atmos CONSULTING

Environmental Impact Assessment Report

Swarclett Wind Farm

Technical Appendix 8-1: Peat Survey Results

Swarclett Wind Energy Limited

wind2

June 2024

Contents

Document Prepared For

Hannah Brown
Wind2 Ltd

Document Prepared By

James Wilson
Principal Ecologist
james.wilson@atmosconsulting.com

Document Approved By

Greg Fullarton
Regional Director
greg.fullarton@atmosconsulting.com

Version	Date	Reason
1.1	December 2023	Original Issue

1 Introduction

This technical appendix summarises the results of peat surveys undertaken to support Chapter 8 Hydrology and Hydrogeology of the EIAR.

In addition to providing information on peat depth, distribution and quality within the Site, the surveys were used to inform:

- the design of the Proposed Development to minimise disruption to peatlands;
- the development of a Habitat Management Plan (HMP) (Technical Appendix 6-4);
- carbon savings and losses evaluation and carbon calculator assessments;
- drainage planning and hydrological assessment; and
- site reinstatement and restoration.

1.1 Site Location and Description

The Proposed Development Site is comprised of a mix of semi-improved agricultural fields, felled / windblown forestry plantation, and an area of mire or fen in the valley bottom. Loch Scarmclate is situated 2.3km to the southwest.

1.2 Peat Definition

For the purpose of this report, the Macaulay Institute, (1984) definition of peat has been used, whereby:

> "*an organic soil which contains more than 60 per cent of organic matter and exceeds 50cm in thickness*".

While deep peat is defined by Bruneau and Johnson (2014) to be:

> "*a peat soil with a surface organic layer greater than 1.00m thickness*."

This follows the Scottish Government *et al.* (2017) guidance where:

> "*Peat soil is an organic soil which contains more than 60 per cent of organic matter and exceeds 50 centimetres in thickness*".

The guidance also states that:

> "*A peat depth survey should assess the presence of any peat layer even when less than 50cm thickness*".

The structure of an active peatland typically comprises a thin surface layer of living vegetation (the acrotelm) overlying a usually thicker layer of well decayed and humified peat, comprising the consolidated remains of former surface vegetation (the catotelm). Where there are no discernible plant remains, the peat is known as amorphous. Below the peat is the basal substrate, mineral soil, mineral superficial deposit or bedrock.

The acrotelm is the upper aerobic layer of peat and consists of living and partially decayed plant material. It typically has a higher hydraulic conductivity than underlying peat and is defined with relation to distance to the water table. Acrotelm thickness varies with topography - such as hummocks, peat hags, hollows – and with time, especially in drought periods or when it is drained. The acrotelm is not always present.

The catotelm layer sits beneath the acrotelm and consists of well decayed and humified material and is denser with a very low hydraulic conductivity. Conditions are permanently anaerobic and anoxic because the catotelm is permanently below the water table. The catotelm is less cohesive than the acrotelm layer.

Amorphous peat is highly decomposed organic material where all recognisable plant remains are absent. These deposits are dark brown to black in colour, plastic, are low tensile strength and are unable to stand unsupported >1m when stockpiled.

2 Method

The survey methodology followed the guidance of the Scottish Government *et al*. (2017) which replaced the previous guidance issued in 2014. This consisted of a desk study element followed by field survey work and GIS analysis.

2.1 Desk Study

A desk study was carried out to determine the likely presence of peat within the Proposed Development Site using the British Geological Survey (BGS) Geology of Britain Viewer superficial geology maps, and NatureScot (formerly Scottish Natural Heritage[1] (SNH)) Carbon and Peatland Map (2016).

The Carbon and Peatland Map is a high level predictive planning tool which provides an indication of the likely presence of peat, at a course scale. The map shows the areas of peat referred to in Table 8-1-1 in Scottish Planning Policy (SPP) (Scottish Government, 2014) – carbon-rich soil, deep peat and priority peatland habitat. On the map, the top two classes (1 and 2) taken together identify the nationally important resource:

- Class 1
  - Nationally important carbon-rich soils, deep peat and priority peatland habitat;
  - Areas likely to be of high conservation value.
- Class 2
  - Nationally important carbon-rich soils, deep peat and priority peatland habitat;
  - Areas of potentially high conservation value and restoration potential.

2.2 Field Survey

Once the likely presence of peat was determined, an initial site assessment was undertaken by carrying out a low-resolution peat survey of the Proposed Development Site on a 100m grid, with individual locations generated by GIS software. This was undertaken in July 2021 (based on the initial four-turbine design) and finalised in July 2023 (using the two-turbine design including battery design). This initial assessment was used to inform the layout design of the Proposed Development infrastructure, please refer to EIAR Volume 2 Chapter 3 Description of Development.

2.3 GIS Analysis

GIS analysis resulted in production of four figures:

- Figure 8-1-1 – display of SNH Carbon and Peatlands map data within the Proposed Development Site and Interpolated Peat Results; and
- Figure 8-1-2 – display of slope angle using the Terrain5 dataset, with 5m resolution, and the Slope tool in ArcGIS 10.3.1.

[1] References will therefore still refer to 'SNH' as this was the publisher of guidance etc. at the time of publication.

3 Results and Discussion

3.1 Desk Study

3.1.1 BGS Viewer

The British Geological Survey (BGS) Geology of Britain Viewer superficial geology maps showed the Proposed Development Site as covered in diamicton till (Devensian), with the nearest pockets of peat to the north-east at Red Moss.

The superficial layers are underlain by siltstone, mudstone and sandstone of the Lybster Flagstone Formation, with an element in the west of the Proposed Development Site being from the Spital Flagstone Formation.

3.1.2 SNH Carbon and Peatland Map

The SNH Carbon and Peatlands Map showed that the Proposed Development Site is dominated by mineral soils with some Class 3 and 4 soils in the east of the Proposed Development Site.

Analysis of slope using Terrain5 data shows that the Proposed Development Site is located on gently rolling topography with a slope of 10 – 14% located at the western edge of the proposed battery storage.

3.2 Site Survey Results

A total of 71 probes were undertaken during the low-resolution site survey. Please refer to Figure 8-1-1 and Table 8-1-2 (Annex A) for further information.

An interpolated peat contour plan figure was developed to indicate the potential maximum peat depth based on the depth penetration probing results at all investigation points across the Proposed Development Site. Please refer to Figure 8-1-1.

The total area of peat across the Proposed Development Site at different depths is presented in Table 8-1-1.

Table 8-1-1: Distribution of Peat Depth by Area

Depth range (m)	Area (m^2)	% of total
0 – 0.5	330,916.80	97.25
0.5 – 1	9,362.92	2.75
1 – 1.5	n/a	n/a
1.5 – 2	n/a	n/a
2 – 2.5	n/a	n/a
2.5 – 3	n/a	n/a
3 – 3.5	n/a	n/a
3.5 – 4	n/a	n/a
Total	**340,279.72**	**100.00**

3.3 Discussion

Peat / peaty soil is very shallow (<1.0m) across the Proposed Development Site.

The substrate beneath the peat / peaty soil varies in character but was typically recorded as bedrock or sandstone. No clay till was identified beneath the peat and no iron pans were observed.

4 References

Bruneau, P.M.C & Johnson, S.M. 2014. Peatland - definitions & information resources. Scottish Natural Heritage Commissioned Report No 701.

Food and Agriculture Organization of the United Nations (FAO) (2011). Classification of Organic Soils. www.fao.org/docrep/x5872e07.htm

Macaulay Institute for Soil Research (1984). Organization and Methods of the 1:250 000 Soil Survey of Scotland. University Press, Aberdeen.

Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only.

Annexes

Annex A: Raw Data

Table 8-1-2: Peat Survey Results – Initial Site Assessment

Point	Measured Depth (cm)	Eastings	Northings
88	7	320150	962250
89	25	320450	962250
90	26	320550	962250
97	31	320650	962450
98	32	320750	962450
100	40	320650	962550
101	35	320750	962550
102	24	320850	962550
103	36	320950	962550
104	29	321050	962550
105	33	321150	962550
106	86	320850	962650
107	3	320950	962650
108	12	321050	962650
109	24	321150	962650
110	6	321250	962650
111	22	321350	962650
112	28	321450	962650
113	38	321150	962750
114	6	321250	962750
115	11	321350	962750
116	21	321450	962750
117	6	321250	962850
118	1	321350	962850
119	25	321450	962850
120	2	321250	962950
121	5	321350	962950
122	1	321450	962950
123	12	321050	963050
124	17	321150	963050
125	2	321250	963050
126	20	321350	963050
127	18	321450	963050
128	6	320950	963150
129	6	321050	963150
130	24	321150	963150
131	0	321250	963150
132	6	321350	963150

Point	Measured Depth (cm)	Eastings	Northings
133	8	320650	963250
134	5	320750	963250
135	9	320850	963250
136	6	320950	963250
137	0	321050	963250
138	2	321150	963250
139	10	321250	963250
140	7	321350	963250
141	12	320650	963350
142	4	320750	963350
143	13	320850	963350
144	21	320950	963350
145	24	321050	963350
146	6	321150	963350
147	14	321250	963350
1	2	320179	962350
2	3	320279	962350
3	4	320379	962350
4	2	320479	962350
5	3	320579	962350
6	2	320179	962450
7	5	320279	962450
8	3	320379	962450
9	1	320479	962450
10	2	320579	962450
11	1	320179	962550
12	1	320279	962550
13	1	320379	962550
14	4	320479	962550
15	4	320579	962550
JF1	80	321276	962588
JF2	70	321228	962612
JF3	51	320706	962444

Swarclett Wind Farm

wind2

Figure 8-1-1
Carbon and Peatland Map and Interpolated Peat Results

Key

- Site boundary
- Proposed infrastructure
- Cosmetic Polygon
- Proposed turbine

Peat probe location

- < 0.5m
- 0.5 - 1m
- 1 - 1.5m
- 1.5 - 2m
- 2 - 2.5m
- 2.5 - 3m
- > 3m

Interpolated peat depth

- < 0.5 m
- 0.6 - 1m
- 1.1 - 1.5m
- 1.6 - 2m
- 2.1 - 2.5m
- 2.6 - 3m
- > 3m

NatureScot Carbon & Peatlands Map (2016) (Inset)

- Non-soil
- Unknown soil
- Mineral soil
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

atmos CONSULTING

0 75 150 300
Meters

N

Scale @ A3:
1:6,500

04/01/2024	TL01i	40422/HB/078d
Drawn by: AF	Checked by: TH	Approved by: MT

Swarclett Wind Farm

wind2

Figure 8-1-2
Slope Angle

Key

- Site boundary
- Proposed infrastructure
- Proposed turbine

Slope gradient

- 10 -12%
- 12 - 14%
- > 14%

atmos CONSULTING

0 75 150 300
Meters

N

Scale @ A3:
1:6,500

22/09/2023 TL01i 40422/HB/087a
Drawn by: AF Checked by: TH Approved by: JW