoration.

1.1.1 Habitat loss

The wind farm development is proposed for an area of peatland within the non-statutory Hoy and North Walls SSSI Moorland Fringes Local Nature Conservation Site (LNCS). As described in Chapter 8: Ecology of the Environmental Impact Assessment (EIA) Report, the permanent habitat loss to the Proposed Development is 4.58 ha, of which 3.37 ha comprises wet heath/modified bog and 1.14 ha comprises blanket mire. Although an additional 3.06 ha of wet heath/modified bog and 0.48 ha of blanket bog will be temporarily lost or disturbed during the construction process, these will be restored subsequently. There is an additional potential for drying of peatland habitats from site drainage; as a worst case scenario these impacts may affect 13.34 ha of wet heath/modified bog and 4.21 ha of blanket bog, although effects are very unlikely to result in loss of habitat on this scale, because drainage effects will be localised, e.g. depending on topography, with some areas experiencing no significant change or even wetter conditions. None of the impacts listed above will affect high-quality examples of very wet blanket bog and wet heath. Nevertheless, for the purposes of this Outline HMP, it is considered that restoration is needed to compensate for the total direct loss of 4.51 ha of wet heath and bog habitats, as well as 17.55 ha of habitat subjected to drying impacts. Both on-site and off-site management is proposed to compensate for the losses.

Over 20% of Scotland's land area is covered by peatlands, and Scotland hosts a significant proportion of the European and world resource (SNH, 2015). Peatlands have particular significance as long-term carbon stores, important to tackling climate change, and as habitats for a range of specialised fauna and flora, as well as the raw ingredient of rural farming, tourism and crofting. Other benefits from peatlands in good condition include provision of clean water and reduced flood risk.

Large areas of peatlands have been lost or damaged: Recent estimates assess that 70% of the Scottish blanket bog and 90% of the raised bog resources have been damaged to some degree (SNH, 2015). Drying and physical damage to peat can result in the release of greenhouse gases, reduce water quality and diminish a range of other services.

The significance of peatlands is evident in their protection by various legislation, policy and local, national or international conservation initiatives, notably including the following:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive');
- Directive 2000/60/EC of the European Parliament and of the Council Establishing a Framework for the Community Action in the Field of Water Policy (the 'Water Framework Directive');
- Scotland's National Peatland Plan (SNH, 2015);
- Climate Change Plan (2018-2032) (Scottish Government, 2018); and
- The Scottish Biodiversity List (Scottish Government, 2013) (a tool to help public bodies carry out their Biodiversity Duty).

1.1.2 Peat excavation and re-use on-site

In Scotland, peat is defined as an organic soil which contains more than 60% of organic matter and exceeds 50 centimetres in thickness (Macaulay Institute for Soil Research, 1984; Bruneau and Johnson, 2014). The structure of an active peatland typically comprises an upper aerobic layer of peat, denoted the acrotelm, consisting of living and partially decayed plant material, overlying a usually thicker layer of well decayed and humified peat, denoted the catotelm (Bruneau and Johnson, 2014). The acrotelm typically has a higher

hydraulic conductivity than the underlying peat and is usually defined with relation to the water table. The catotelm is denser, with a very low hydraulic conductivity; conditions are anaerobic and anoxic because the catotelm is permanently below the water table. The catotelm is weaker and of lower tensile strength than the acrotelm. Below the peat forming layers is the basal substrate; either a mineral soil, mineral superficial deposit or bedrock.

Scottish Environment Protection Agency (SEPA) has a statutory and legislative duty to ensure that peat spoil generated during construction is stored, re-used, treated or disposed of correctly (which may require authorisation or permits). SEPA's policy on the management of peat spoil is set out in SEPA (2010) and SEPA (2017). These outline a hierarchy in which the best management option is to minimise the volumes of peat generated by construction in order to preserve the various ecosystem services associated with peatlands, and to reduce potential carbon losses associated with construction. The key guiding principle is only to re-use peat where it is suitable for the identified and required use. Careful handling is essential to retain the structure and integrity of the excavated materials and thereby maximise the potential for excavated material to be re-used.

In accordance with the SEPA hierarchy, peat excavation for the Proposed Development has been kept as low as possible through design mitigation. As described in EIA Report Appendix 11.2: Outline Peat Management Plan, it is estimated that 36,639 m^3 of acrotelmic peat and 29,472 m^3 of catotelmic peat will be excavated for the Proposed Development, respectively. Of these volumes, it is estimated that 19,053 m^3 of acrotelmic peat and 17,884m^3 of catotelmic peat will be re-used within the site as batters or verges around infrastructure and for borrow pit restoration. Therefore, an estimated 17,586 m^3 of acrotelmic peat and 11,588 m^3 of catotelmic peat cannot be re-used. However, as described in Appendix 11.2, 7650 m^3 of acrotelmic peat and 8743 m^3 of catotelmic peat will be available for on-site restoration. The remaining peat will be available for off-site peatland restoration. Both the on-site and off-site restoration proposals will be delivered through implementation of the present HMP.

1.2 HMP Implementation

1.2.1 Roles and Responsibilities

The Applicant will be responsible for meeting the commitments made in the HMP. At this stage it is envisaged that these activities will be managed by contractors employed by the Applicant of the Proposed Development.

It is anticipated that the implementation of the final HMP will be a condition of the planning consent for the Proposed Development. Following consent, the (detailed) HMP will be agreed with Orkney Islands Council (OIC) natural heritage team in consultation with appropriate stakeholders, notably Scottish Natural Heritage (SNH) and Scottish Environment Protection Agency (SEPA), and it is envisaged that together with the Applicant these organisations will form the HMP Steering Group.

1.2.2 Review and Monitoring

This Outline HMP has been based on the guidance given by SNH in their publication: Planning for development: what to consider and include in Habitat Management Plans (SNH, 2016). This guidance states that the HMP should "*incorporate flexibility and be subject to periodic review. This will ensure that works/actions can be altered in response to monitoring results over time, evolving guidance or unexpected events. Any alterations would be subject to approval of the HMP steering group*."

Monitoring is the process undertaken to measure and evaluate the effects of the management, and the results are used to inform future management decisions (Elzinga *et al.,* 2001). In other words, relevant, appropriately timed monitoring is important to enable the success of the HMP tasks to be determined and to identify opportunities for further development of habitat management tasks.

Monitoring objectives are outlined for each conservation feature in the sections below. Each monitoring objective will be 'SMART' (acronym explained below) and cost effective:

- S – Specifically address the feature;

- M – Measurable, i.e. quantified (for example, in terms of definitive numbers of individuals or proportionate growth of a population);
- A – Achievable;
- R – Relevant, and in compliance with, the overarching HMP aims (which encompass legal, policy and best practice requirements); and
- T – Time-based to ensure that success rates or alternatively remedial actions can be ascertained.

Monitoring results will be reported to the HMP Steering Group. Reporting of monitoring results and the review of management prescriptions will be undertaken by suitably qualified and experienced ecologists. The HMP Steering Group will be responsible for reviewing the results of the monitoring and agreeing amended management prescriptions if necessary.

1.3 Duration

The HMP runs from the first commissioning of the Proposed Development. The HMP will be reviewed by the HMP Steering Group on an approximately 5-year cycle until Year 15, after which the need for further monitoring will be reviewed.

2. Peatland Restoration

2.1 Aims and Objectives

The broad aims and objectives are as follows:

- Management and restoration of degraded blanket mire habitat on Hoy, both within the site and out with the application boundary of the Proposed Development site, through use of excavated peat and control of grazing and peat cutting.

2.2 Target Areas

Using a model developed by Strath Caulaidh Ltd on behalf of ScottishPower Renewables (as cited in ScottishPower Renewables, 2015), by assessing the current condition of the peatland habitats within candidate areas it is possible to quantify the degree of improvement which could be made to these areas through restoration. Table 1 defines the criteria used to assess current habitat condition for blanket bog.

Table 1 Criteria used to assess condition of existing blanket bog habitats (based on Table 1 in ScottishPower Renewables, 2015)

Aspect of condition	Relative Condition Class				
	Class 1 Excellent	Class 2 Good	Class 3 Acceptable	Class 4 Poor	Class 5 Very Poor
Distribution of bog vegetation	Complete cover	Cover +/- complete	Widespread	Localised	Generally absent
Distribution of active mire	All active	Generally active	Locally active	Generally inactive	Inactive
Proportion of water table above main peat mass for majority of year	100%	70-99%	40-69%	10-39%	<10%

Natural *Sphagnum* micro-topography	Widespread	Regularly found	Localised signs	Rare or relict forms	Completely absent
Expected *Sphagnum* cover	60-90%	20-70%	10-30%	5-15%	0-5%
Proportion of habitat in target condition	100%	75%	50%	25%	0%

Suitable candidate areas occur both within the site and in close proximity, and these are shown in Figures 1 and 2, respectively. The on-site candidate areas are insufficient to accommodate all the excavated peat, which cannot be re-used; however, they are considered because their use will minimise the handling of peat and reduce the amount of peat taken off site.

2.2.1 Candidate areas within the site

The candidate areas within the site are shown on Figure 1. They occur as two clusters of cutover peat areas around grid references ND 28665 94370 (On-site HMP Area A, immediately to the east of the proposed Turbine 6 location) and ND 28921 94275 (On-site HMP Area B), respectively. A third area, On-site HMP Area C, which is located in the north of the site at ND 29149 94754, is not peatland, but an area of mineral soil earthworks that were formerly part of the infrastructure required to construct the Former Naval Headquarters and Communications Centre on site. All three areas occur on shallow (<6°) slopes.

The areas are typically cutover, elongated peatland 'cells' where the remaining peat comprises two or three relatively straight faces of up to c.1.5m in height, with the vegetation above the edge being subject to drying impacts. In some places, only a single cut face remains. The 'floor' of each cutover area typically retains a shallow layer of peat with exposed stones being locally present. The substrate shows varying degrees of vegetative recovery, with common cottongrass (*Eriophorum angustifolium*) dominating the youngest stands. Plate 1 shows an example of this from a cell in On-site HMP Area A.

Plate 1 Cutover cell within On-site HMP Area A

Where cutover cells have been left for a longer time, heather (*Calluna vulgaris*) has gained dominance (e.g. Plate 2), and this is typical of the cutover cells in On-site HMP Area B. However, the vegetation remains poor in species and is best characterised as modified bog of limited value.

Plate 2 Cutover cell with heather in the cutover area

Cutover areas in between the remaining 'banks' in On-site HMP Areas A and B are suitable peat receptor areas, where restoration of the peat profile will lead to re-wetting of the wider hydrological unit.

On-site HMP Area C is located within an engineered feature and comprises bare mineral soil with scattered grasses. It occurs northeast of a mineral mound (see Plate 3) and adjacent to intact peatland to the north and east.

Plate 3 Disturbed mineral soil in On-site HMP Area C

By applying the criteria in Table 1 to the habitat within the candidate HMP area, it is possible to quantify the net benefit which can be achieved through restoration of blanket bog. For example, if 10,000 m^2 of Class 2 blanket bog is present (which is defined as having 75% of the 10,000 m^2 habitat in target condition, i.e. 7,500 m^2), the benefit of restoring the area would potentially amount to 2,500 m^2.

The results of the calculations for habitats within the three on-site HMP areas is shown in Table 2.

Table 2 Quantification of the net benefit from restoration of blanket bog within the on-site HMP areas

Area	Relative Condition Class					Total (m^2)
	Class 1	Class 2	Class 3	Class 4	Class 5	
On-site HMP Area A						
Approximate split across classes	0%	10%	25%	55%	10%	**100%**
Existing cover per class (m^2)	0.00	625.90	1,564.75	3,442.45	625.90	**6,259.00**
Existing cover in target condition (m^2)	0.00	469.42	782.38	860.61	0.00	**2,112.41**
Restoration benefit (m^2)	0.00	156.48	782.38	2,581.84	625.90	**4,146.59**
On-site HMP Area B						
Approximate split across classes	0%	10%	40%	40%	10%	**100%**
Existing cover per class (m^2)	0.00	590.90	2,363.60	2,363.60	590.90	**5,909.00**

Area	Relative Condition Class					Total (m^2)
	Class 1	Class 2	Class 3	Class 4	Class 5	
Existing cover in target condition (m^2)	0.00	443.17	1,181.80	590.90	0.00	**2,215.87**
Restoration benefit (m^2)	0.00	147.73	1,181.80	1,772.70	590.90	**3,693.13**
On-site HMP Area C						
Approximate split across classes	0%	0%	0%	0%	100%	**100%**
Existing cover per class (m^2)	0.00	0.00	0.00	0.00	2,404.00	**2,404.00**
Existing cover in target condition (m^2)	0.00	0.00	0.00	0.00	0.00	**0.00**
Restoration benefit (m^2)	0.00	0.00	0.00	0.00	2,404.00	**2,404.00**
Total for all onsite HMP areas						
Restoration benefit (m^2)	0.00	304.20	1,964.18	4,354.54	3,620.80	**10,243.71**

Table 3 details the volumes of peat which can be accommodated within the three on-site HMP areas. These volumes are based on areas with mature vegetation being avoided and that a maximum of 0.7 m of catotelmic peat will be placed into the areas, because of its likely high water content and low strength.

Table 3 Quantification of peat receptor capacities

Area	Available for Peat Placement (m^2)	Catotelmic Peat (to Max. 0.7 m) (m^3)	Acrotelmic Peat (0.7 m to 1.5 m) (m^3)
On-site HMP Area A	75% of 6,259	3,286	3,755
On-site HMP Area B	75% of 5,909	3,102	3,545
On-site HMP Area C	75% of 2,404 (conservative)	1,262	1,442
Total	**10,929**	**7,650**	**8,743**

2.2.2 Candidate areas off site

The off-site candidate area comprises cutover peatland southeast of Binga Fea, at National Grid Reference ND 28959 92054. It is accessed via a track from the B9047 between Heldale and North Ness. This area has shallow (<6°) slopes.

Peat cutting has in many places resulted in the complete removal of the peat body above the mineral substrate, typically within elongated cells, where the remaining peat comprising relatively straight faces of c.1.5 m in height, with the vegetation above being subject to drying impacts. Plate 4 shows an example of a target area.

Plate 4 Cutover cell within the HMP area with peat removed to the mineral substrate

Elsewhere within the HMP area, degradation is on a smaller scale or happened a longer time ago and the vegetation has therefore partly recovered. The cut faces may have collapsed, with the vegetated upper layer (effectively the acrotelm) having been undercut by erosion and sunk to a gentler slope. In some such areas the peat may not always have been removed to the mineral substrate. Generally speaking, the degree of degradation decreases with the distance from the track. Plate 5 illustrates an example of this.

Plate 5 Partly revegetated cutover cell within the HMP area with collapsed, remaining faces

Areas in between vegetated peat that lack a diverse and mature cover of peatland species can be suitable peat receptor areas, where restoration of the peat profile will lead to re-wetting of the wider hydrological

unit. Cutover cells have the added benefit that the remaining peat faces will keep deposited peat in place, thereby reducing the risk of wash out.

Although peat deposition is not appropriate for areas of mature peatland vegetation, such areas may also benefit from management, both by the improved hydrological conditions where the areas are in close proximity to peat receptor areas that will increase the cover of wet mire species, such as *Sphagnum* mosses, and through control of peat cutting and livestock grazing, which may otherwise degrade the peatland in the future.

By applying the criteria in Table 1 to the blanket bog habitat within the candidate HMP area, it is possible to quantify the net benefit which can be achieved through restoration. The results of the calculations for habitats within the candidate HMP area is shown in Table 4.

Table 4 Quantification of the net benefit from the restoration of blanket bog within the off-site HMP area

Area	Relative Condition Class					Total (m^2)
	Class 1	Class 2	Class 3	Class 4	Class 5	
Off-site HMP Area						
Approximate split across classes	0%	12.5%	25%	38%	25%	**100%**
Existing cover per class (m^2)	0.00	50,027.50	10,0055.00	150,082.50	100,055.00	**400,220.00**
Existing cover in target condition (m^2)	0.00	37,520.62	50,027.50	37,520.62	0.00	**125,068.75**
Restoration benefit (m^2)	0.00	12,506.88	50,027.50	112,561.88	100,055.00	**275,151.25**

Table 5 details the volumes of peat which can be accommodated within the off-site HMP area. The volumes are based on areas with mature vegetation being avoided and that a maximum of 0.7 m of catotelmic peat will be placed into the areas.

Table 5 Quantification of peat receptor capacities

Area	Available for Peat Placement (m^2)	Catotelmic Peat (to Max. 0.7 m) (m^3)	Acrotelmic Peat (0.7 m to 1.5 m) (m^3)
Off-site HMP Area	30% of 400,220	84,046	96,053

Avoiding areas with mature vegetation, the off-site restoration areas can accommodate a substantial amount of peat. However, it is understood that a maximum of 20,000 m^3 of peat could be moved to the off-site area.

Landowner agreement has been reached for restoration management within this area.

2.3 Objectives

The long-term aspiration (>5 years) is to restore the blanket mire habitat to a high quality, including a relatively diverse plant assemblage in which *Sphagnum* mosses are abundant. The precise species structure which would be expected is difficult to define, and variation is anticipated and accepted. Blanket mire habitat

is therefore defined as all terrestrial habitats within the target areas that have a peat substrate. No attempt will be made to define the habitat from the depth of the peat substrate, because of the history of peat cutting.

A number of indicators have been used to formulate objectives which reflect different aspects of blanket bog quality over time. These will be compared against suitable reference areas, where possible, to allow the quality of the restored blanket mire to be assessed in context. The objectives are stated in Table 6.

Table 6 Objectives for blanket bog management

Feature	Objective	Definition
Sphagnum and peat	3.1	At least one species of *Sphagnum* is present in the sample plot
	3.2	*Sphagnum papillosum* is present in the sample plot
	3.3	*Sphagnum* spp. account for at least 30% of basal cover in the sample plot
	3.4	Visible trampling or uprooting impacts of large grazing mammals on *Sphagnum* is absent in the sample plot
	3.5	Bare peat arising from trampling or from disturbance by machinery comprises <1% of 'basal' cover in the sample plot
Higher plants	3.6	Cotton-grasses are present in the sample plot
	3.7	Heather is present in the sample plot
	3.8	Heather with at least 10cm average canopy height and with <20% of leading shoots browsed by sheep on average, is present in the sample plot
	3.9	'True grasses' foliar cover should be less than 5% in the sample plot
	3.10	The combined cover of heather, cotton-grasses and deergrass should account for no more than 75% of foliar cover in the sample plot

2.4 Management Methodology

2.4.1 Background

A considerable body of evidence is accumulating on the types of peatland restoration techniques and their efficacy. A compendium of UK case studies has been published by the International Union for the Conservation of Nature (IUCN) and is provided in Cris *et al*. (2011). Measures developed by the Yorkshire Peat Partnership (YPP) are widely used in peatland restoration schemes, albeit mainly on the UK mainland, and may be relevant to Orkney. The final HMP will be is based on information drawn from the above, from other projects on Orkney and from engagement with the HMP Steering Group. However, the methods are likely to include some or all of the methods described below, or variations of these.

2.4.2 Peat excavation and re-instatement (on-site and off-site HMP areas)

The Proposed Development site contains significant areas of blanket mire. Apart from the permanent and temporary land takes, the blanket mire will be safeguarded during the operational life of the Proposed Development, with maintenance of the hydrology of the peatland being key to maintaining the structure and quality of the vegetation.

Acrotelmic and catotelmic peat excavated during construction of the Proposed Development will be used for restoration of the cutover peatlands (the 'HMP receptor areas') within the areas shown on Figures 1 and

2. The cutover areas comprise excavations surrounded by peatland that can be built up using excavated peat to achieve a topography, which mirrors the adjacent uncut peat, and which will therefore tie into the hydrology of the wider peatland unit. This is predicted to result in active peat formation within the restored areas.

Excavated acrotelmic and catotelmic peat will be handled separately and either stored temporarily in separate areas or being moved directly to and reinstated in the HMP receptor areas. The following principles will be followed:

- Areas of peat within the footprint of any excavation will have the top layer of vegetation stripped off as turf prior to construction by an experienced specialist contractor. When excavating areas of peat, excavated turfs will be as intact as possible, which will typically be achieved by removing large turves up to 500mm deep.
- Excavated soils and turves will be handled so as to avoid cross contamination between distinct horizons and ensure reuse potential is maximised. Unless being moved to the receptor areas upon excavation, excavated peat will be stored in separate horizons.
- Completely restoring the peatland topography of the on-site HMP receptor areas will be prioritised over those of the off-site location. Reinstatement will be done to a detailed plan, which will divide HMP receptor areas into smaller units.
- Volumes of excavated peat available for restoration of the peatland topography of the off-site HMP receptor areas are unlikely to be sufficient to restore the topography of the entire off-site HMP area; edge locations will therefore be prioritised that are adjacent to intact peatland. Reinstatement will be done to a detailed plan, which will divide HMP receptor areas into smaller units.
- If temporarily stored, turves will be stored adjacent to the construction area in a way that ensures they remain moist and viable. Turves will be stored vegetation side up.
- Peat will be reinstated as soon as practicable following excavation.
- Peat will be kept damp. The moisture content of stored/stockpiled peat will be monitored monthly and if it falls below 25% of that in surrounding, intact peat then it will be watered.
- The amount of time any bare peat will be exposed will be minimised to preserve its integrity.
- The phasing of work will be carried out to minimise the total amount of exposed ground at any one time. By stripping turves and replacing as soon as possible after peat has been re-distributed there will be minimal areas of bare peat.
- The height of the restored surface will match that of the adjacent peat.
- Any peat areas on steep ground or that remains partially bare will be covered using geotextile or a similar method to stop erosion.
- Any areas of bare peat, where vegetation is not re-growing, will be seeded with a seed mixture obtained from the existing habitat or commercial seeds of Orcadian genetic provenance.
- Low ground pressure diggers will be used for both excavation and reinstatement of the peat to minimise the risk of peat compression and damage to vegetation.

2.4.3 Hag reprofiling (off-site HMP areas)

Yorkshire Peat Partnership (YPP) (no date) describes hags as the exposed edges of a peat block that continue to erode away due to the combined effects of freeze-thaw action, cantilever collapse of large blocks followed by desiccating wind erosion during drier periods. These factors are relevant to Orkney too, although the relative severity of wind desiccation may be more extreme than on the UK mainland. Actively eroding and exposed hags are hostile environments for plants and need to be stabilised before any vegetation can be re-established.

The YPP guidance states the aim should be to achieve a hag or gully edge that has no more than about a 33–35° stable slope and which is well vegetated. To achieve this a 1-2 m length of vegetation on the top of the hag can be 'rolled' back or undermined (to a depth that retains the root structure of the vegetation) far enough to enable the underlying peat to be cut and moved to the foot of the hag to create a stable 33° sloping bank. The vegetation is then rolled back and compacted to cover the newly profiled slope. This method is suitable for peat faces which cannot be restored with peat excavated for the Proposed Development.

Where the vegetation does not completely cover the newly re-profiled slope and natural re-vegetation is considered unlikely further treatment of the bare peat will be required. This can be a geo-textile spread across the peat, as recommended by YPP. The material is staked in and can then be seeded with blanket bog species.

2.4.4 Control of livestock grazing (on-site and off-site HMP areas)

Livestock will be excluded during the establishment phase and controlled during operation of the wind farm.

Sheep grazing of blanket bog at low to moderate levels can be beneficial and help maintain and enhance vegetation diversity and productivity. However, high levels of grazing intensity can be damaging to blanket bog habitat, leading to severe vegetation degradation and extensive peat erosion. Managing appropriate grazing levels is therefore a crucial element to achieving the objectives for blanket bog. Because of natural variability in the productivity of grazing land, it is not possible to define exact figures for the stocking density, which should be adjusted according to the condition of the vegetation and substrate rather than to a rigid figure. However, as an approximate guideline, stock figures should not exceed 0.4 sheep per hectare during the summer months (IUCN, 2014).

Monitoring will be carried out (see below) to determine if the grazing levels are appropriate and/or if additional management intervention is required, where and when.

2.4.5 Control of peat cutting (on-site and off-site HMP areas)

There will be no peat cutting within the HMP areas during operation of the wind farm.

2.4.6 Control of muirburn (on-site and off-site HMP areas)

There will be no muirburn within the HMP areas during operation of the wind farm.

2.5 Monitoring

Monitoring will be carried out in years 1, 2, 3 and 5 post peat reinstatement after which the requirement for further monitoring will be reviewed. Monitoring will be the same for the on-site and off-site HMP areas. Although the exact monitoring regime will be defined once management techniques have been finalised, and in agreement with the HMP Steering Group, it will be designed to specifically allow robust assessment of whether the objectives stated in Table 4 are being met or whether a change in management is required, e.g. to:

- Flatten the re-instated surfaces to reduce the degree to which local surface drawdown in the summer leads to local oxidative wastage of placed peat;
- Compact the peat in places where there is a high degree of void spaces, if evident;
- Stabilise any erosion areas with geotextiles;
- Control undesirable species, e.g. tall rushes;
- Seed with peatland species;
- Change grazing regime; and
- Temporarily fence off areas to prevent grazing and poaching.

The implementation of such additional treatments and their timing would be subject to ongoing discussions between the Contractor and the HMP Steering Group.

2.5.1 Dipwell monitoring

A minimum of two dipwells will be installed within both the on-site and off-site HMP receptor areas, and each dipwell will have a control in adjacent intact peatland. These will monitor the water table level over time.

2.5.2 Vegetation monitoring

Vegetation monitoring will consist of simple assessments to note vegetation recovery and the cover of *Sphagnum* mosses and other peatland species, within a minimum of three permanent plots within both the on-site and off-site HMP receptor areas, with each plot have a control in adjacent intact peatland.

2.6 Conclusion

By applying the principles outlined in the present document, it will be possible to achieve a restoration benefit from the restoration of 10,244 m^2 blanket bog within the site boundary and 275,151 m^2 in an off-site location. This corresponds to a total benefit of 28.5 ha, which outweighs the conservative assessment of 22.06 ha being lost or significantly altered because of the Proposed Development, representing a direct loss of 4.51 ha of wet heath and bog habitats, as well as 17.55 ha of wet heath and bog habitats being subjected to drying impacts.

2.7 References

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Figures

Figure 1: On-site Restoration Areas

N

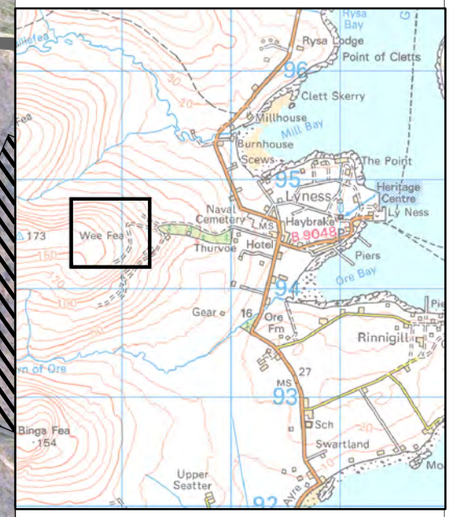
On-site HMP Area C = 2404m2

On-site HMP Area A = 6259m2

On-site HMP Area B = 5909m2

KEY

- Site Boundary
- Turbine
- Burrow Pit Search Area
- Temporary Hardstanding
- Substation Building
- Permanent Hardstanding
- Substation Compound
- Construction Compound
- Proposed Onsite Restoration Area



0 0.045 0.09 km

Scale 1:2,250 @ A3

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Figure 1

On-Site Restoration Areas

Date:	Drawn by:	Checked by:	Version:
15/06/2020	AG	MF	V1

Project Number: EDI 1675

Figure 2: Off-site Restoration Area

N

HMP Area = 400220m2

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

KEY

Site Boundary

Proposed Off-Site Restoration Area

0 0.1 0.2 km

Scale 1:5,000 @ A3

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Figure 2

Off-Site Restoration Areas

Date:	Drawn by:	Checked by:	Version:
15/06/2020	AG	MF	V1

Project Number: EDI. 1675

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