TECHNICAL APPENDIX 7.1

Outline Peat Management and Restoration Plan

ITPENERGISED
Earth. Smart. Solutions

ScottishPower Renewables

9th Floor Scottish Power Headquarters

320 St Vincent Street

Glasgow

G2 5AD

ITPEnergised

7 Dundas Street

Edinburgh

EH3 6QG

Registration Number: SC450178

Tel: 0131 557 8325

Table of Contents

Appendix 7.1 Outline Peat Management and Restoration Plan

1 Introduction

1.1.1 This Outline Peat Management and Restoration Plan (PMP) document has been prepared by ITPEnergised (ITPE) on behalf of the Applicant for the construction of the proposed Development, located near Barrhill, South Ayrshire. The Site is principally covered in Sitka Spruce plantation forestry with areas of open moorland on the upper slopes.

1.1.2 The infrastructure of the proposed Development comprises 12.6 km of existing tracks that would be upgraded and widened, 4.3 km of new floated tracks, and 8.7 km of new excavated tracks, 18 wind turbine locations and associated crane hardstandings and laydown areas, one permanent control compound including a substation, two temporary construction compounds, a meteorological mast and up to eight borrow pit search areas.

1.1.3 The design of the proposed Development has been undertaken as an iterative process to avoid areas of deep peat as much as possible to limit peat excavation and to limit the potential for peat slide, as presented in **Chapter 3: Site Selection and Design**.

1.1.4 The PMP provides details on the approximate predicted volumes of peat that would be excavated during construction of the proposed Development, the characteristics of the peat that would be excavated, and the principles of how and where this excavated peat would be stored, reused and managed. This PMP would be further developed and implemented subsequent to the proposed Development receiving consent from the Scottish Ministers. Further details and specific plans would be determined during the detailed design process and once further site investigations have been undertaken. These details would then be included in a detailed PMP as part of the detailed Construction Environment Management Plan (CEMP). The responsibility for the implementation of the PMP would be with the Principal Contractor.

1.1.5 The potential volumes of peat extracted and re-used has been calculated based on an area specific or infrastructure specific basis using a modelled peat contour plan developed on high-density probing surveys where excavations would be undertaken. This has allowed high levels of confidence in the estimation of the volumes of peat that would be excavated and that would then require appropriate re-use.

2 Objectives

2.1.1 The PMP has been developed to demonstrate that peat has been afforded significant consideration during the construction phase of the proposed Development, should consent be granted. It aims to propose mitigation measures that would minimise any impacts and the long-term habitat restoration and management plans for key areas of the Site.

2.1.2 The PMP outlines the overall approach of minimisation of peatland disruption that has been adopted. It aims to ensure that all further opportunities to minimise peat disturbance and extraction would be taken.

2.1.3 The PMP seeks to identify that appropriate proposals to re-use the surplus peat can be accommodated within the proposed Development, without significant environmental or health and safety implications, to minimise risk in terms of carbon release and human health.

3 Layout

3.1.1 The layout of the Outline PMP is as follows:

- summary of relevant policy and guidance;
- definition of peat, details of peatland characteristics and peat conditions onsite;
- potential impacts on peat and an overview of peat excavation principles;
- estimate of peat volumes to be excavated and reinstated;
- classification of the peat characteristics present onsite;
- peat excavations and handling methods/controls and temporary peat storage; and
- reuse in infrastructure construction restoration.

3.1.2 Tables are includes showing:

- a summary of depth of penetration probe data;
- locations and quantities of excavated peat that would be generated, with summary info of interpreted peat depth, dimension and area details of the infrastructure areas;
- locations and available volumes for re-use of excavated peat; and
- a summary of the peat extraction and re-use balance.

4 Policy and Guidance for Peat Management

4.1.1 This PMP has been compiled in accordance with the following policy and best practice guidance:

- *Good Practice during Windfarm Construction* (Scottish Renewables, SNH, SEPA & Forestry Commission Scotland, 4th Edition 2019);
- *Guidance on Developments on Peatland: Site Surveys* (Scottish Government, Scottish Natural Heritage and SEPA, 2017);
- *SEPA Regulatory Position Statement – Developments on Peat* (SEPA, 2010);
- *Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste* (Scottish Renewables and SEPA, 2012); and
- *Peat Landslide Hazard and Risk Assessments. Best Practice Guide for Proposed Electricity Generation Developments* (Scottish Government, 2017).

5 Peat Conditions

5.1 Definitions of Peat

5.1.1 The Scottish Government Peat Landslide Hazard Best Practice Guide (2017) uses the following Joint Nature Conservation Committee (JNCC) report 455 '*Towards an Assessment of the State of UK Peatlands*' definition for classification of peat deposits:

- **Peaty (or organo-mineral) soil**: a soil with a surface organic layer less than 0.5 m deep;
- **Peat**: a soil with a surface organic layer greater than 0.5 m deep which has an organic matter content of more than 60 %;
- **Deep Peat**: a peat soil with a surface organic layer greater than 1.0 m deep.

5.2 Peat Conditions of Site

Desk Based Review

5.2.1 A desk study has been undertaken to review published geological conditions, based on British Geological Survey (BGS) mapping and the SNH Carbon and Peatlands Map (2016).

Peat Surveys

5.2.2 Following on from the desk study, field surveys were undertaken, to measure the peat depth and provide additional observations relating to slopes, general topography and ground cover. Peat survey work undertaken at the Site is summarised below and further detail is provided in **Technical Appendix 7.2: Peat Slide Hazard and Risk Assessment**.

5.2.3 Stage 1 survey work was undertaken from June to August 2019. The surveys aimed to achieve a good coverage of the Site in line with relevant 2017 peat survey guidance, while recognising the access restrictions resulting from dense conifer forestry cover across much of the Site area. Targeting breaks in the forestry where possible (e.g. forestry rides and watercourses), the survey was designed to ensure that a suitable coverage of the developable areas of the Site was achieved, in consultation with SEPA.

5.2.4 Data obtained from the peat depth surveys were used to plot the presence and distribution of peat across the proposed infrastructure development areas at the Site, create a contour plan, and feed into detailed design iteration.

5.2.5 Following "design chill", a Stage 2 peat depth probing exercise was undertaken in September 2019, to record peat depth at each proposed turbine and hardstanding location, along the route of proposed access tracks, and at proposed infrastructure locations including construction compounds, control building and substation, and borrow pit search areas.

Peat Survey Results

5.2.6 A total of 1,950 probes were undertaken across the Site area, during the surveys described above.

5.2.7 Peat thickness varies across the Site from 0 to over 3 m, as shown in Table 7.1.1.

Peat Depth Interval (m)	Number of occurences	% of probes
0	46	2.4
0.01 – 0.49	769	39.4
0.5 – 0.99	695	35.6
1.0 – 1.49	246	12.6
1.5 – 1.99	132	6.8
2.0 – 2.49	35	1.8
2.5 – 2.99	22	1.1
3.0 or greater	5	0.3
Total	1,950	100

Table 7.1.1: Distribution of Peat Depth Recorded at the Site

6 Potential Impacts on Peat During Construction

6.1.1 The initial construction phase for wind energy projects will often include soil and peat stripping and excavation activities associated with constructing the foundations for turbine bases, crane pads, access tracks, control compound and substation, temporary construction compounds, and borrow pits.

6.1.2 There are four main types of impact on peat which can occur during construction. These are:

- Loss of structural integrity and peat strength, due to stripping off or damaging the surface vegetation turf, excavation, handling and transporting peat (particularly wet, subsurface peat);
- Erosion and gullying, caused by exposure and desiccation of bare peat surfaces primarily caused by water erosion, due to surface runoff after rainfall;
- Contamination, caused by leaks, spillages or inappropriate laydown of materials; and
- Peat slide, caused by laying wet peat on top of wet peat, laying other heavy materials (including excavated mineral soil or other construction materials) on top of wet peat or by inappropriate stockpiling, such as attempting to create stockpiles of peat that are too high, without bunding, engineering or geotechnical support.

6.1.3 A range of methods and control measures are described below which are designed to prevent these impacts from occurring.

6.2 General Excavation Principles

6.2.1 The proposed Development was designed within the confines of several environmental constraints. From the outset, the design sought to avoid areas of known or potential deep peat where possible, taking into account other environmental and technical factors such as ecology, watercourse stand-off buffers, topography, and efficient operation of the turbines. Where it has not been possible to site infrastructure in areas of <1 m of peat due to these other factors, efforts have been made to minimise the footprint of site infrastructure on deep peat as far as practicable.

6.2.2 The result is that most infrastructure has been sited outside areas of deep peat, as summarised below:

- Based on the average depth of peat recorded by probes at each proposed turbine location, all turbines are sited outside deep peat except proposed Turbines 7 and 18. Additionally, although the proposed Turbine 3 location itself is not on deep peat, probes in the immediate vicinity did identify deep peat. At these three proposed turbine locations, the average peat depth was recorded at approximately 1.2 to 1.4 m.
- Based on the average depth of peat recorded by probes at each proposed turbine hardstanding, all are sited outside deep peat except the hardstandings associated with the above proposed turbines (3, 7 and 18), where the average peat depth recorded was approximately 1.4 to 1.55 m.
- The proposed permanent control compound and temporary construction compounds are all sited outside areas of deep peat, with average peat depths measured at these locations being approximately 0.5 to 0.7 m.
- The measured depth of peat at the proposed met mast location is slightly above 1m (average 1.06 m).
- None of the borrow pit search areas are within deep peat, with average peat depths measured at these locations being approximately 0.1 to 0.8 m.
- The majority of proposed new cut access tracks are sited away from deep peat. Several stretches unavoidably cross localised pockets of deep peat, and it is proposed that these will be floated to avoid the requirement to excavate deep peat. The total length of track proposed to be floated is 4.33 km, which is approximately 17% of the total proposed Development track length.

6.2.3 During the construction of the Proposed Development, all reasonable measures will be taken to avoid or minimise excavations and minimise disturbance to peat and peatland habitats.

6.2.4 Ground disturbance areas around excavations will be kept to a minimum and will be clearly defined onsite. Access to working areas during construction will be restricted to specified routes, comprising constructed tracks.

6.2.5 Cable routes will in general follow access tracks. Any peat excavated will be replaced. Therefore, this has not been included within the excavation volumes; however, it will still need to be managed onsite and the details of this will be provided within the Detailed PMP for the proposed Development, which will be prepared by the Applicant and the contractor and agreed with SAC, SEPA and SNH.

6.2.6 Peat and topsoil excavated at the temporary laydown area and the temporary construction compounds will be stored and also reinstated. Therefore, peat generated from these areas has not been included within the excavation volumes; however, it will still need to be managed onsite. Part of the construction compound area at the site access from the A714 may be retained as a car park, however the peat depths recorded at this location are minimal, and it is anticipated that any peat excavated can be used for restoration and landscaping in this specific area. The details of site-specific storage methodology and locations will be provided within the Detailed PMP, which will be produced following preconstruction investigative works at site.

6.2.7 Stretches of existing track will require widening, which will entail excavation of peat, where present, along the widening corridor. However, it is reasonable to assume that excavated peat can be used for restoration locally i.e. road verges along the widened track. Therefore, peat generated from road widening has not been included within the excavation volumes; however, it will still need to be managed onsite.

7 Estimation of Peat Volumes to be Excavated

7.1.1 The construction period for the proposed Development would be approximately 18 months onsite. The programme, phasing and nature of construction activities are described in **Chapter 4: Development Description**. Those activities which would generate volumes of peat are as follows:

- establishment of the temporary construction compounds, which would include stripping of topsoil, peat and remaining sub-soil and careful stockpiling of the material for later reinstatement in accordance with the CEMP which would be prepared in advance by the appointed Principal Contractor;
- formation of cut track (as shown on **Figure 4.1** of the EIA Report), which would involve the removal and temporary storage of turves, as appropriate, followed by excavation down to formation level (the timing of this activity would tie in with the construction of sections of floated track);
- construction of the turbine foundations and crane hardstandings, which would require the excavation of peat and subsoil to expose underlying bedrock or other suitable founding stratum. The depth of the excavation would be dependent on the ground conditions and depth to bedrock, but is likely to be up to on average 3.5 m for turbine foundations (shallower for hardstandings, assumed to be up to 1 m or the full depth of peat if greater than 1 m);
- excavation of trenches for underground cabling between the turbines and the substation, which would be up to 3 m wide and approximately 1.2 m deep. These would be carefully reinstated with the stored peat once the cables have been laid; and
- construction of the permanent control compound/substation and permanent met mast.

7.1.2 Table 7.1.2 below provides an estimate of peat volumes to be excavated, as well as assumptions used in developing the estimates. It also provides an estimate of volumes of acrotelmic and catotelmic peat to be disturbed.

Infrastructure	Area (m2)	Peat depth (m)	Total Volume (m3)	Acrotelm (m)	Catotelm (m)	Volume Acrotelm (m3)	Volume Catotelm (m3)	Assumptions
T1 - base	1075	0.78	838.7	0.40	0.38	430.1	408.6	Includes excavation of turbine foundation to base. Assumes 37m diameter, max excavation 3.5m depth.
T2 - base	1075	0.53	569.9	0.40	0.13	430.1	139.8	
T3 - base	1075	1.22	1311.8	0.40	0.82	430.1	881.7	
T4 - base	1075	0.57	612.9	0.40	0.17	430.1	182.8	
T5 - base	1075	0.80	860.2	0.40	0.4	430.1	430.1	
T6 - base	1075	0.52	559.1	0.40	0.12	430.1	129.0	
T7 - base	1075	1.39	1494.5	0.40	0.99	430.1	1,064.5	
T8 - base	1075	0.54	580.6	0.40	0.14	430.1	150.5	
T9 - base	1075	0.44	473.1	0.40	0.04	430.1	43.0	
T10 - base	1075	0.72	774.2	0.40	0.32	430.1	344.1	
T11 - base	1075	0.81	870.9	0.40	0.41	430.1	440.8	
T12 - base	1075	0.71	763.4	0.40	0.31	430.1	333.3	
T13 - base	1075	0.93	999.9	0.40	0.53	430.1	569.9	
T14 - base	1075	0.96	1032.2	0.40	0.56	430.1	602.1	
T15 - base	1075	0.21	225.8	0.21	N/A	225.8	N/A	
T16 - base	1075	0.63	677.4	0.40	0.23	430.1	247.3	
T17 - base	1075	0.92	989.2	0.40	0.52	430.1	559.1	
T18 - base	1075	1.17	1258.0	0.40	0.77	430.1	827.9	
T1 - hardstanding	4525	0.46	2081.5	0.40	0.06	1,810.0	271.5	Assumes 80m x 30m hardstanding plus 85m x 25m laydown area, excavation depth full depth of peat.
T2 - hardstanding	4525	0.55	2488.8	0.40	0.15	1,810.0	678.8	
T3 - hardstanding	4525	1.54	6968.5	0.40	1.14	1,810.0	5,158.5	
T4 - hardstanding	4525	0.65	2941.3	0.40	0.25	1,810.0	1,131.3	
T5 - hardstanding	4525	0.75	3393.8	0.40	0.35	1,810.0	1,583.8	
T6 - hardstanding	4525	0.62	2805.5	0.40	0.22	1,810.0	995.5	
T7- hardstanding	4525	1.44	6516.0	0.40	1.04	1,810.0	4,706.0	
T8 - hardstanding	4525	0.61	2760.3	0.40	0.21	1,810.0	950.3	
T9 - hardstanding	4525	0.39	1764.8	0.39	N/A	1,764.8	N/A	
T10 - hardstanding	4525	0.84	3801.0	0.40	0.44	1,810.0	1,991.0	
T11 - hardstanding	4525	0.84	3801.0	0.40	0.44	1,810.0	1,991.0	
T12 - hardstanding	4525	0.54	2443.5	0.40	0.14	1,810.0	633.5	
T13 - hardstanding	4525	0.97	4389.3	0.40	0.57	1,810.0	2,579.3	
T14 - hardstanding	4525	0.88	3982.0	0.40	0.48	1,810.0	2,172.0	
T15 - hardstanding	4525	0.35	1583.8	0.35	N/A	1,583.8	N/A	
T16 - hardstanding	4525	0.46	2081.5	0.40	0.06	1,810.0	271.5	
T17 - hardstanding	4525	0.75	3393.8	0.40	0.35	1,810.0	1,583.8	
T18 - hardstanding	4525	1.51	6832.8	0.40	1.11	1,810.0	5,022.8	
Control compound and substation	5500	0.52	2860.0	0.40	0.12	2,200.0	660.0	Assumes 5500m² compound area.
Met mast	625	1.06	662.5	0.40	0.66	250.0	412.5	Assumes 25m x 25m base.
Cut Tracks (New - 8.66km)	43,300	0.57	24681.0	0.40	0.17	17,320.0	7,361.0	Assumes 8.66km length x 5m width.
Borrow Pit A	4,937	0.71	3505.3	0.40	0.31	1,974.8	1,530.5	Entire borrow pit search areas, full depth of peat to be excavated (conservative estimate as less than full area anticipated to be required).
Borrow Pit B	2,980	0.11	327.8	0.11	N/A	327.8	N/A	
Borrow Pit C	13,415	0.43	5701.4	0.40	0.025	5,366.0	335.4	
Borrow Pit D	9,418	0.41	3861.4	0.40	0.01	3,767.2	94.2	
Borrow Pit E	8,318	0.45	3743.1	0.40	0.05	3,327.2	415.9	
Borrow Pit F	6,289	0.76	4779.6	0.40	0.36	2,515.6	2,264.0	
Borrow Pit G	12,629	0.82	10355.8	0.40	0.42	5,051.6	5,304.2	
Borrow Pit H	4,450	0.65	2892.5	0.40	0.25	1,780.0	1,112.5	
Total			**142290.7**			**83,725.9**	**58,564.8**	

Table 7.1.2: Calculated Peat Volumes to be Excavated

7.1.3 The peat depths presented above are mean depths taken from the combined average depth of the peat probes relevant to those locations. These peat depths are taken to include the full depth of any material recorded as peat during the surveys. Information on classification of acrotelmic and catotelmic peat is provided below.

7.2 Classification of Excavated Material

7.2.1 There are two distinct layers within peat, the upper acrotelm and the lower catotelm. The acrotelm is the fibrous surface to the peatland, which exists between the growing peat surface and the lowest position of the water table in dry summers.

7.2.2 Peat soil generally below 0.5 m to up to 1 m in depth is classified as the catotelm, moderately decomposed with a high fibrous content and moderate water content. There are various stages of decomposition of the vegetation as it slowly becomes assimilated into the body of the peat.

7.2.3 Laboratory testing on peat samples extracted from a range of depths at proposed turbine and infrastructure locations across the Site do not provide a clear distinction between acrotelmic and catotelmic peat. Moisture contents are slightly higher on average for samples collected from greater than 0.5 m depth (approximately 87% versus an average of approximately 83% at shallower depth) although carbon content is fairly consistent across the range of sample depths, with the exception of samples which are interpreted as not being peat (i.e. mineral soils/organic soils). Bulk densities are all higher than typical for peat soils, but are generally slightly higher below 0.5 m depth.

7.2.4 In general, the carbon content of samples collected from depths shallower than 0.5 m suggest that the soils could be interpreted as organ-mineral or peaty soils rather than peat, potentially due to degradation associated with forestry onsite. However, for the purposes of this assessment and management plan, it has conservatively been assumed that all materials identified as peat by the probing surveys are classified as peat.

7.2.5 As can be seen in Table 7.1.2, a conservative estimate of peat greater than 0.4 m in depth has been classified as catotelm, although it should be noted that the state of decomposition will increase as depth increases.

8 Peat Management Measures

8.1 Peat Protection Ahead of Soil Stripping

8.1.1 The layout of the proposed Development has already taken into account constraints relating to sensitive areas. The proposed Development layout, including areas to be felled for the purposes of the development, and access track routes, would be marked on an Access Plan and would be demarcated on the ground as appropriate. Off-road tracking of heavy plant would not be permitted outside the marked area.

8.1.2 The Access Plan and the route of the access tracks would provide a designated controlled route and a permissible corridor within which service vehicles and plant can operate prior to peat and topsoil stripping. The purpose of the Access Plan would be to protect in situ peat in areas that are not affected by the development and to prevent unnecessary vehicle and plant tracking across these areas. The following rules would apply to the Access Plan:

- There would be no vehicle access to areas of the Site outside the area marked on the Access Plan (the proposed Development layout and felling areas marked on the plan);
- There would be no stopping of vehicles outside the area marked on the Access Plan;
- Servicing or refuelling activities would only take place within clearly designated areas within the Access Plan, identified in the CEMP; and
- Laydown of materials (either construction materials or waste materials) would take place only within designated areas within the Access Plan. There would be no laydown, unless identified in the construction drawings, of any type of materials either within the access route corridors or anywhere outside of designated areas. All laydown areas not already considered would be subject to a peat slide risk assessment prior to their designation.

8.1.3 Access routes and working areas would be clearly delimited throughout the construction phase to ensure that peat compaction and damage in areas not directly involved in the works would be avoided. The construction works would be phased to ensure that peat was stripped in each part of the Site ahead of mineral subsoil.

8.2 Handling of Excavated Material

8.2.1 Excavation of soils would be undertaken in such a manner as to avoid cross-contamination between distinct acrotelmic and catotelmic horizons, where possible. The different horizons would be kept and stored separately for use at a later date.

8.2.2 During and after excavation, the storage, haulage and reuse of excavated material would be planned to minimise material movement around the Site. Where possible, immediate reuse is preferred to temporary storage.

8.2.3 Turves would be stripped and handled with care and stored with the vegetation side upward, such that damage to the living vegetation mat would be prevented or minimised as far as possible.

8.2.4 To ensure the minimum amount of damage to peat during stripping activities, strict procedures would be adopted for heavy plant access, stripping and handling/transport of surface, intact, peaty turf, and subsurface wetter peat. Antecedent moisture conditions are critical for this and peat stripping, and handling would not take place if there are heavy rainfall conditions.

8.2.5 Peat stripping and excavation would generally follow the methodologies recommended for mineral soil by MAFF (2000) and Defra (2009). However, peat is a very different material from mineral topsoils and subsoils. For example, it is recognised that subsurface wet peat lacks strength and its consistency in many cases is that of a slurry. Hence, the stripping and excavation method(s) to be used in each part of the Site would be agreed in advance with the Environmental Clerk of Works (ECoW) and Geotechnical Engineer.

8.2.6 Wherever possible, a 360^{o} excavator would be used to permit stripping of large-scale peat turves, with their vegetation intact. Ideally these should be a minimum of 0.5 m deep and up to 1 m^{2}. However, the depth and scale would depend on the depth, consistency and condition of the surface peat at each location and the plant used for stripping. Where practicable, the largest possible turves that allows for the turves to remain intact would be stripped. This assists in maintaining the structural integrity of each excavated turf.

8.3 Temporary Storage

8.3.1 Temporary storage may be required where material is not needed for immediate reinstatement. To minimise handling and haulage distances, where possible, excavated material would be stored local to the site of excavation and/or local to the end–use site where it would be required for re-profiling, landscaping or structural purposes. The exact storage locations would be agreed with the Geotechnical Engineer and ECoW prior to commencement of the main phase of works. Details would be provided on a plan to accompany the PMP and relevant Method Statements, for agreement with SNH and SEPA.

8.3.2 Temporary storage locations would be appropriately located and designed to minimise impact to sensitive habitats and species, prevent risks from material instability and runoff into watercourses.

8.3.3 Stripped materials would be carefully separated to keep peat and other soils apart, and stored in appropriately designed and clearly defined separate piles. Peat would be excavated as turves which would be as large as possible (see Paragraph 8.2.6) and kept wet in order to minimise desiccation during storage.

8.3.4 Stockpiles would be isolated from any surface drains and a minimum of 50 m away from watercourses, and stockpiles would not be located on areas of deep peat, in order to avoid peat slide risks associated with additional loading . Stockpiles would include appropriate bunding to minimise any pollution risks where required. Excavated topsoils would be stored on geotextile matting to a maximum of 1 m thickness.

8.3.5 Peat would not be stockpiled or deposited permanently higher than 1 m, and turf would be stockpiled separately. Peat would not be stockpiled for more than six months, unless otherwise agreed with SEPA.

8.3.6 Turves would be stored turf side up and would not be allowed to dry out. The condition of stored turves would be monitored by the ECoW.

9 Estimation of Peat Volumes to be Reinstated

9.1.1 Table 7.1.3 below, shows estimated volumes of peat that can be used to reinstate infrastructure and provide appropriate landscaping, in line with the current best practice listed above. This also provides an indicative breakdown of estimated volumes of acrotelmic and catotelmic peat.

9.1.2 It should be noted that these figures have been informed by discussions held with SEPA on previous windfarm projects, regarding the size of proposed batters and verges.

Infrastructure	Total Area (m2)	Average Depth (m)	Total Volume (m3)	Max Catotelm depth (m)	Remainder (acrotelm) (m)	Volume Catotelm (m^3)	Volume Acrotelm (m^3)	Assumptions
Turbine - base batters	2092.3	1.0	2092.3	0.7	0.3	1464.6	627.7	Assumes base circumference of 116.24 x 1m high (average) x 1m wide. Acrotelm (turves) for upper 0.3m.
Hardstanding landscaping batters	15660.0	0.3	4698.0	0.0	0.3	0.0	4698.0	Assumes 3m wide batter x 1m high at highest end, grading down to ground level (0.3m average height). All acrotelm given limited depth.
Operations building landscaping batter	310.0	1.0	310.0	0.7	0.3	217.0	93.0	Assumes base circumference of 310m x 1m high x 1m wide
Cut Track Verges	43300.0	0.5	21650.0	0.2	0.3	8660.0	12990.0	Verge either side of 8.66km of cut tracks, 4.33km floating tracks. Assumes 2.5m wide verge x max. 1m high, grading down to ground level. Acrotelm (turves) for upper 0.3m.
Floating Track Verges	21650.0	0.5	10825.0	0.2	0.3	4330.0	6495.0	
Borrow Pits	62436.0	2.0	124872.0	0.7	1.3	43705.2	81166.8	Assumes maximum fill of 2m.Maximum of 0.7m catotelm given likely high water content and low strength.
Total volume of excavated peat that could be reused			142290.7			58564.8	83725.9	
Total reinstatement volume available for reusing excavated peat			164447.3			58376.8	106070.5	
Remaining Excavated Peat			**-22156.6**			**188.0**	**-22344.6**	

Table 7.1.3: Calculated Restoration Volume Available for Reuse of Excavated Peat

9.1.3 The calculations provided above illustrate that there are clearly sufficient opportunities to utilise the total volume of excavated peat for reinstatement onsite following methods described in best practice guidance. The calculations suggest that there could be a small excess of excavated catotelmic peat (188 m^3). Given the conservatisms employed in assumptions regarding acrotelmic and catotelmic peat, and the opportunities to micro-site infrastructure away from deeper peat following detailed pre-construction site investigations, it is considered that an excess of excavated catotelm is very unlikely to be realised in practice, and there will be sufficient opportunity to reuse all excavated peat in site restoration.

9.1.4 It should also be noted that these calculations do not include for the potential use of peat in proposed habitat management measures.

10 Monitoring and Inspection

10.1.1 There would be frequent, routine and regular inspections of peat in all stockpiles and temporary storage areas as part of the PMP audit process. Inspections would assess in situ peat physical conditions, integrity of containment and temporary drainage conditions, and they would seek to confirm that stockpile design and management was adequate to prevent erosion and peat slide. These inspections would take place weekly during stockpile creation and storage.

10.1.2 Should any problems be observed during regular visual inspections of peat stockpiles, this would invoke implementation of an appropriate corrective action which would be recorded and monitored for effectiveness. Types of corrective actions would include, but would not necessarily be limited to: modification of temporary drainage, additional or modified bunding, incorporating of sediment fencing if required, light re-grading to correct any areas of surface erosion, etc.

10.1.3 Regular, frequent inspections of peat conditions during construction and restoration phases of work would be carried out by the Geotechnical Engineer and ECoW as follows:

- Peat surface, peat profile and peat consistency conditions would be carried out as part of ground investigations prior to the start of construction. This information would provide detailed information on the baseline conditions for each part of the infrastructure footprint.
- Restored peat conditions would be inspected immediately after restoration to ensure that the methods detailed in the PMP had been correctly implemented and to inform any corrective actions should they be required.
- The physical condition of peats would be retained as carefully as possible both at the peat storage and the peat restoration stages. This is particularly important for vegetation establishment.

11 Conclusion

11.1.1 This Outline PMP provides the guiding principles which would be applied to the detailed PMP for the proposed Development. The detailed PMP would be prepared for agreement with SEPA and SNH and would form part of an overarching CEMP.

11.1.2 This Outline PMP addresses the following peat-related issues:

- the volumes of peat that are predicted to be excavated;
- the capacity to reuse the peat onsite;
- peat handling and temporary storage; and
- restoration and monitoring of peatland habitat.

11.1.3 The calculations provided above illustrate that there are sufficient opportunities to utilise arising peat for reinstatement onsite following methods described in best practice guidance.

11.1.4 The various calculations presented here would be updated and expanded upon as part of detailed design works, taking account of pre-construction site investigations and micro-siting, to confirm actual quantities of arising peat. The Applicant would achieve an actual balance between arising peat and reinstatement by prioritising the areas for reinstatement, following advice from the project ECoW and Geotechnical Engineer. It is anticipated that a detailed, construction phase PMP would be conditioned, and maintenance and updating of this plan in conjunction with an updated geotechnical (peat) risk register by a Geotechnical Engineer would also be conditioned.

11.1.5 The implementation of the detailed PMP would ensure a robust commitment to excavating, storing and reinstating peat in a manner that follows best practice and ensures the protection of peat throughout the construction and post-construction phases. The detailed PMP and the CEMP for the proposed Development would also include detailed Construction Method Statements and a 'live' Geotechnical Risk Register. These documents and the associated management and monitoring onsite would ensure the active consideration and protection of peat in all aspects of the construction process.

12 References

Joint Nature Conservation Committee. (2011). *Towards an Assessment of the State of UK Peatlands*.

NERC. (2012). *Geology of Britain*. Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html Accessed in June 2019, July 2019 and October 2019.

Scottish Government (2017). *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments*.

Scottish Government, SNH and SEPA. (2017). *Guidance on Developments on Peatland - Site Surveys*.

Scottish Natural Heritage (2016). *Carbon and Peatland Map*.

Scottish Renewables and SEPA (2012).*Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste*

Scottish Renewables, SNH, SEPA & Forestry Commission Scotland (2019). *Good Practice during Windfarm Construction, 4th Edition*

SEPA (2010). *SEPA Regulatory Position Statement – Developments on Peat.*

ITPENERGISED
Earth. Smart. Solutions

Registered Address:

7 Dundas Street

Edinburgh

EH3 6QG

+44 (0) 131 557 8325