

PEAT MANAGEMENT PLAN

11-7

Appendix 11-7 Strathy Wood Wind Farm

Draft Peat Management Plan

E.ON

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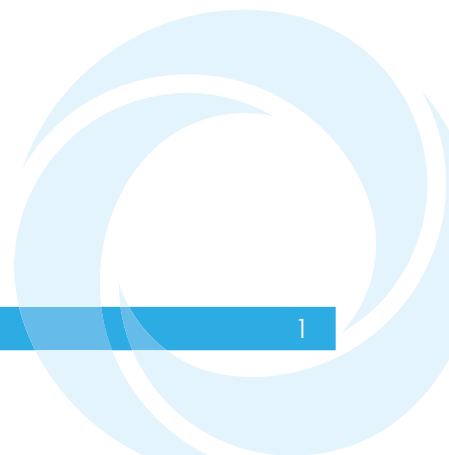
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1 Background

This report is a working document which details the location, quantities and type of peat materials that will be excavated, stored and reinstated during the construction, operation and decommissioning phases of the proposed wind farm development and follows the good practice guidance published by SEPA and Scottish Renewables in 2012.

Excavated peat associated with developments on peatland is not classed as waste provided it is suitable (from an engineering as well as environmental perspective) for a required and predetermined end use as part of construction works and reinstatement on a site. The overall aim is to minimise the impacts associated with excavation of peat by using the following hierarchy of design principles: prevent excavation; reduce volumes of peat excavated; and reuse excavated peat in a manner to which it is suited. The following tasks help to achieve this aim to re-use any peat excavated on the proposed development:

- Estimate the likely volume and properties of peat to be extracted based upon peat depth survey data and the proposed development site design.
- Estimate the volumes and properties of peat which will be re-used and an overall net balance for excavated versus re-used peat.
- Refining proposed development site design to minimise the volume of peat requiring to be excavated.
- Ensuring that this report is consistent with and is cross-referenced to the carbon payback calculation (Appendix 5-1) and peat stability assessment (Appendix 11-5).
- Prepare a working document that can be used during the design, construction, operation, decommissioning and restoration of the proposed development by an Ecological Clerk of Works (ECoW) to record actual peat volumes and peat properties extracted and re-used.



2 Role of the Peat Management Plan

The draft Peat Management Plan (PMP) is intended to be a working document throughout the key stages of the design, construction, operation, decommissioning and re-instatement of a site proposed for development as set out below.

2.1.1 Stage 1: Environmental Impact Assessment

During the early design of the proposed development and as part of the iterative process of consideration of environmental impacts the PMP endeavours to show how, through site investigation and iterative design so far as reasonably practicable to minimise the quantity of peat which will be excavated. The volumes of peat anticipated to be excavated by the proposed development have been considered as well as how excavated peat will be managed. The overall aim is to minimise the impacts associated with the excavation of peat by using the following hierarchy of design principles: prevent excavation; reduce volumes of peat excavated; and reuse excavated peat in a manner to which it is suited. The following tasks have been undertaken to meet this hierarchy of principles:

- Calculate preliminary estimated volumes of excavated materials and potential reuse volume requirements based on initial site design / layout.
- Determine whether there is likely to be negative or positive overall peat balance, and whether the generation of excess material will be avoided, and, if not, where reductions in the volumes of excavated materials may be achieved.
- Refine site layout to reduce volumes of excavated material and reduce carbon impacts of the project construction activities.
- Record specific examples of how overriding principles of prevention and minimisation of peat disturbance are to be taken into account in the design of the site.
- Ensure the assessment is consistent with and feeds into the peat slide risk assessment and carbon payback assessment.
- Identify limitations and make recommendations for further site investigation (post-consent) in order to steer detailed design and micro siting such that opportunities for further reductions in excavated peat volumes can be implemented.

2.1.2 Stage 2: Post Consent / Pre-construction

This draft PMP sets out how excavated materials at site can be managed in an appropriate manner, on the basis of the investigation and data gathered to date. The site material mass balance calculations may be further developed and refined post planning consent, and prior to the relevant construction works commencing, as a consequence of any further or more detailed ground investigation or survey works required to inform detailed design.

Volumes of peat excavation will be identified for each area of the site from which the peat will be excavated e.g. each section of the track layout, crane pads, borrow pits, construction compound, etc. The volumes of peat to be reused will be identified and allocated according to the intended, valid, reuse of peat. Prior to construction a

qualified Ecological Clerk of Works (ECoW) will be appointed and whose role it will be to monitor the peat management plan is being implemented as stated.

2.1.3 Stage 3: Construction Stage

During construction it will be confirmed with reasonable certainty the likely peat excavation volumes with the aim of ensuring that, as far as reasonably practicable, there is a balance of material use across the proposed development and disturbance of peat and associated haulage is kept to a minimum. Within micro-siting allowances, the alignment and design of tracks, hardstanding orientation and construction methods will be reviewed to avoid/minimise peat disturbance as much as possible in light of the more detailed topographic/design information available once construction actually commences. Regular review and update of the site material mass balance calculation and maintenance of as-built records of excavated and reused volumes will be undertaken.

2.2 Guiding Principles for the Construction Phase

During the construction stage the Contractor will regularly review and update the site material mass balance calculation and maintain as-built records of excavated and reused volumes. The following principles will apply:

- Position site infrastructure in areas of shallower peat or design appropriate engineering solution to avoid and/ or minimise excavation of peat.
- Review track layout and remove redundant tracks on site by designing turning places rather than circular tracks.
- Where safety considerations allow, reduce the number of passing places by carefully planning the curvature of tracks and reinstate passing places post construction if possible. Reducing the size of the temporary construction compounds by removing non-essential components or stacking worker's cabins if safe to do so.
- Where safety, construction and turbine delivery logistics allow, consider removing or minimising the need for creating separate lay down areas on virgin ground by storing turbine components at the port, on previous hardstandings, alongside crane hardstandings or in passing places during construction.
- Design piled foundations where ground conditions allow and peat conditions are such that removing the peat would cause more disturbance. This practice would be dependent on safety, cost and construction logistics and consideration of other potential environmental impacts such as noise, vibration, groundwater interception and disturbance of wildlife.
- Only re-use peat where it is suitable for the identified and required use. Careful handling is essential to retain any existing structure and integrity of the excavated materials and thereby maximise the potential for excavated material to be reused.

3 Estimated Excavated Peat Volumes

As part of the assessment of the environmental impacts for the proposed development a net carbon balance for peat was determined using Worksheet 5 of the carbon calculator tool (Appendix 5-1). Table 1 provides the predicted volumes of peat expected to be extracted from turbine bases, access tracks, hard standings and any other temporary or permanent structures planned. A payback period for carbon provided in Appendix 5-1 contains the worksheets and core data entered and here the same data is used to look specifically at peat management. Chapter 4 and technical Appendix 5-1 provides details of the site design used to determine the areas of land take and Technical Appendix 11-5 the peat slide risk assessment report, provides further information on peat structure/ characteristics and depth values used to generate the estimated excavation volumes and re-instated volumes in Table 1 below.

Table 1: Excavated and Re-instated Peat Volume Estimates (cubic metres)

Source	Excavated peat volume	*Storage	Re-instated peat volume	Source
Turbine bases	8640	yes	Borrow pit infill 24835	Stored peat
Hardstandings	17280	No	Verges for access tracks/floating roads 44225	Immediate re-use
			Surface restoration turbine bases/hardstanding 17000	Stored peat
Access tracks	23185	no	<i>Note: average acrotelm (fibrous 'brown' peat) to catotelm (colloidal 'black' peat) ratios are 70:30 and all restoration will use this ratio of 30% catotelm overlaid with 70% acrotelm peat. (60242 actrotelmic and 25818 catotelmic)</i>	
Borrow pits	16000	yes		
Additional excavation	20970	no		
Tota	86075	33000	86060	

*storage of peat to be recorded and detailed by ECoW – assumed this will be restored once wind farm is decommissioned.

If the volume of peat excavated exceeds the intended re-use then clear plans for the disposal of excess peat will need to be provided. For this proposed development there is no predicted excess peat and all of the peat excavated will be re-used on site.

3.1 Storage

Where peat needs to be stored temporarily before it can be used for its intended purpose it will be stored such that it is protected from erosion, compaction and decomposition. This means adhering to good practice guidance on separating out distinct horizons and keeping the height of piled peat to a minimum (in all cases below 0.5m). A geotextile membrane will be used on bare peat surfaces to stabilise it and re-vegetation of peat using local, appropriate flora will be undertaken. 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 re-watered. Amorphous or catotelmic peat which has a high water content and low shear strength will not be used as infill material but will be re-used to re-instate areas such as turbine bases ensuring the fibrous actrotelmic horizon (along with vegetation) is placed above it. To reduce the risk of erosion of both peat particles and dissolved organic carbon into nearby surface waters care will be taken to keep stored peat at least 100 meters away from and tributaries for lochs and groundwaters. Contouring of peat bunds to reduce the risk of erosion and geotextile membranes to stabilise bare peat surfaces will reduce the risk of erosion to nearby water bodies significantly.

3.2 Monitoring Progress

An Ecological Clerk of Works (ECoW) will maintain a record of actual peat volumes excavated and their subsequent re-use using Table 1 as a guide to compare predicted and actual peat volumes. This will be recorded and monitored during the construction, operation, decommissioning and restoration stages of the wind farm and will be made available on an annual basis to regulators as required.

4 References

Developments on peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste. Scottish Renewables & Scottish Environment Protection Agency (2012)

Regulatory position statement — developments on peat. Scottish Environment Protection Agency (2012)

Developments on peatlands: site investigations. Scottish Government (2011)

Calculating carbon savings from wind farms on Scottish peatlands - a new approach. Nayak et al., 2008; Nayak et al., (2011).