

7.3 (TA) DRAFT PEAT MANAGEMENT PLAN

SUMMARY

The Development is expected to result in 177,393 m³ of peat excavation. However, through considered peat re-use measures it is proposed that all of the excavated peat can be re-used on site.

Post consent, the principles set out within this Technical Appendix will be used to develop the Peat Management Plan following completion of the detailed ground investigation and site design.

INTRODUCTION

- 1.1 This Technical Appendix has been prepared to assess the impact of the development of Kype Muir Extension on existing peat and to incorporate peat management principles into the development at the design stage.
- 1.2 The peat baseline is based on peat probing carried out in May 2012, June 2013 and July 2014 and discussed in Chapter 14: Ground Conditions and Hydrology of the original ES while the peat depths across the site area are displayed in Figure 7.2.4. In the absence of detailed site data the acrotelm peat layer has been assumed to be 450 mm based on Scottish Government peat survey guidance.
- 1.3 Measures to reduce the volume of peat excavated based on best practice guidance have been incorporated into the infrastructure design and include the avoidance of the deepest areas of peat, approx. 2.4 km of floating track and floating construction compounds. The worst case volume of excavated peat is estimated to be 177,393 m³, of which 68,984 m³ would be acrotelm and 108,409 m³ would be catotelm.
- 1.4 A number of on-site peat re-use opportunities have been identified based on best practice guidance and incorporated into the design; including bowl shaped borrow pits which will allow the re-use of excavated catotelmic peat. It is anticipated that all of the 177,393 m³ of excavated peat will be re-used within the proposed Development Area.
- 1.5 The principles of a peat handling method statement and temporary peat storage have been set out and will be used to develop a Peat Management Plan following a detailed ground investigation and detailed design of infrastructure, should consent be granted.

PEAT MANAGEMENT PRINCIPLES

- 1.6 Peat management seeks to avoid waste peat through applying the waste hierarchy of The Waste Management Licensing (Scotland) Amendment Regulations 2016, which is defined as follows.
 - Prevention;
 - Preparing for re-use;
 - Recycling;
 - Other recovery e.g. energy recovery; and

- Disposal.

1.7 Prevention methods have been incorporated into the site design and include the avoidance of the areas of deeper peat and inclusion of floating infrastructure. A number of on-site re-use opportunities have been identified based on best practice guidance. Prevention and re-use measures are detailed later in this document.

PEAT BASELINE

Peat Survey

1.8 Preliminary peat depth probing was undertaken in May 2013, June 2013 and July 2014. The results are discussed in Chapter 14: Ground Conditions and Hydrology of the original ES.

Acrotelmic and Catotelmic Layers

1.9 Scottish Government (2014) 'Peat Survey Guidance' states the acrotelm layer, the surface layer of a peatland within which all living vegetation exists, is usually less than 300 millimetres (mm) thick but may be up to 500 mm. Therefore, in the absence of detailed peat characteristics within the Development site it has been assumed the acrotelm layer is 450 mm thick. The depth of the underlying catotelm layer is assumed to be the remaining section of the measured peat depth.

1.10 It should be noted that the Scottish Government updated their peat survey guidance in 2017, however, as agreed by SEPA in their Scoping Response (PCS/156786) in February 2018, the methodology used for assessing ground conditions and hydrology, as well as the baseline data used as part of the assessment, will be as per the original ES.

PEAT EXCAVATION

1.11 The first principal of peat management is to prevent the loss of peat habitat wherever possible. This section sets out the measures used to minimise loss of peat habitat and the expected peat excavation volumes.

Avoidance of Deeper Areas of Peat

1.12 Peat is fairly widespread across this site with depths in the flatter areas to the northern central and north eastern areas of the site ranging from 1.5m to 5m, including isolated area with depths greater than 5m. In order to minimise the volume of peat being excavated on site, areas of deeper peat have been avoided, the majority of site infrastructure has been located in areas of peat with depths less than 2m and no infrastructure is located in areas with peat depths greater than 3m.

Floating Access Tracks

1.13 Floating access track has been specified where peat is greater than 1m deep, except for sections of track that are in close proximity to excavated infrastructure. This approach has resulted in floating track specified for approximately 2.4 km (27%) of the 9 km total new track length to avoid peat excavation.

1.14 The floating access tracks will be designed in accordance with best practice guidance; Scottish Natural Heritage and Forestry Commission Scotland (2010) 'Floating Roads on Peat', herein referred to as SNH & FCS (2010).

Floating Construction Compounds

- 1.15 It is proposed that the construction compounds be constructed following a similar methodology as that used to construct the floating access tracks.

Peat Excavation Estimated Volumes

- 1.16 Table 7.3.1 details the construction activities that would generate peat excavation and the approximate associated volumes. The peat depths are those shown on Figure 7.2.5. As Borrow Pit 3 is a disused quarry it is assumed that any peat existing here has already been excavated, therefore the total peat excavation volume has been reduced by 12,963m³. It should be noted that these volumes form a worst case estimate and include a 5% contingency for battered excavations.
- 1.17 These volumes are considered a worst case as a worst case infrastructure layout has been assumed, i.e. all foundations and crane pads can accommodate the 220 m tip height turbines. However, only four of the fifteen turbines are expected to be this size and the infrastructure for the smaller turbines will require smaller areas resulting in less peat being excavated.

Table 7.3.1 Peat Excavation Volumes

Infrastructure Type	Average Peat Depth (m)	Total Surface Area (m ²)	Total Peat Excavation Volume (m ³)	Estimated Acrotelm Excavation Volume (m ³)	Estimated Catotelm Excavation Volume (m ³)
Excavated Track	1.12	50,102	56,209	22,546	33,663
Borrow Pit	0.84	42,426	35,752	19,011	16,741
Control Building	1.87	4,151	7,767	1,868	5,899
Crane Pad and Laydown Area	1.40	41,545	58,242	18,695	39,547
Turbine Foundation	1.38	7,954	10,976	3,579	7,397
Total			168,946	65,699	103,247
Inc. 5% Contingency			177,393	68,984	108,409

- 1.18 It is estimated that a total of 177,393 m³ of peat will be excavated, of which 68,984 m³ will be acrotelm and 108,409 m³ will be catotelm.

PEAT RE-USE

- 1.19 Measures to re-use peat have followed best practice guidance SR & SEPA (2012), SNH & FCS (2010), Scottish Government (2014) and Scottish Environment Protection Agency (2010) 'Developments on Peat and Off-Site Uses of Waste Peat', herein referred to as SEPA (2017).

Access Track and Crane Pad Verges

- 1.20 Acrotelmic peat placed on verges would not exceed 4 m wide and 0.8 m deep along tracks and surrounding crane pads and shall be in accordance with Scottish Renewables and SEPA (2012) Guidance on the Assessment of Peat Volumes, Re-use of Excavated Peat and Minimisation of Waste. Where cables are located adjacent to access tracks, peat may be spread further to ensure sufficient cover is achieved.
- 1.21 Where floating tracks are constructed peat could be used to help tie the roads into the surrounding environment.

Above Turbine Foundations

- 1.22 Approximately 1.1 m of acrotelmic peat would be placed above foundations.

Re-use of Peat at Transitions

- 1.23 Acrotelmic peat would be used at the transitions between floating and excavated tracks to permit a gradual change in the stiffness of the road construction in accordance with best practice guidance SNH & FCS (2010). Refer to SNH & FCS (2010) for further details on the construction.

Borrow Pit Restoration

- 1.24 The borrow pits have been located in weakly permeable bedrock and designed with a bowl shape to be excavated below groundwater level so that water would pond within the excavation. This would allow approximately 1.60 m minimum of catotelm to be placed within the borrow pit base without drying out. Acrotelmic material would be used to cover the surface of the borrow pit at depths of 0.40 m minimum.
- 1.25 The resulting overall peat depth at each borrow pit location may be greater than the depth of peat adjacent to the borrow pit. However, the borrow pits will likely be excavated to a depth greater than 2 m and therefore the reinstated peat isn't likely to interact significantly with the surrounding peat and will instead be groundwater fed due to the bowl shape design.
- 1.26 It is recommended that the following principles based on best practice guidance including SR & SEPA (2012), SNH & FCS (2010), SEPA (2017) and Scottish Government (2014) are adopted in the final method statements for borrow pit restoration.
- All peat and soil sourced from the borrow pits will be replaced within the same borrow pit, at a maximum gradient of 1:4 (V:H), where possible, details of how the peat will be stored are discussed below; and
 - Restoration activities will be overseen by an Ecological Clerk of Works to ensure methods are properly adhered to.

Peat Re-Use Estimated Volumes

- 1.27 Table 7.3.2 details the peat re-use locations and volumes. The volumes of reused peat have been calculated using the same principles as set out in the 2016 consented draft PMP. A breakdown of the calculations supporting these volumes is included in TA7.3.1.

Table 7.3.2 Peat Re-Use Volumes

Infrastructure Type	Volume of acrotelmic peat re-used (m ³)	Volume of catotelmic peat re-used (m ³)	Total Peat Excavation Volume (m ³)
New track verges (includes floating and excavated)	28,938		Required to tie the access tracks into the landscape and to encourage vegetation re-growth in keeping with the surrounding habitat.
Above turbine foundations	12,655		Required to restore the natural habitat and to encourage vegetation re-growth in keeping with the surrounding landscape.
Crane pad verges	4,320		Required to tie the raised crane pad sides into the landscape and to encourage vegetation re-growth in keeping with the surrounding habitat.
At transitions from floating road to excavated road	330		Required to create a gradual change in stiffness of road construction from floating road to excavated road.
Borrow pit restoration	23,058	92,234	Used to reinstate borrow pit profile to a comparative level with gentle slopes which blend in with the surrounding landscape. Also to encourage vegetation re-growth.
Total	69,301	92,234	
Balance	-317	16,176	

PEAT BALANCE

1.28 Table 7.3.3 shows the peat balance for Kype Muir Extension. Although it identifies some excess peat, it is expected that the actual excavated volume will be less than is shown in Table 7.3.1 as at this stage a worst case infrastructure layout has been assumed, i.e. all foundations and crane pads can accommodate the 220 m tip height turbines. Taking this into consideration it is expected that all of the excavated peat will be reused within the Development and no peat will be removed from site.

Table 7.3.3 Peat Balance

Use	Acrotelmic Peat (m ³)	Catotelmic Peat (m ³)	Total (m ³)
Excavated	68,984	108,409	177,939
Re-used	69,301	92,234	161,535
Waste	-317	16,176	15,858

PEAT HANDLING METHOD STATEMENT

1.29 It will be necessary for the Peat Management Plan to detail precise methods and timing involved in handling, storing and reusing excavated peat materials. The final method statement will follow the principles detailed below, in accordance with the best practice guidance including SR & SEPA (2012), SNH & FCS (2010), SEPA (2017) and Scottish Government (2014).

- The surface layer of peat and vegetation (acrotelm) would be stripped separately from the catotelmic peat;
- Acrotelmic material would be stored separately from catotelmic material;
- 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;
- Less humified catotelmic peat (consolidated peat), which maintains its structure upon excavation, will be kept separate from highly humified amorphous peat;
- Acrotelmic material would be replaced as intact as possible once construction is complete; and
- To minimise handling and transportation of peat, acrotelmic and catotelmic peat would be replaced, as far as is reasonably practicable, in the location from which it was removed. Acrotelmic material must always be placed on the surface.

TEMPORARY PEAT STORAGE

1.30 The Peat Management Plan will detail precise methods and timing involved in temporary storage, should this be required (the preference being that peat is placed at its end use location directly from it being excavated). The final method statement will follow the principles detailed below, in accordance with the best practice guidance including SR & SEPA (2012), SNH & FCS (2010), SEPA (2017) and Scottish Government (2014).

- Temporary storage of peat will be minimised;
- Suitable storage areas will be sited in areas avoiding watercourses, stability risk, groundwater dependent terrestrial ecosystems or other sensitive areas;
- Reinstatement would, in all instances, be undertaken at the earliest opportunity to minimise storage of turves and other materials;
- Timing the construction work, as much as possible, to avoid periods when peat materials are likely to be wetter;
- Temporary storage and replacement of peat excavated from borrow pits will occur within the 'source' pit; and
- Transport of peat with the Development site from excavation to temporary storage and restoration site will be minimised.

CONCLUSION

- 1.31 The principles of peat management have been set out, namely to follow the waste hierarchy of The Waste Management Licensing (Scotland) Regulations 2011.
- 1.32 Measures to prevent the loss of peat habitat have been incorporated into the design stage of the proposed Development through the avoidance of the deeper areas of peat and the specification of floating construction compounds and 2.4 km of floating access track. A number of on-site peat re-use opportunities have been identified based on best practice guidance and incorporated into the design; including bowl shaped borrow pits which will allow the re-use of excavated catotelmic peat.
- 1.33 Based on the information currently available, worst case estimates of acrotelmic and catotelmic peat extraction and re-use volumes have been calculated. Although a small percentage of excess peat is currently calculated it is proposed that all excavated peat will be reused within the Development site as the volume of excavated peat is expected to be less than currently calculated when the detailed site design work is undertaken post-consent. Following completion of the ground investigation and detailed design, post consent, the peat balance will be recalculated, in line with planning conditions 23i, 25, and 46 to confirm this is the case.
- 1.34 The principles of a peat handling method statement and temporary peat storage have been set out. The principles set out within this document will be used to develop a Peat Management Plan following a detailed ground investigation and detailed design of infrastructure, should consent be granted.

REFERENCES

- Scottish Environment Protection Agency (2010) Regulatory Position Statement – Developments on Peat.
- Scottish Executive (2011) The Waste Management Licensing (Scotland) Regulations 2011.
- Scottish Government (2014) Peat Survey Guidance.
- Scottish Natural Heritage and Forestry Commission Scotland (2010) Floating Roads on Peat.
- Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency and Forestry Commission Scotland (2013) Good Practice During Wind Farm Construction.
- Scottish Renewables and SEPA (2012) Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste.