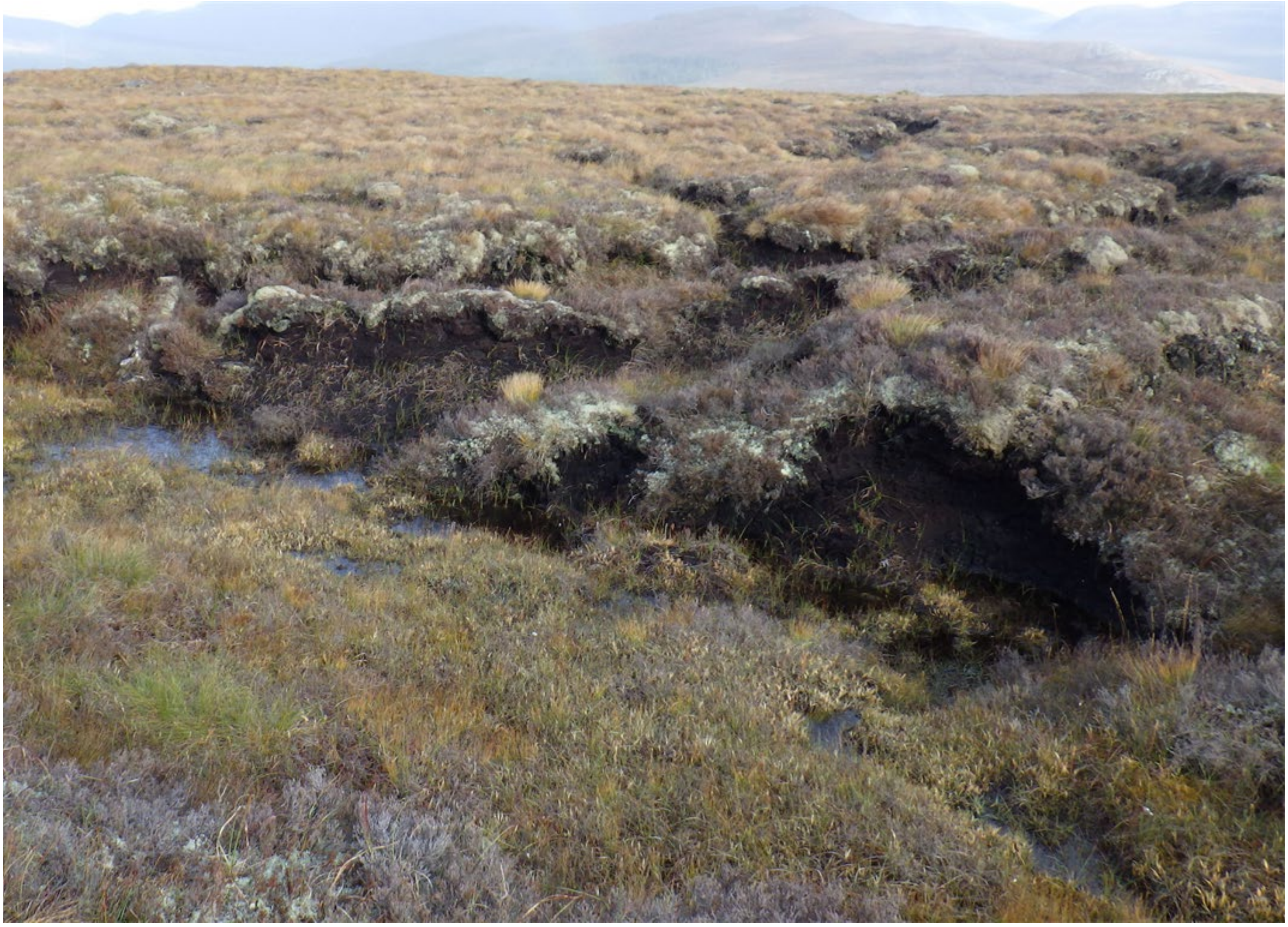

ESB Asset Development UK Limited

Chleansaid Wind Farm: Outline Peat Management Plan

Technical Appendix 10.2

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RSK GENERAL NOTES

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1 INTRODUCTION

1.1 This report provides an Outline Peat Management Plan for Chleansaid Wind Farm (hereafter referred to as the Proposed Development) and associated development infrastructure.

1.2 The report forms a Technical Appendix to the Environmental Impact Assessment (EIA) Report for the Proposed Development and should be read in conjunction with this document. It has been produced to address the requirement for excavation of peat and peaty soils during the construction process.

1.3 This report will consider total volumes of peat that need to be excavated and will set out options for reuse of the excavated material. Guidance on management and handling of excavated peat and soils will be provided.

Site location

1.4 The Proposed Development is located on the Dalnessie Estate, approximately 13 km to the north-east of Lairg in the Scottish Highlands, near the A836–A838 junction. The Proposed Development falls within The Highland Council (THC) area, in the North, West and Central Sutherland ward. The land is currently used as a shooting estate and for sheep grazing. Surrounding land uses include commercial forestry, sporting and recreational uses.

1.5 The Proposed Development lies in an area of rough moorland and rough grazing with boggy areas and is bounded to the west and south-west by commercial forestry some of which has been recently felled. The eastern side is bounded by the River Brora and the north-eastern side by the pronounced ridge of Leathad Chleansaid. The Proposed Development is underlain by nationally important carbon-rich soils, including areas of deep peat and some priority peatland habitat (NatureScot, 2016).

Development proposals

1.6 The Proposed Development includes the following key elements:

- Up to 16 wind turbines, of approximately 6 MW each, 12 with a maximum tip height of 200 m and four with a maximum tip height of 180 m;
- Hardstanding areas at the base of each turbine, with a maximum total area of 2,156 m^2;
- One permanent meteorological mast and two permanent LiDAR compounds, and associated hardstanding areas;
- Total length of access tracks is 17,002 m, of which 11,121 m is new access track with associated watercourse crossings and 5,881 m is existing access track and watercourse crossings which will need to be upgraded;
- An operations control building with parking and welfare facilities;
- A substation compound;

- An energy storage facility;
- Telecommunications equipment;
- Up to four temporary construction compounds;
- Two borrow pits, to provide suitable rock for access tracks, turbine bases and hardstandings; and
- Underground cabling linking the turbines with the substation.

1.7 Full details of the Proposed Development design are provided in **Chapter 2** of the EIA Report.

Aims

1.8 This report aims to undertake a review of all available peat depth information for the Proposed Development and immediate environs, and to provide a series of calculations determining the estimated volumes of peat that will require excavation in order to allow the Proposed Development to progress. Options will be provided to address use of the excavated peat within necessary restoration of the Proposed Development's infrastructure. A series of good practice measures relating to peat and soil handling and storage will also be provided.

Assessment method

1.9 The assessment has involved the following stages:

- Desk study;
- Peat depth surveys and infrastructure design;
- Volume calculations for excavation and reuse;
- Peat handling and storage guidance.

2 PEAT CONDITION

Developments on peat

Definition of peat

2.1 Scotland's Soils (2018a) classifies peat as:

> *An accumulation of partially decomposed organic material, usually formed in waterlogged conditions. Peat soils have an organic layer more than 50 cm deep from the soil surface which has an organic matter content of more than 60%.*

2.2 Organic soils which are 50 cm or thinner can also support peatland vegetation and as a result are also considered within Scotland's broader peatland system in Scotland's National Peatland Plan (NatureScot, 2015). These are often described as 'peaty gleys' or 'peaty podzols', reflecting key aspects of the underlying soil. Peaty soils have a higher plant fibre content and are less decomposed than peat.

2.3 Active peatland typically consists of two layers: the surface layer or *acrotelm* and the deeper layer or *catotelm*. The acrotelm contains the living vegetation and consists of living and partially decayed plant material. It typically has a low but variable hydraulic conductivity and allows some through-flow of water within the plant material. The underlying catotelm is denser, with a very low hydraulic conductivity, and is formed from older decayed plant material. The catotelm varies in structure, in some areas retaining a proportion of fibrous material and in other areas being more humified and amorphous. The degree of humification typically increases with depth.

2.4 Underneath the peat-forming layers, the basal substrate can be a mineral soil, a superficial deposit such as glacial material, or bedrock. There may be a transition zone through a mineral-rich peaty layer at the base of the peat, although this is usually no more than 5 cm in thickness.

Importance of peat

2.5 Peatland forms a key part of the Scottish landscape, covering more than 20% of the country's land area, and forming a significant carbon store (Scotland's Soils, 2018b). In addition, peatland is an internationally important habitat.

2.6 Active and healthy peatlands develop continuously, removing carbon dioxide from the atmosphere and storing it within the peat soil. Peatland protection and restoration form key parts of the Scottish Government's Climate Change Plan, which targets restoration of 250,000 ha by 2030 (Scottish Government, 2018). As of March 2020, over 25,000 hectares of peatland had begun restoration, and in 2020 the government announced a £250 million ten-year funding package to support the restoration of degraded peat (Scottish Government, 2020). Restoration will need to be conducted at a faster pace to reach targets.

2.7 It is therefore important that developments in peatland areas take recognition of the importance of peatland as a habitat and carbon store. Careful planning of developments, and careful infrastructure design, can remove or minimise the disturbance of peat that would be needed to allow the development to proceed.

Development setting

Topography and geomorphology

2.7.1 The turbine area lies on the south-western slope of Leathad Chleansaid, a prominent ridge extending south-east from the higher ground of Creag Riabhach na Greighe. The highest point within the turbine area is immediately south of the summit at Sròn Leathad Chleansaid, where the application boundary reaches an elevation of 335 m above Ordnance Datum (AOD). From the ridge crest, the ground slopes south-east towards the Allt nan Con-uisge and east towards the River Brora. The lowest ground is located along the Allt nan Con-uisge in the south-eastern part of the turbine area, at 195 m AOD. The proposed access track to the turbine area to the west falls to an elevation of 140 m AOD when it joins the A836 adjacent to the River Tirry.

2.7.2 The section of the turbine area surrounding the Allt nan Con-uisge is relatively flat compared with the steeper north and north-eastern sections. A low unnamed hill to the north of Loch na Fuaralachd, on the western application boundary, interrupts the gentle slope southwestwards. Following the topography, the majority of the turbine area drains roughly south and south-east to join the River Brora.

2.7.3 There is limited evidence of modification to peatland areas within the Proposed Development. However, red deer roam both the turbine area and the wider estate resulting in areas of peatland deterioration, primarily around the Dalnessie property. Some areas of poaching by deer activity was apparent within the Proposed Development, mainly around minor watercourses and in boggy ground. Some drainage channels have been constructed on the lower slopes of Leathad Chleansaid in an attempt to improve the land quality. Some areas of peatland within and adjacent to the Proposed Development show signs of peat erosion, which may have been exacerbated by deer activity.

2.7.4 To the south and west of the turbine area there is a large commercial forestry plantation with associated extensive drainage. Much of this has recently been clear-felled.

Habitats and vegetation

2.8 The majority of the Proposed Development is open moorland used as a shooting estate and for rough sheep grazing. The Proposed Development is underlain by nationally important carbon-rich soils, deep peat and priority peatland habitat.

2.9 National vegetation classification (NVC) survey mapping of the turbine area indicates that there are six main communities present:

- M15 – *Scirpus cespitosus - Erica tetralix* wet heath;
- M17 – *Scirpus cespitosus - Eriophorum vaginatum* blanket mire;
- M20 – *Calluna vulgaris - Eriophorum vaginatum* blanket mire;
- M23 – *Juncus effusus/acutiflorus - Galium palustre* rush-pasture;
- M25 – *Molinia caerulea - Potentilla erecta* mire;
- U4 – *Festuca ovina - Agrostis capillaris - Galium saxatile* grassland.

2.10 The area of M15 dominates the majority of the northern region of the turbine area on the steeper slopes, with a small region of M20 north of Turbine T14. The southern region is largely dominated by M17 along the lower flatter-lying areas adjacent to the watercourses.

2.11 Alongside the watercourses small areas of M23 are present, with a region of U4 alongside the River Brora immediately east of the turbine area. M25 is found across the turbine area in small to larger isolated sections.

Hydrology

2.11.1 The Proposed Development lies across two catchment areas: the River Brora and the River Tirry catchments.

River Brora catchment

2.12 The River Brora catchment has a total area of approximately 67.48 km^2 and drains 86% of the Proposed Development.

2.12.1 The Allt nan Con-uisge provides the main drainage for the turbine area. It is located within the broad valley south-west of Leathad Chleansaid and drains south-east into the River Brora approximately 800 m upstream of Dalnessie. A number of minor tributaries and drainage ditches drain into the Allt nan Con-uisge from the slopes of Leathad Chleansaid and the low, poorly defined hills to the south-west of the main channel.

2.12.2 The River Brora provides the drainage for the eastern end of the turbine area, including the lower slopes of Sròn Leathad Chleansaid. The River Brora heads mainly south-east, to reach the North Sea at Brora.

River Tirry catchment

2.12.3 The River Tirry catchment has a total area of 163.41 km^2 and drains 14% of the Proposed Development.

2.12.4 The Abhainn Sgeamhaidh drains the northernmost part of the turbine area, around A' Chleansaid and the slopes below Creag Dhubh. It flows mainly south-west to join the River Tirry west of the A836 before it reaches Loch Shin.

2.12.5 The Fèidh Osdail provides the drainage for the proposed access track to the turbine area. This watercourse drains west and joins the River Tirry near the junction where the proposed access track to the turbine area leaves the A836.

2.12.6 The Brora and Tirry catchments are not entirely independent. The weir at Dalnessie and associated artificial channel provide a cross-link from the River Brora into the River Tirry catchment via the Fèidh Osdail. This was established to support the hydro-electric scheme downstream of Loch Shin during periods of high flow in the River Brora.

Catchment statistics

2.13 The catchment wetness index (PROPWET) for the River Brora and River Tirry catchments are 0.59 and 0.70 respectively, indicating the Proposed Development is wet for 59-70% of the time.

2.14 The Proposed Development has a mid-low range of values for baseflow index (BFI HOST), indicative of the relatively impermeable geology with flow dominated by surface water inputs rather than a significant baseflow component.

2.15 The standard percentage runoff (SPR HOST) is 54.62-55.44%, indicating that around 55% of rainfall for the Proposed Development is converted into surface runoff from rainfall events. This gives a comparatively high runoff risk as soils within the Proposed Development would have a limited capacity to store rainfall and/or they have a relatively slow infiltration rate. As a result, soils with a high SPR tend to saturate quickly, leading to rapid runoff and ‘flashy’ watercourses that rise and fall in level quickly.

2.16 Catchment statistics are derived from the Flood Estimation Handbook Web Service (CEH, 2021).

Peat characteristics

2.17 Across the majority of the turbine area, peat is in near-natural condition consisting of a patchwork of peaty soils, shallow peat and deeper peat reflecting the underlying topography and hydrological setting.

2.18 Very deep peat (>2.5 m) is primarily located in the south-western half of the turbine area, and in some isolated areas in the eastern part of the turbine area. Peaty soils and shallow peat cover the steeper slopes in the north-eastern part of the turbine area.

2.19 Directly west and south-west of the turbine area, peatland has been considerably disrupted by the plantation of coniferous forestry and is no longer in near-natural condition. Drainage ditches have been excavated throughout the forested areas in an attempt to improve the ground for tree growth. Much of the forestry has recently been clear-felled, resulting in additional disruption to the ground conditions from the felling works.

2.20 This may have had some influence on the south-western part of the turbine area, as some peat in this area shows signs of active erosion (Photograph 10.2.1).

Photograph 10.2.1: Active peat erosion in the south-western part of the turbine area, between proposed Turbines T3 and T4.

Peat at the Proposed Development

2.21 The Proposed Development was identified to include areas of peatland at an early stage, as indicated by superficial geology and soils mapping for the region. A broad-scale peat depth survey on a 100 m grid was undertaken by RSK in June 2020. The peat depth data from these surveys were used to inform the infrastructure layout design process in September 2020.

2.22 A second phase of peat depth surveying was undertaken by RSK in October 2020, focusing on the proposed infrastructure layout. Further changes to the layout following a second design meeting in March 2021 required an additional survey in May 2021, also undertaken by RSK.

2.23 The combined peat depth data were used to generate a detailed map of peaty soil and peat depth for the Proposed Development. This is provided on **Figure 10.1.4**. Measured peat and soil depths range from 0 (bedrock at surface) to 7.75 m. A total of 2,046 peat depth measurements have been recorded for the Proposed Development and immediate surroundings.

2.24 The intention has been to avoid peatland areas where possible, and to minimise incursion into peatland where it has not been possible to avoid it altogether. Approximately 47% of the development infrastructure including drainage is underlain by peaty soil or topsoil no greater than 0.5 m deep, with 53% of infrastructure underlain by peat of depths varying between 0.51 m and 3.55 m.

Peat excavation volumes

2.25 The tables below set out the estimated volumes of peat that need to be excavated in order to allow construction of the Proposed Development to proceed. The calculations are provided per 'scheme element', as totals for each element type, and as an overall total. Each set of calculations provides subdivision into 'acrotelm' and 'catotelm'.

2.26 For the purposes of these calculations, the acrotelm has been assumed to form the uppermost 0.5 m where peat is present. Acrotelm is known to vary in thickness, but it is recommended that peat turves are excavated to approximately 0.5 m where possible, including the uppermost part of the catotelm, to promote quicker regeneration of disturbed areas following reinstatement.

2.27 Volumes of peaty soil and topsoil have not been included, in line with the definition of peat quoted above. Soils would also require excavation but are less sensitive than peat to both excavation and restoration.

2.28 **Table 10.2.1** provides peat volumes that require excavation in order to allow construction of the access track network and associated drainage. The proposed new access track width will be approximately 5.5 m, although may be up to 7 m for short sections, such as passing places, laydown areas and tighter bends. The working corridor for excavation calculations of proposed new access track includes an additional 5 m buffer on each side to calculate excavational width. Turning heads present directly adjacent to the access track have been included as part of the access track.

2.29 Upgraded existing access track final width will be between 5.5 m and 7 m. The existing access track has been assumed to be approximately 4 m wide. For excavation calculations an additional 1.5 m of track hardstanding and a 5 m buffer along one side of the track has been used to calculate excavational width.

Table 10.2.1: Peat excavation volumes for access tracks

Scheme element	Acrotelm (m^3)	Catotelm (m^3)	Total (m^3)
Access entry to T02 including T01.	9,412	9,412	18,824
Access to T03 and T04 from T02 access	4,860	10,272	15,132
Access to T05, T06, T07 and BP1 from T02 access	4,610	6,589	11,199
Access to T08, T09 from T07 access	2,029	4,185	6,214
Access to T12, T13 and T14 from T09 access	5,754	6,679	12,433
Access to T15 from T14 access	2,869	3,443	6,312
Access to T10 and T16 from T15 access	2,471	2,273	4,744
Access to T11 from T10 access	2,551	7,043	9,594
Upgraded existing access track	7,167	8,279	15,446
Total	**41,723**	**58,175**	**99,898**

2.30 **Table 10.2.2** provides peat volumes that require excavation in order to allow construction of the turbine foundations, hardstanding areas and crane pads, plus associated drainage. Calculations have been made for each turbine base plus necessary hardstanding areas, making use of peat depth data for the relevant turbine and hardstanding footprint. Where turning heads are present directly adjacent to areas of turbine hardstanding these have been combined.

Table 10.2.2: Peat excavation volumes for turbines, hardstandings, crane pads and associated drainage

Scheme element	Acrotelm (m^3)	Catotelm (m^3)	Total (m^3)
Turbine T1	2,118	1,580	3,698
Turbine T2	3,259	3,584	6,843
Turbine T3	2,060	3,227	5,287
Turbine T4	2,013	831	2,844
Turbine T5	343	69	412
Turbine T6	200	40	240
Turbine T7	1,150	1,687	2,837
Turbine T8	3,173	3,128	6,302
Turbine T9	3,051	2,822	5,873
Turbine T10	1,725	2,032	3,757
Turbine T11	2,061	2,977	5,037
Turbine T12	2,609	2,218	4,827
Turbine T13	686	960	1,646
Turbine T14	1,930	793	2,723
Turbine T15	1,831	984	2,815
Turbine T16	752	426	1,178

Scheme element	Acrotelm (m^3)	Catotelm (m^3)	Total (m^3)
Total	**28,961**	**27,358**	**56,319**

2.31 **Table 10.2.3** provides peat volumes that require excavation in order to allow construction of additional infrastructure, such as construction compounds and borrow pits, plus associated drainage. Calculations have been made for each footprint, making use of peat depth data for the relevant infrastructure element. No additional excavation of peat will be required for compounds within the footprint of Borrow Pit BP1, following the excavation of Borrow Pit BP1.

2.32 The two proposed mobilisation compounds will not involve any excavation works, but will be constructed by laying geotextile directly over the ground with a layer of hardstanding material placed on top of the geotextile. As a result, no peat excavation is required for these compounds.

Table 10.2.3: Peat excavation calculations for other infrastructure elements

Scheme element	Acrotelm (m^3)	Catotelm (m^3)	Total (m^3)
Borrow Pit BP1	11,437	8,806	20,243
Borrow Pit BP2	752	301	1,053
Main Construction Compound	No additional excavation		
Substation Construction Compound and Battery Energy Storage Compound			
Control Building and Substation Compound			
Additional Construction Compound	861	1,206	2,067
Mobilisation Compounds	0	0	0
Permanent Met Mast and Lidar Compounds (x2)	415	206	621
Total	**13,465**	**10,519**	**23,984**

2.33 A summary of the total peat volumes is provided in Table 10.2.4.

Table 10.2.4: Summary of estimated peat excavation volumes

Scheme element	Acrotelm (m^3)	Catotelm (m^3)	Total (m^3)
All tracks	41,723	58,175	99,898
All turbine infrastructure	28,961	27,358	56,319
All other infrastructure	13,465	10,519	23,984
Total	**84,149 (46.7%)**	**96,052 (53.3%)**	**180,201**

Peat reuse

2.34 The guidance document '*Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste*' (Scottish Renewables/SEPA, 2012) identifies a number of reuse options for excavated peat within wind farm developments. These have all been tested in practice and found to be effective, if undertaken with care and appropriate handling of the peat.

Dressing-off edges of constructed infrastructure

2.35 Excavated peat can provide a valuable means for dressing-off and reinstating the slopes and edges of constructed infrastructure. This should be undertaken as soon as practicable after construction and should be managed such that a suitable tie-in to the surrounding topography is created as part of the process. This has a twofold purpose – to reduce the visual effect of the infrastructure and to retain as much of the existing habitat as possible.

2.36 A secondary part of this would involve full reinstatement of elements of infrastructure only required for the construction phase, principally temporary construction compounds. Temporary parts of the turbine hardstandings may also be reinstated following installation of the turbines.

Verge reinstatement on track sections

2.37 For cut tracks, the track margins can be reinstated to form a verge slightly raised above the track level. This acts as a partial visual screen for the track network. Well-designed track margins also help to direct track surface runoff into trackside drainage, where it can be directed for treatment.

2.38 Where existing tracks require upgrading, new works are typically focused on one side of the track and reinstatement would also usually be focused on the track side with new works. Reinstatement of the already-existing track verge can be undertaken where the ground has been left raw or where previous reinstatement has not been effective.

Borrow pit restoration

2.39 Excavated peat has been used successfully in borrow pit restoration, where the method of reuse and the final restoration profile is in keeping with overall habitat and environmental reinstatement objectives. Care must be taken to ensure that no residual risks from pollution of the environment or harm to human health results from the restoration. Unconsolidated peat may be the most suitable material for this purpose, depending on the local situation. Fencing of the restored area may be appropriate if required to exclude grazing in order to encourage vegetation recovery or to allow stabilisation of the surface until vegetation cover has established.

2.40 However, for the Proposed Development it is considered that use of excavated peat in borrow pit restoration would be inappropriate. Borrow Pit BP1 is intended to house the control building and battery storage area, so will need to remain as an active part of the Proposed Development for its lifetime. As a result any restoration would be confined to the sloped faces and margins around the control building and battery storage.

2.41 Borrow Pit BP2 is considered to be suitable for borrow pit restoration using excavated peat.

Peatland restoration

2.42 Peat can provide a valuable material for ditch and peat channel blocking, as part of a peatland restoration plan on blanket bog. In areas with wider ditches, it may be appropriate to use saturated or unconsolidated peat behind dams in order to speed up the restoration process and regeneration of associated vegetation.

2.43 Some existing peatland restoration was observed to the south-east of the Proposed Development in September 2020, to the west of the existing access track (Photograph 10.2.2). This indicates that peatland restoration is currently taking place within the Dalnessie estate. However, high levels of deer grazing and trampling pressure were also observed at the same location at the time of the May 2021 site visit which would negatively affect restoration attempts.

Photograph 10.2.2: Existing peatland restoration works at Dalnessie Estate, immediately south-east of the Proposed Development.

Peat reuse volumes

2.44 Calculations have been made to determine where excavated peat can usefully be reused within the Proposed Development, for the purposes of reinstatement and restoration. Estimated volumes for reuse are provided in **Table 10.2.5**, subdivided by the different reinstatement and restoration methods that are appropriate for the Proposed Development.

Table 10.2.5: Estimated soil and peat volumes for different reuse options

Reuse option	Acrotelm (m^3)	Catotelm (m^3)	Total (m^3)
Dressing-off edges of turbine hardstandings	9,800	4,200	14,000
Dressing-off edges of additional construction compound	300	100	400
Dressing-off of met mast and LiDAR compound hardstandings	400	100	500
Proposed access track verge reinstatement	33,300	-	33,300
Modified existing access track verge reinstatement	8,800	-	8,800
Borrow Pit BP2 restoration	12,800	30,000	42,800
Peatland restoration	19,000	62,000	81,000
Totals	**84,400**	**96,400**	**180,800**

2.45 All figures provided in **Table 10.2.5** have been rounded down to the nearest 100 m^3, to make allowance for the uncertainties present within the figures.

2.46 It has been assumed that limited catotelmic peat would be reused for dressing-off edges and reinstatement of construction infrastructure. In areas with natural hollows, use of some catotelmic peat may be appropriate but it is likely in practice that most of this work would make use of acrotelmic peat.

2.47 It has been assumed that all track verge reinstatement would use entirely acrotelmic peat, although some catotelmic peat may be used in areas with natural hollows.

2.48 Reinstatement and dressing-off have assumed a maximum depth of 0.6 m and a maximum width of 2.5 m from the infrastructure or track margin, to be varied in practice as best suits the local ground conditions.

2.49 Approximately 31% of the catotelmic peat would be used for borrow pit restoration in BP2, with acrotelm providing a surface layer. Calculations assume that approximately 25% of Borrow Pit BP2 would remain accessible during the wind farm operation, to provide aggregate for track repair. The borrow pit has been designed with a shallow bowl-shaped profile in order to facilitate restoration with available peat from the site, with a restored depth of up to 2 m where appropriate.

2.50 Borrow Pit BP1 is not proposed to be reinstated with excavated peat. Where appropriate dressing off of borrow pit and permanent compound edges, as well as reinstatement of temporary compounds, would be carried out using excavated soils.

2.51 The remaining excavated peat from construction would be used for peatland restoration within the Proposed Development. Peatland restoration works would focus on the main areas where active peat erosion has been identified. These areas are focused between Turbines T4 and T11, with a small additional area between Turbines T3 and T4. Additional peat hagging and erosion in parts of the wider Dalnessie estate would be considered for peatland restoration and ditch blocking following consultation with the estate owners and NatureScot, to allow targeting of the work to the most suitable areas.

2.52 **Figure 1** within **Technical Appendix 8.5** (Outline Habitat Management Principles) indicates areas identified as potential restoration areas within the Proposed Development.

3 PEAT HANDLING & STORAGE

Peat excavation

3.1 During the construction of the Proposed Development infrastructure, the appointed Contractor would adopt the following good practice guidelines with relation to peat excavation:

- Where peat conditions are suitable, peat turves would be excavated as intact blocks of the uppermost 0.5 m including the vegetated surface acrotelm layer and the upper part of the catotelm.
- In areas where peat conditions do not allow clean removal of peat turves, the upper layer of peat would be removed as divots or mulch rather than as turves. Careful handling would help to keep the vegetated blocks largely the right way up.
- Underlying peat would be extracted as close to intact as is feasible within the constraints of the area. Remoulding of the peat by the excavator would be kept to a minimum.
- Excavated materials would be classified depending on their composition, and each type would be stored separately. Anticipated material classes are: peaty soils and topsoil, subsoil, acrotelmic peat, catotelmic peat, mineral soil, and rock.
- Excavated peat would be transported as short a distance as practicable for either reuse or temporary storage, in order to minimise loss of structure during transport.

3.2 Peat and soil stripping can be adversely affected by wet weather. The following ‘stop’ conditions are recommended to guide any peat and soil stripping activity (**Table 10.2.6**; CH2M & Fairhurst, 2018).

Table 10.2.6: Recommended ‘stop’ conditions (CH2M & Fairhurst, 2018)

‘Stop’ rule	Requirements
High intensity rainfall	Rainfall during construction greater than 10 mm per hour
Long duration rainfall	Rainfall in the preceding 24 hours greater than 25 mm
7-day cumulative rainfall (1)	Preceding 7 days of rainfall greater than 50% of the monthly average
7-day cumulative rainfall (2)	Preceding 7 days of rainfall greater than 50 mm

3.3 Monitoring of rainfall for ‘stop’ conditions would require access to a suitable local source of data, such as the Met. Office’s monitoring stations at Altnaharra SAWS and Kinbrace, or a site-specific rainfall station, to allow identification of these conditions being exceeded in order to allow appropriate action to be taken.

Temporary storage

3.4 Temporary storage of peat should be avoided or minimised wherever possible. This is best achieved by transporting the peat to an allocated reuse location as soon as practicable following excavation. This would help to retain its structural integrity as far as possible, would minimise volumes of peat requiring storage and would help to prevent the peat drying out.

3.5 The Environmental Clerk of Works (ECoW) would maintain a schedule of reuse and restoration areas and would direct whether excavated peat should be stored or transported directly to a suitable reuse location. Immediate reuse is likely to be more practicable in the later stages of construction.

3.6 Soils, peat turves and peat would all be stored separately. The following outline good practice would be applied to all areas of peat and soil storage:

- Excavated materials would not be stored immediately above excavation faces, in order to prevent overburden-induced failure.
- Local drainage lines, areas of very wet ground and locally steep slopes would be avoided for excavated material storage, including peat.
- Peat turves would be stored vegetation-side up where possible.
- Careful handling of upper-layer peat divots, from areas where peat turves cannot be excavated, would help to retain vegetated blocks the right way up.
- Catotelmic peat would be stored separately from vegetated peat blocks, in mounds up to 1 m high.
- Limited smoothing or 'blading' of stockpiled catotelm peat, topsoil and subsoil would help to shed rainwater and prevent ponding of water on the stockpile.
- In periods of dry weather, light spraying of the temporary peat stores would be applied in order to minimise drying.
- All temporary storage areas for excavated peat and soils would be at least 50 m from any watercourse.
- Runoff from stored peat and soils would be managed to avoid impacts to habitats and watercourses. Where necessary, drainage control measures such as use of silt fences or straw bales would be put in place.
- Monitoring of peat storage areas may be required during wet weather or snowmelt. This would be undertaken by the Contractor, with findings reported to the ECoW.

3.7 Areas identified as potentially suitable for peat and soil stockpiles are detailed in **Table 10.2.6** and shown on **Figure 10.2.3**. Storage areas would be assessed for suitability during construction works and priority would be given to areas near to the material source; key constraints would be slope, watercourses and sensitive habitats.

Table 10.2.7: Potential areas for peat and soil stockpiles

Location	Grid reference
East of BP2, south of the access track	NC 6232 1559
Between T02 and T02, to the east of access track	NC 6194 1613
East of T02, south of the access track	NC 6171 1642

Reinstatement and restoration

3.8 The following principles would be applied in all situations where peat is being reinstated or used in restoration:

- Reinstatement of peat turves and vegetated peat divots would ensure that surface re-vegetation is encouraged as early as possible. Vegetated peat must only be used for surface layer reinstatement and restoration.
- Re-seeding of any significant areas of bare peat would be undertaken with a suitable species mix appropriate to the surrounding habitats. Careful planning of reinstatement should minimise areas of bare peat by appropriate distribution of vegetated peat turves and divots.
- Grazing by livestock and deer may need to be prevented in sensitive areas, by selective use of fencing, until re-vegetation has become established.
- In the event that stored peat becomes dewatered or desiccated, this material would not be exposed in the upper part of any reinstatement or restoration area in order to minimise any further character loss. Storage of excavated peat would be minimised in order to prevent or limit dewatering and desiccation.

Updated peat management

3.9 The Outline Peat Management Plan presented here would be updated and refined as necessary with further site-specific detail once ground investigation results become available. This would involve recalculation of peat volumes requiring excavation and storage. Location-specific reinstatement and restoration would be directed by the ECoW, taking account of specific local variation in topography and natural ground conditions. The Construction Peat Management Plan, to be prepared post-consent, would be a live document, with revisions added as necessary during the construction process.

4 SUMMARY

4.1 This Outline Peat Management Plan provides an assessment of the likely volumes of peat that would require excavation during the construction of the Proposed Development, and of the volumes of peat that can legitimately be used in reinstatement and restoration of development infrastructure. The assessment has included consideration of all proposed infrastructure that would require construction and excavation work where peat would require removal.

4.2 The assessment indicates that there would be a balance in peat volumes and that all peat excavated for construction would be able to be reused within the Proposed Development or within the wider Dalnessie estate, either for reinstatement or peatland restoration. Approximately 48% of the excavated peat would be acrotelmic, which provides good opportunities for promoting re-establishment of peatland vegetation around construction areas. Sensitive reinstatement would help to minimise the visual impact of the construction works as well as minimising the habitat loss from construction.

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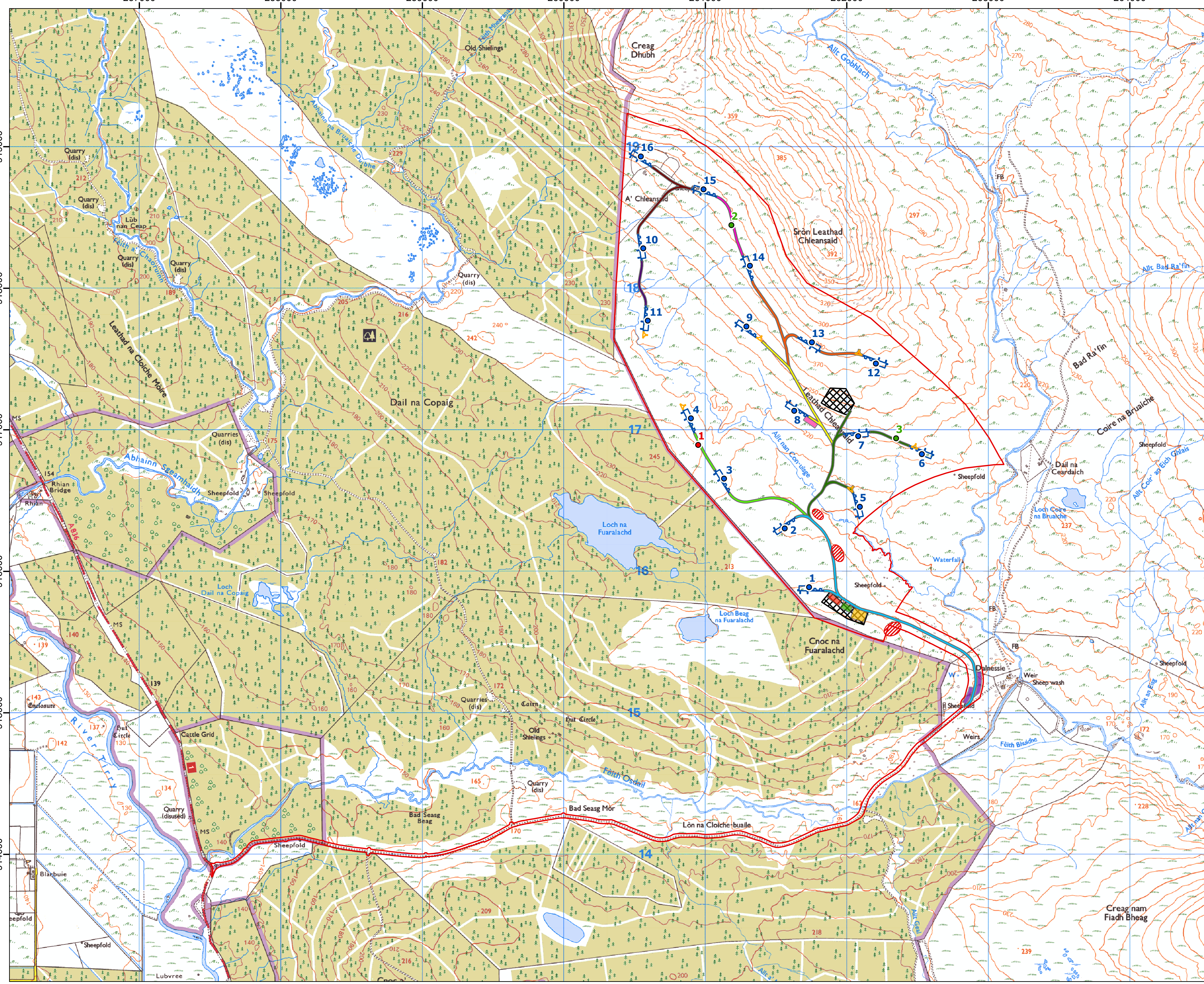
6 FIGURES



Legend:

- Permanent Lidar Location
- Permanent Met Mast
- Proposed Turbine Locations
- Turning Head
- Hardstanding
- Application Boundary
- Control Building and Substation Compound (100m x 75m)
- Substation Construction Compound and Battery Energy Compound (75m x 45m)
- Main Construction Compound (100m x 40m)
- Additional Construction Compound (100m x 40m)
- Mobilisation Compounds
- Borrow Pit
- Potential Peat Storage Area

Track Sections

- Access Entry to T02 including T01
- T03 and T04 Access
- T05, T06, T07 and BP1 Access
- T08, T09 Access
- T10 and T16 Access
- T11 Access
- T12, T13 and T14 Access
- T15 from T14 Access

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Rev	Date	Description	Drn	Chk	App
00	14/12/2021	First Draft	CM	CI	CI
01	25/01/2022	Update BP1	CM	CI	CI

Chleansaid Wind Farm

TITLE:

Figure 10.2.1:
Track Sections and Peat Storage

0 0.5 1
Kilometres
SCALE: 1:25,000 @ A3

REV 01

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