Scottish & Southern Electricity Networks
TRANSMISSION

Beauly to Blackhillock to New Deer to Peterhead 400 kV Project

Environmental Impact Assessment Report

Volume 5 | Appendices

Appendix 10.4 - Peatland Carbon Emission Assessment

APPENDIX 10.4 – PEATLAND CARBON EMISSION ASSESSMENT

Appendix Figures

No figures accompany this appendix

Appendix Annexes

No annexes accompany this appendix

1 Introduction

1.1.1 This Peatland Carbon Emission Assessment (PCEA) is an Appendix to **Chapter 10: Water and Geological Environment** and has been prepared by WSP on behalf of the Applicant to support the Environmental Impact Assessment (EIA) Report for Beauly to Blackhillock to New Deer to Peterhead 400 kV Project (the 'Proposed Development'). It has been developed due to the identification of peatland and peat habitats on the Site and to accord with SEPA's scoping response. Itis not intended to be read as a standalone assessment and reference should be made to the introductory chapters of this **EIA Report (Chapters 1-6)**. Reference should also be made to Chapter 8: Ecology, as well to as **Appendix 10.1: Peat Survey Report** and **Appendix 10.2: Peat Management Plan (PMP)**. This PCEA has been developed due to identification of the presence of peatland (**Chapter 10: Water and Geological Environment)** and peat habitats on the site (**Chapter 8: Ecology**) and as requested by SEPA in their EIA scoping response. It should be read in conjunction with the Peat Survey Report included as **Appendix 10.1** and (PMP) as **Appendix 10.2**.

1.1.2 The PMP will be further developed and implemented in consultation with SEPA, NatureScot, The Highland Council (THC), Moray and Aberdeenshire Councils. Further details and specific plans will be determined during the detailed design process and once further site investigations have been undertaken. These details will then be included in a detailed Peat Management Plan as a part of the Principal Contractor's (PC) detailed Construction Environmental Management Plan (CEMP). The responsibility for the implementation of the PMP will be with the PC.

1.1.3 The potential volumes of carbon emitted due to the Proposed Development are based on the peat extracted and re-used, and have been calculated based on an area specific or infrastructure specific basis, using a modelled peat contour plan developed on a high-density probing grid where excavations are proposed to be undertaken.

1.1.4 This PCEA has been developed in alignment with the PMP which addresses the management of peat during the construction period for the Proposed Development and the restoration of the site both during construction and once construction has been completed. In accordance with SEPA guidance, as much peat as possible is re-used on site.

2 Objectives

2.1.1 This PCEA has been developed to quantify the carbon emissions from the disturbance of peat as a result of the construction and operation of the Proposed Development.

2.1.2 In line with the National Planning Framework (NPF4) Policy 5[1], this assessment and the accompanying assessments propose mitigation measures in line with the PMP that will minimise any impacts to peat and management methods to protect excavated peat, and therefore reduce the lifecycle greenhouse gas emissions as far as possible.

3 Structure

3.1.1 The structure of the PCEA is as follows:

- Section 4 presents the Peat Carbon Emissions Assessment;
- Section 5 states the measures being taken to avoid and minimise the disturbance of peat; and
- Section 6 presents the summary of the assessment.

[1] Scottish Government (2022). National Planning Framework 4: Edinburgh: Scottish Government, Policy. ISBN 9781805250890 Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4.pdf

3.1.2 Tables are included showing:

- Table 4.1 Net Peat Balance; and
- Table 4.2 Peat Carbon Emissions.

4 Peat Carbon Emissions Assessment

4.1 Peat Carbon Emissions Assessment Methodology

4.1.1 To inform the PCEA, peat depth surveys were undertaken between July 2024 and August 2025, which included peat probing and coring. The strategy for these surveys was submitted to SEPA in April 2024 following a meeting on 22 April 2024 during which both peat survey strategy and peat model development were discussed. During a meeting on 19 August 2024 the survey strategy was presented and agreed with NatureScot.

4.1.2 The study area for the PCEA assessment was aligned with the peat study area described in **Appendix 10.1: Peat Depth Survey Report.**

4.1.3 To obtain a detailed understanding of the spatial and depth distribution of peat and its properties, a series of tasks have been completed which include:

- The development of a peat depth model by the James Hutton Institute (JHI) using various input layers to determine the likelihood of peat occurrence across the site. A comparison was then completed with probing and coring data undertaken at various locations for model verification prior to commencement of probing at infrastructure locations.
- Depth of penetration probing was completed, as agreed with SEPA and Nature Scot, at 21,203 locations (see **Appendix 10.1: Peat Depth Survey Report**):
  - where the JHI model predicts peat with the initial probing density dependent on the model value assigned to the infrastructure where probing is required. A coarser grid (50 m) was used where there was less likelihood of peat and a denser grid was used where the likelihood was higher. If peat was located on the coarser grid, the probing density was increased to the denser grid; or
  - where priority peatland habitats were present based on habitat mapping regardless of the JHI model score as requested by NatureScot.
- No probing was completed where the JHI model predicted no peat and no priority peatland habitats were mapped.
- Coring was also completed at 40 locations to enable verification of the probing depths and assessment of the characteristics of the peat (see **Appendix 10.1: Peat Depth Survey Report**).

4.1.4 The PCEA was undertaken in line with NatureScot guidance 'Advising on peatland, carbon-rich soils and priority peatland habitats in development management' (2023)[2], the 'Calculating potential carbon losses and savings from wind farms on Scottish peatlands' (Scottish Government, 2018)[3] guidance and the Peatland Code Emissions Calculator[4].

[2] NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management
[3] Scottish Government (2018). Calculating potential carbon losses and savings from wind farms on Scottish peatlands – Technical Guidance. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/carbon-calculator-technical-guidance/documents/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands-technical-guidance/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands-technical-guidance/govscot%3Adocument/Calculating%2Bpotential%2Bcarbon%2Blosses%2Band%2Bsavings%2Bfrom%2Bwind%2Bfarms%2Bon%2BScottish%2Bpeatlands%2B-%2Btechnical%2Bguidance.pdf
[4] IUCN UK Peatland Programme (2023). Peatland Code – Emissions Calculator Guidance (Version 2). March 2023. Available at: https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2024-04/Peatland%20Code%20V2%20-%20FINAL%20-%20WEB_0.pdf

4.1.5 The carbon stored within the peatland is calculated in accordance with the methodology provided in the Scottish Government Guidance on Calculating potential carbon losses and savings from wind farms on Scottish peatlands.

4.1.6 Within the Scottish Government Guidance (2018)[3], the loss of carbon from the removed peat (Removed (t CO_2)), is calculated from the carbon content of dry peat (pCdrypeat (%)), the dry soil bulk density (dried to a constant weight at 105°C, (BDdrysoil (g cm-^{3})), and the volume of peat removed (Vdirect (m^3)). This is shown in the below formula:

$$L_{Removed} = \frac{3.667}{100} \times pC_{dry\ peat} \times BD_{dry\ soil} \times V_{direct}$$

4.1.7 The volume of peat extracted was used to calculate the potential emissions associated with its removal, storage and reinstatement. The following factors were used within the calculation of the peatland emissions:

- Content of dry peat (% carbon value) – suggested default value by the Scottish Government Guidance (2018)[3] is 42%
- Bulk Density of Peat (kg/m^3) - suggested default value by the Scottish Government Guidance (2018)[3] is 175

4.1.8 In line with the Scottish Government Guidance (2018), the loss of carbon from peat removed from site is assumed to be 100% due to the low likelihood of successful restoration. If peat is returned to the site with full restoration of the habitat and hydrological conditions, the volume of restored peat is added to the calculation of Carbon emission savings due to site improvement. However, for this assumption the restoration plan should demonstrate a high probability that peat hydrology will be restored and disturbance of peat minimised.

4.2 Peat Characteristics and Extraction Volumes

Peat Characteristics

4.2.1 Peat depth surveys covered a total of 21,203 depth of penetration probes and 40 cores; showing 7.65 % of the surveyed area with peat up to 1 m depth and 9.09 % of the area with peat >1 m depth, to a maximum depth of 8.1 m with an average of 0.92 m.

4.2.2 Peat is almost entirely absent for the section of the Proposed Development from Beauly to about 7 km east of Inverness and from south of Elgin to Peterhead.

4.2.3 From approximately 7 km east of Inverness to directly south of Elgin, peat occurrence and depth is variable along with peat generally present in pockets which can extend up to 8 m in depth.

4.2.4 To validate probing depths, cores were taken at 40 selected locations, showing a distinct acrotelm layer in 35 of the 40 coring locations (0.05 m and 0.20 m thick) at an averaged depth of 0.11 m where present. The coring survey pointed out that amorphous peat was not identified at site. For further details, see **Appendix 10.1: Peat Depth Survey Report**.

4.2.5 Using the survey data, a peat contour model was created in the ArcMap GIS environment using a natural neighbour approach.

4.2.6 To inform the carbon baseline, a contour shapefile layer of peat presence and depth across the peat study area, was based on peat probing points and provided by Fluid Environmental Consulting was used. This provided the preconstruction peat volumes that were used to undertake the PCEA.

4.2.7 To inform the post-development assessment, the Proposed Development's scheme design was overlayed on top of the peat contour layer to identify the total area of peat impacted, and its depth. It was assumed that in the final scheme design, all overlayed areas of peat will be lost. However, for temporary construction such as access roads, it was assumed that loss was temporary and reinstated.

Peat Extraction Volumes

4.2.8 The total volume of peat predicted to be excavated totals 24,531 m^3 which is 3,147 m^3 more than the currently identified 21,384 m^3 of peat reuse in the temporary infrastructure areas (**Table 4.1**). The additional restoration areas provide some contingency if peat excavation volumes are greater than have been calculated or if some peat restoration areas are determined on closer inspection to not be suitable.

Table 4.1 Net Peat Balance

	Towers Volume (m^3)	Tracks Volume (m^3)	Total Volume (m^3)
Excavated Peat	19,762	4,769	24,531
Peat Reuse	19,783	1,601	21,384
Total Excess of Peat			3,147

4.3 Peat Carbon Emission results

4.3.1 The Proposed Development is predicted to result in the removal 1,803,029 kg of carbon as part of the 24,531 m^3 extracted. This would result in total emissions of 6599 tCO2e if it was not re-used / reinstated. Taking into account the reuse of all the extracted peatland, an estimated 1,571,724 kg of the peatland carbon will be reinstated and the potential emissions avoided as shown in **Table 4.2**.

Table 4.2 Peat Carbon Emissions

	Removal during Construction	Post Construction Reinstatement (short term, 2-5 years)	Overall Change
Carbon stored within Peat (kg)	1,803,029	1,571,724	**231,305**
Carbon Storage (tCO2e)	6599	5753	**5753**

4.3.2 The condition of the removed peat in line with the Peatland Code Emissions Calculator[5] was not recorded as part of the peat depth surveys and therefore any emissions resulting from the degradation of peatland without its removal is not included.

4.3.3 As stated in the Peat Management Plan and **Section 5** the potential for changes in condition is minimal and steps will be taken to ensure the health of any reinstated or reused peat is maintained. The exact volume and form of reuse is not known at the point of writing this report.

5 Avoidance and Minimisation of Peat Disturbance

5.1 NatureScot's 2023 Guidance and NPF4 Mitigation Hierarchy

5.1.1 In line with the NPF4 and NatureScot's 2023 guidance on peatland and carbon-rich soils, the Proposed Development adheres to the mitigation hierarchy to ensure that impacts on peatland habitats, carbon-rich soils, and sensitive ecosystems are avoided, minimised and, where necessary, compensated for. The following hierarchy is applied to the Proposed Development:

[5] IUCN UK Peatland Programme (2023). Peatland Code – Emissions Calculator Guidance (Version 2). March 2023.

- Avoid – The Proposed Development design has prioritised avoiding areas of peatland, carbon-rich soils, and priority peatland habitat from the outset. Site selection and layout have been carefully considered to prevent disturbance to these sensitive areas;
- Minimise – Where impacts cannot be fully avoided, efforts have been made to reduce them to the absolute minimum. This includes measures such as using existing access routes, optimising infrastructure locations, and implementing sensitive construction techniques to limit soil disturbance and damage to peatland habitats. Methods include:
  - the use of floated access tracks and floated working areas, which are assumed to results in no peat loss where feasible; and
  - piling of foundations so that peat can be displaced rather than excavated.
- Restore – Where damage to peatland habitats is unavoidable, restoration measures will be implemented to repair any damaged areas. This includes re-establishing peatland vegetation and improving the condition of any degraded habitats, ensuring that any impacted areas are restored to the extent possible; and
- Offset – In cases where residual impacts remain, effective restoration and management of equivalent peatland habitats will be carried out to offset the loss. On-site restoration measures will be prioritised.

5.1.2 Through this approach, the Applicant seeks to ensure that peatland and carbon-rich soils are adequately protected, and any unavoidable impacts are effectively managed, in line with both NPF4 and NatureScot's guidelines.

5.1.3 The development of the infrastructure layout has been an iterative process designed to avoid or minimise impact on blanket bog habitats and peat where possible. The mapping of peat depth through probing has therefore allowed a peat depth contour map to be generated with a greater level of detail at proposed infrastructure locations. The peat depth model has been used to inform further layout modifications to enable higher confidence in the avoidance of peat. Where avoidance of peat >1 m in depth has been unavoidable for any section of track, a floating track design is proposed, if feasible. This also applies to other hardstanding areas. The final iteration of the infrastructure layout was informed by detailed peat probing across all infrastructure.

6 Summary

6.1.1 To inform the PCEA, peat depth surveys were undertaking between July 2024 and August 2025, which included peat probing and coring. The strategy for these surveys was submitted to SEPA in April 2024 following a meeting on 22 April 2024 during which both peat survey strategy and peat model development were discussed. During a meeting on 19 August 2024 the survey strategy was presented and agreed with NatureScot.

6.1.2 Peat depth surveys covered a total of 20,542 depth of penetration probes and 40 cores; showing approximately 7.8 % of the surveyed area with peat up to 1 m depth and 9.2 % of the area with peat >1 m depth to a maximum depth of 8.1 m.

6.1.3 Peat is almost entirely absent for the section of the Proposed Development from Beauly to about 7 km east of Inverness and from south of Elgin to Peterhead.

6.1.4 The total volume of peat predicted to be excavated totals 24,531 m^3 which is 3,147 m^3 less than the currently identified 21,384 m^3 of peat reuse in the temporary infrastructure areas

6.1.5 The Proposed Development is predicted to result in the removal 1,803,029 kg of carbon as part of the 24,531 m^3 extracted. This would result in total emissions of 6599 tCO2e if it was not re-used / reinstated as shown in **Table 4.2**. After the reinstatement of 21,384 m^3 of peat as detailed above the total carbon emissions are expected to be 846 tCO2e.

6.1.6 The measures proposed for the avoidance, minimisation and restoration of peat as part of the proposed development are detailed in **Appendix 10.2: Peat Management Plan**.