VOLUME 2: CHAPTER 10 – GEOLOGY AND SOILS

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10. GEOLOGY AND SOILS

10.1 Introduction

This Chapter of the Environmental Impact Assessment Report evaluates the likely significant effects of the Proposed Development on the geology, soils and peat resource. This assessment was undertaken by ERM.

This Chapter includes the following sections:

- Legislation, policy and guidance;
- Assessment methodology and significance criteria;
- Baseline conditions;
- Assessment of potential effects;
- Mitigation and residual effects;
- Cumulative effect assessment;
- Summary of effects; and
- Statement of significance.

Please note that, for the purposes of this chapter, the terms “peat” and “peatlands” refer to the soils, rather than to the habitat that the soils support.

10.2 Legislation, Policy and Guidance

Consideration was given to the National Planning Framework 4 (NPF4) that sets out the Scottish Government’s policy on how nationally important land use planning matters should be addressed. Policy 5 within this document details the approach to soils, and includes some of the following key points relating to developments on peatlands:

“*Development proposals on peatland, carbon rich soils and priority peatland habitat will only be supported for:*

- *Essential infrastructure and there is a specific locational need and no other suitable site;*
- *The generation of energy from renewable sources that optimises the contribution of the area to greenhouse gas emissions reductions targets;*
- *Small-scale development directly linked to a rural business, farm or croft;*
- *Supporting a fragile community in a rural or island area; or*
- *Restoration of peatland habitats.*

Where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required to identify:

- *the baseline depth, habitat condition, quality and stability of carbon rich soils;*
- *the likely effects of the Proposed Development on peatland, including on soil disturbance; and*
- *the likely net effects of the development on climate emissions and loss of carbon.*
- *This assessment should inform careful project design and ensure, in accordance with relevant guidance and the mitigation hierarchy, that adverse impacts are first avoided and then minimised through best practice. A peat management plan will be required to demonstrate that this approach has been followed, alongside other appropriate plans required for restoring and / or enhancing the site into a functioning peatland system capable of achieving carbon sequestration.”*

In addition to the NPF4, guidance of relevance to this Chapter includes:

- NatureScot (formally Scottish Natural Heritage (SNH) (2019)) 4th Edition, Good Practice During Wind Farm Construction[1];
- The Scottish Government (2017), Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation[2];
- Scottish Government, SNH, SEPA (2017) Peatland. Guidance on Development on Peatland, on-line-version-only[3];
- The Scottish Government (2009), The Scottish Soil Framework[4];
- NatureScot (2023) Advising on peatland, carbon-rich soils and priority peatland habitats in development management[5];
- NatureScot (2024) Pre-application guidance for onshore wind farms[6];
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741)[7]; and
- Planning Advice Note PAN 50 Controlling the Environmental Effects of Surface Mineral Workings[8].

10.3 Assessment Methodology and Significance Criteria

The parameters of the design that influence the geology and peat assessment in relation to physical effects is based on the substation layout and associated infrastructure. No additional design parameters, other than those set out in **Volume 2 Chapter 2** Project Description of this EIAR, are required for the assessment presented in this Chapter.

The site infrastructure may be micro-sited, where constraints allow. Such relocations have been considered when undertaking the assessment and mitigation recommended.

Scope of the Assessment

The key issues for the assessment of potential geology and peat effects relating to the Proposed Development are as follows:

- Potential for peat destabilisation and peat slide risk;
- Potential effects relating to peat disturbance and the subsequent effects from excavated peat and management of peat and peaty soils;
- Potential for compaction of superficial soils; and
- Potential for loss of important geological minerals.

This is assessed through technical assessment in the form of:

1 SNH (2019): Good practice during windfarm construction, 4th Edition [Online] Available at: Good practice during Wind Farm construction | NatureScot (Accessed 24/06/2024)
2 Scottish Government (2017) Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation [online] Available at: Proposed electricity generation developments: peat landslide hazard best practice guide - gov.scot (www.gov.scot) (Accessed 11/07/2024)
3 Scottish Government (2017) Guidance on Development on Peatland [online] Available at: Guidance+on+developments+on+peatland+-+peatland+survey+-+2017.pdf (www.gov.scot) (Accessed 11/07/2024)
4 Scottish Government (2009) Scottish Soil Framework [online] Available at: The Scottish Soil Framework (www.gov.scot) (Accessed 11/07/2024)
5 NatureScot (2023) Advising on peatland, carbon-rich soils and priority peatland habitats in development management [online] Available at: Advising on peatland, carbon-rich soils and priority peatland habitats in development management | NatureScot (Accessed 15/07/2024)
6 NatureScot (2024) Pre-application guidance for onshore wind farms [online] Available at: NatureScot pre-application guidance for onshore wind farms | NatureScot (Accessed 15/07/2024)
7 CIRIA (2023) Environmental Good Practice on Site Guide (fifth edition) [online] Available at: Environmental good practice on site guide (fifth edition) (ciria.org) (Accessed 11/07/2024)
8 The Scottish Office Development Department (1996) Planning Advice Not 50: Controlling the Environmental Effects of Surface Mineral Workings [online] Available at: 0026467.pdf (www.gov.scot) (Accessed 11/07/2024)

- PSRA;
- OPMP; and
- Assessment of effects following the engineering design of Development layout, detailed in **Volume 2 Chapter 2** Project Description of this EIAR.

Extent of the Study Area

The Proposed Development is located on the north western slope of Meall Mò, adjacent to the south western boundary of the existing 275 kV Loch Buidhe Substation. Access to the existing 275 kV Loch Buidhe Substation is taken off Lochbuie Road, to the north-west of the Site. The Site lies approximately 9.5 km to the north east of Bonar Bridge, within The Highland Council (THC) area, cantered on Ordnance Survey National Grid Reference (OSNGR) 265194 E, 897429 N.

Currently the Site predominantly comprises commercial forestry, of which a significant proportion has been felled. An unnamed surface watercourse (Unnamed Watercourse A) is present, draining in a north westerly direction towards Allt Garbh-airigh.

Existing ground levels comprise an overall fall from approximately 230 m Above Ordnance Datum (AOD) in the south-east to approximately 200 m AOD in north west adjacent to the existing 275 kV Loch Buidhe Substation access track.

Consultation Undertaken to Date

Consultation for this EIAR topic was undertaken with the organisations shown in **Table 10.1**. Only organisations that were consulted and that had inputs regarding the geology and peat are listed in the table below.

Table 10.1 Scoping Consultation Responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
The Highland Council	Email Response to Scoping on 9 May 2024	*The Highland Council has highlighted that SEPA do not agree with potential off-Site peat restoration required to mitigate the effects of the proposed development not being included in the EIA.*	No off-site peat restoration will be required for this development as highlighted in **Volume 4 Appendix 10.2** outline peat management plan (oPMP).

Method of Baseline Data Collation

The assessment of peat and geology has included the review of publicly available information in relation to the current condition of the soils at the Site with the information detailed in the baseline description. This was supported by detailed site walkover surveys. The information has been reviewed in the context of the Proposed Development to evaluate both short and long-term effects.

The assessment has involved a review of the following data sources detailed below:

- National Soils Map of Scotland[9];
- Carbon and Peatland 2016 Map[10];

[9] Scotland's Environment (2023). National Soils Map of Scotland. [Online] Available at: Scotland's Soils - soil maps (environment.gov.scot) (Accessed 24/06/2024)

10 Scotland's Environment (2023). 2016 Carbon and Peatland Map. [Online] Available at: https://map.environment.gov.scot/Soil_maps/?layer=1 Scotland's Soils - soil maps (environment.gov.scot) (Accessed 24/06/2024)

- British Geological Survey (BGS) Geoindex – Superficial Soils[11]; and
- BGS Geoindex – Solid Geology[12].

Soil types are of high sensitivity where they are categorised as peat soils of high moisture content, such as those found in blanket bog.

The methodology employed for the evaluation is in accordance with Scottish Government guidance. Also using experience from other development projects, there is an assessment of the effects on geology and soils either affected directly or indirectly by construction or operation of the Proposed Development.

Assessment Modelling

The assessment of effects is based on the final design of the Development detailed in **Volume 2 Chapter 2** Project Description of this EIA Report. The assessment considers the sensitivity of the receptor and the magnitude of any potential change, to conclude whether the effect is significant.

Determining Magnitude of Change and Sensitivity of Receptors

Sensitivity of Receptors

The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, is assessed in line with best practice guidance, legislation, statutory designations and / or professional judgement.

Table 10.2 details the framework for determining the sensitivity of receptors, informed by NatureScot guidance[13] and outlined in **Volume 2 Chapter 4** EIA Process and Methodology.

Table 10.2 Framework for determining sensitivity of receptors

Sensitivity of Receptor	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	Soil type and associated land use are highly sensitive (e.g., peat/blanket bog); Class 1 or 2 priority peatland, carbon-rich and peaty soils cover >20% of the development area; Areas containing geological or geomorphological features considered to be of national importance (e.g., geological SSSIs); and Receptor contains areas of regionally important economic mineral deposits.
Medium	Soil type and associated land use are moderately sensitive (e.g., commercial forestry); Class 1 or 2 priority peatland, carbon-rich and peaty soils cover <20% of the development area; Class 3 and 5 peatland areas, carbon rich and peaty soils; Receptor contains areas of locally important economic mineral deposits; and Areas containing geological features of designated regional importance including Regionally Important Geological/geomorphological Sites (RIGS), considered worthy of protection for their historic or aesthetic importance.
Low	Geological features or geology not protected and not considered worthy of specific protection. Soil type and associated land use not sensitive to change in hydrological regime (e.g., intensive grazing); and Receptor contains Class -2, -1, 0, and 4 non-peatland areas, with no carbon-rich and/or peaty soils.

[11] BGS GeoIndex (2023). Onshore GeoIndex, [Online] Available at: GeoIndex - British Geological Survey (bgs.ac.uk) (Accessed 24/06/2024)
[12] BGS GeoIndex (2023). Onshore GeoIndex, [Online] Available at: GeoIndex - British Geological Survey (bgs.ac.uk) (Accessed 24/06/2024)
[13] Scottish Natural Heritage (NatureScot) and Historic Environment Scotland (2018), Environmental Impact Assessment Handbook [Online] available at: Environmental Impact Assessment Handbook | Hist Env Scotland (historicenvironment.scot) (Accessed: 26/06/2024)

Sensitivity of Receptor	Definition
Negligible	The receptor is resistant to change and is of little environmental value.

Magnitude of Effects

The magnitude of likely significant effects is identified through consideration of the Proposed Development, the degree of change to baseline conditions predicted as a result of the Proposed Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

The NatureScot[14] criteria for assessing the magnitude of an effect are presented in **Table 10.3** and are also outlined in **Volume 2 Chapter 4** EIA Process and Methodology.

Table 10.3 Framework for determining magnitude of effects

Magnitude of Effects	Definition
High	Major or total loss of or alteration to peatland resource such that post development characteristics or quality will be fundamentally or irreversibly changed; Long term / permanent change to human or environmental health; Catastrophic failure of site infrastructure due to ground instability; Long term / permanent change to baseline resource; and Major or total loss of a geological site or mineral deposit, where the value of the site would be severely affected.
Medium	Loss of, or alteration to the baseline resource such that post development characteristics or quality will be partially changed; Mid-term / permanent change to human or environmental health; Ground failure that requires remediation but does not cause catastrophic failure of site infrastructure; Mid-term / permanent change to baseline resource; and Partial loss of a geological site or mineral deposit, with major effects to the settings, or where the value of the site would be affected.
Low	Small loss of soils or peatland, or where soils will be disturbed but the value not impacted; Short-term change to human or environmental health; Ground settlement / subsidence that does not adversely affect site infrastructure or require remedial action; Short-term change to baseline resource; and Small effect on a geological site or mineral deposit, such that the value of the site would not be affected.
Negligible	Minimal or no change to soils or peatland deposits; Minimal or no change to human or environmental health; Minimal or no change to ground stability; A very slight change from the baseline conditions. The change is barely distinguishable, and approximates to the 'no-change' situation; and Minimal or no change to a geological site or mineral deposit.

Significance of Effects

The sensitivity of the asset and the magnitude of the predicted effects is used as a guide, in addition to professional judgement, to predict the significance of the likely effects. **Table 10.4** summarises guideline

[14] Scottish Natural Heritage (NatureScot) and Historic Environment Scotland (2018), Environmental Impact Assessment Handbook [Online] available at: Environmental Impact Assessment Handbook | Hist Env Scotland (historicenvironment.scot) (Accessed: 26/06/2024)

criteria, informed by NatureScot guidance, for assessing the significance of effects and outlined in **Volume 2 Chapter 4** EIA Process and Methodology.

Table 10.4 Framework for assessment of the significance of effects

		Sensitivity of Receptor / Receiving Environment to Change / Effect			
		High	Medium	Low	Negligible
Magnitude of Change / Effect	High	Major	Major	Moderate	Negligible
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations and are shaded in light grey in the above table.

Limitations and Assumptions

During the peat probing assessment there is a portion of land within the red line boundary between the substation and Loch Buidhe which was not probed. There is no development proposed in this area and it was therefore deemed not at risk from the Proposed Development.

The desk-based assessments are based on large scale mapping which does not necessarily consider the localised environment. Due to this, field surveys were completed to inform the occurrence of soils and geology.

Notwithstanding the above, it is considered that a robust assessment has taken place.

10.4 Sensitive Receptors

The key sensitive receptors in the assessment are:

- Existing infrastructure in the form of tracks and footpaths, existing substation, existing watercourse crossings and dwellings;
- Proposed infrastructure in the form of the proposed substation and other associated infrastructure;
- Sensitive areas of Groundwater Dependent Terrestrial Ecosystems (GWDTEs), deep peat (>1.0m), blanket bog, and other sensitive habitats;
- Class 1 or 2 priority peatland, carbon-rich and peaty soils cover >20% of the Proposal of Application Notice (PAN) Boundary; and
- Areas containing geological or geomorphological features considered to be of national importance (e.g., geological SSSIs).

10.5 Baseline Conditions

Published Geology

Superficial Soils

The BGS 1:50,000 superficial deposits map[15] indicates that most of the Site is situated on superficial deposits comprising Peat at the very north and south of the Site as well as a few instances throughout the centre of the Site shown to be situated on Till and Morainic Deposits (Undifferentiated), comprising Diamicton, Sand and Gravel.

The superficial soils map can be seen in **Volume 3a Figure 10.1** Superficial Soils.

[15] BGS GeoIndex (2023). Onshore GeoIndex, [Online] Available at: GeoIndex - British Geological Survey (bgs.ac.uk) (Accessed 24/06/2024)

Bedrock Geology

The BGS 1:50,000 bedrock geology map shows that most of the Site is underlain by the Altnaharra Psammite Formation comprising Psammite and Micaceous Psammite. The very south of the Site adjacent to Loch an Lagain is underlain by Migdale Pluton comprising Monzogranite. Migdale Pluton comprising Monzogranite is also noted in a few isolated instances through the centre of the Site.

The underlying bedrock geology can be seen in **Volume 3a Figure 10.2** Bedrock Geology.

National Soils Map of Scotland

The national soil map of Scotland[16] indicates that most of the Site (excluding southern and western boundaries) is situated on component soils comprising peaty gleys with dystrophic blanket peat with peaty gleyed podzols; soils which are part of the Gleys major soil group and Peaty Gleys major soil subgroup. The very west, and south of the Site is shown to be situated on component soils comprising peaty gleyed podzols with dystrophic semi-confined peat with peaty gleys; soils which are part of the Podzols major soil group and the peaty gleyed podzols major soil subgroup.

2016 Carbon and Peatland Map

The Carbon and Peatland Map 2016[17] details that the Site is mostly underlain by Class 5 peat. This is not designated as a high priority peatland habitat and is classified as:

“Class 5 Peat: Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.”

Land on the northern and western periphery of the Site boundary is classified as Class 1 and Class 2 peat, which are nationally important carbon-rich soils of high conservation value defined as:

“Class 1 Peat: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value”.

“Class 2 Peat: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential”.

No development is proposed in areas of Class 1 or Class 2 peat.

The spread of peat across the Site can be seen in **Volume 3a Figure 10.3** 2016 Carbon and Peatland Map.

Peat Survey Data

Peat is a sedimentary material, which is dark brown or black in colour, and comprises partially decomposed remains of plants and organic materials preserved in anaerobic conditions, essentially within a waterlogged environment. There are two principal types of peat:

- Acrotelm is the upper layer, quite fibrous and contains plant roots. Acrotelmic peat is relatively dry, generally lying above the groundwater table and has some tensile strength; and
- Catotelm is the lower layer of peat which is highly amorphous and has a very high water content. Catotelm generally lies below the ground water table and has a very low tensile strength.

Interpolation of these principal types are discussed further in **Volume 4 Appendix 10.2** Outline Peat Management Plan.

16 Scotland’s Environment (2023). National Soils Map of Scotland. [Online] Available at: Scotland's Soils - soil maps (environment.gov.scot) (Accessed 24/06/2024)
17 Scotland’s Environment (2023). 2016 Carbon and Peatland Map. [Online] Available at: https://map.environment.gov.scot/Soil_maps/?layer=1 Scotland's Soils - soil maps (environment.gov.scot) (Accessed 24/06/2024)

It has been recognised that the design of the Proposed Development has taken account of the presence of peat, both as a physical consideration in terms of stability and engineering properties, and as a habitat resource.

Field Survey Results

A total of 651 peat probes were advanced throughout the peat surveys. Recorded peat depths of 0.5 m or less accounted for 49.2% of the total probing results with a further 20.7% of probes recording depths of 1.0 m or less. Figure 1 'Recorded Peat Depths' (**Volume 4 Appendix 10.2** Outline Peat Management Plan) shows the distribution of peat throughout the Site. This figure shows that the majority of the Site does not have deep peat and indicates the isolated areas of deeper peat in the north west of the Site and the eastern side of the Site.

The deepest pocket of peat, up to 4.95 m, is located in a lower lying area of the Site in the north west. This point is not beneath any proposed infrastructure. The peat depths at different Site Infrastructure is shown in **Table 10.5.**

Table 10.5 Peat depths recorded at site infrastructure

Proposed Site Infrastructure	Average Peat Depths within 50 m of Infrastructure (m)
Substation	1.32 m
Access Tracks	1.21 m
Parking & Welfare Facilities	1.4 m
Construction Compound	1.8 m
SuDS Pond	1.16 m

Peat Stability and Peat Management

The PSRA shows the majority of the Site to be of a Low and Negligible risk with isolated points that are of moderate risk for peat slide. The moderate risk points are generally located on steep slopes and within zones of blanket bog, with their proximity to these high sensitivity receptors being a primary reason for their moderate risk classification.

There are some moderate risk points located beneath and around the Proposed Development footprint, these points are located in areas of deeper peat and are spread throughout the proposed substation area. By implementing appropriate mitigation measures the moderate risk points can be mitigated to low and negligible risk.

For the oPMP, peat depth data was utilised to calculate estimated peat excavation and re-use volumes based on an outline 3D civil Site layout design. In this, rational options for reuse of excavated material are detailed as well as guidance on good practice for storage and management of excavated material including peat. Further details are provided in **Volume 4 Appendix 10.2** oPMP.

Details of mitigation and good construction techniques to reduce the risk of peat slides are detailed in **Volume 4 Appendix 10.1** PSRA and in **Section 6** of this EIA Report.

Unexploded Ordinance (UXO)

The Zetica Unexploded Ordinance (UXO) Map[18] shows that the entire Site is at low risk of UXO. This indicates an absence of contamination due to UXO, for the soil and peat environment of the Site.

Zetica [online] UXO Risk Maps available at: Risk Maps | Zetica UXO (Accessed 26/06/2024)

Mining

The Coal Authority Interactive Map Viewer[19] shows that the Site does not fall within a high risk area for mining or within an area that was previously mined. Therefore, contamination due to mining at the Site is disregarded.

10.6 Issues Scoped Out

No evidence of soil contamination was identified during the site walkovers or desk studies. No areas were identified and therefore no effects are anticipated. Should potentially contaminated land be encountered during excavations or decommissioning, appropriate action will be taken in accordance with the principles set out in Part IIA of the Environmental Protection Act 1990[20] and SSEN's General Environmental Management Plans, included as **Volume 4 Appendix 2.1** of this submission.

10.7 Assessment of Effects, Mitigation and Residual Effects

Mitigation by Design

Embedded mitigation comprises good practice methods and works outlined in the publication 'Good Practice During Wind Farm Construction'[21]. These are established and effective methods applicable to the Proposed Development to which the applicant will be committed throughout the duration of the construction works.

Volume 2 Chapter 2 Project Description and **Volume 2 Chapter 3** The Site Selection Process and Alternatives, provide further details of the mitigation undertaken through embedded design of the site layout avoiding key environmental constraints including limiting the impacts on deep peat where possible, as well as taking cognisance of hydrological and ecological features and associated buffers.

Construction Phase

Disturbance of deep peat

In its regulatory position statement, SEPA states that:

"*Developments on peat should seek to minimise peat excavation and disturbance to prevent unnecessary production of waste soils and peat"*[22].

The key items of infrastructure which influence this effect are the dimensions, location and type of new access tracks, substation platforms and SuDS pond. Other features which should be considered for excavation requirements include the onsite ancillary infrastructure as well as temporary construction infrastructure.

Some excavations may need temporary sub-surface water controls, such as physical cut-offs or de-watering. These temporarily divert flows away from the excavation, and temporarily lower the local water table and sub-surface water levels in peat. Localised temporary changes to soil and peat interflow patterns may therefore arise. Substation foundations and hardstandings also have the potential to change sub-surface water flow by creating physical barriers within naturally occurring drainage macropores in soil or peat. Although it should be noted that the site is within a wider area of commercial forestry, which has been partially felled, with artificial drainage channels present.

The drying out of peaty soil can result from alterations to the natural drainage regime. Measures set out in **Volume 4 Appendix 10.2** oPMP, are considered sufficient, and sufficiently reliable, to avoid substantial alterations to the natural drainage regime. As a result, peat is not expected to dry out, beyond what would be the case in the baseline scenario. No substantial impediments to near-surface water flow will be created as the

[19] The Coal Authority [online] Interactive Map Viewer Available at: Interactive Map Viewer | Coal Authority (bgs.ac.uk) (Accessed 26/06/2024)
[20] UK Government (1990), Environmental Protection Act [online] Available at: Environmental Protection Act 1990 (legislation.gov.uk) (Accessed 12/07/2023)
[21] NatureScot (2024) Good Practice during Wind Farm Construction [online] Available at Good practice during wind farm construction | NatureScot (Accessed 15/07/2024)
[22] SEPA (2010), SEPA Regulatory Position Statement – Developments on Peat [online] Available at: Microsoft Word - Peat Position Statement - update 290310.doc (sepa.org.uk) (Accessed 12/07/2023)

detailed site drainage design will take into account any severance of saturated areas to ensure hydrological connectivity is maintained, in accordance with SEPA / SNH 'Good practice during wind farm construction'.

The layout design process has sought to avoid areas of deep peat where topography allows. Nonetheless, as can be seen in **Table 10.5**, the Site infrastructure is located in areas of deep peat. Construction activities including the excavation of tracks, substation foundations and hard standing areas along with other infrastructure will lead to the disturbance of peat. Beyond the main construction activities, other considerations include the temporary storage of soils and peat on site. The details of peat disturbance as a result of excavations and subsequent re-use methods are included in **Volume 4 Appendix 10.2** oPMP. Figure 2 'Interpolated Peat Depths' within the oPMP illustrates the areas of deep peat on Site.

Given the consideration that the losses of, or alteration to, the baseline resource will be such that post development characteristics or quality of peat will only be partially changed or the loss of individual areas of varying sensitivity, but the value would either not be affected, or would be, but not to a major degree, In the absence of mitigation, the Proposed Development will result in a potential moderate effect. With proposed mitigation measures and the peatland restoration proposed, the effects will be minor which will be **not significant**, in terms of the EIA Regulations.

Peat Stability

Peat instability is generally the result of a combination of causative factors. Several construction activities have the potential to increase the likelihood of peat slides in areas where peat is present at a sufficient depth and where gradients are sufficiently steep to result in a peat slide event.

In general, construction activities have the potential to increase the likelihood of peat slides by way of locating proposed infrastructure including track networks on sloping ground where peat is present. All construction activities involve the removal of surface vegetation and excavation of peat and other near surface soils from either the bedding surface of the underlying rock or the formation level within underlying soils which naturally increases potential for slide.

During construction care must be taken to ensure that the natural hydrological conditions of the surrounding peatland are maintained as altering the surface or subsurface water flow and existing drainage patterns can increase the likelihood of bog burst. The measures outlined in **Volume 4 Appendix 10.2** oPMP are sufficient such that the existing hydrological conditions at the Site will not be substantially altered as a result of the Proposed Development.

Due to the presence of peat, a PSRA was undertaken and is included in **Volume 4 Appendix 10.1** PSRA. The PSRA was carried out in accordance with Scottish Government guidance.

Peat slides can affect soils, local sensitive habitats and have the potential to affect surface water systems from soil inundation, leading to sedimentation. This can have an effect by slip materials sliding onto areas of sensitive habitat, or causing damage to local surrounding surface soils and can also reduce water quality and / or modify drainage patterns. Receptors identified across the PSRA are:

- Sensitive Habitat (Blanket Bog);
- Existing Roads and Tracks;
- Major and minor watercourses; and,
- Proposed substation infrastructure.

Given the increased potential for slide, low magnitude of effects and medium sensitivity of receptors, in the absence of mitigation, the Proposed Development will result in a potential 'minor' effect and is therefore likely **not significant**, in accordance with the EIA regulations.

Mitigation measures with regard to peat stability for each area of the PSA are outlined in **Volume 4 Appendix 10.1** PSRA. The adoption of these measures will further reduce the risk of peat instability across the Site.

Loss and Compaction of Peat and Soils

The design process has sought to avoid the disturbance of deep peat where possible but the peat depths are generally deeper than 1.0 m for the majority of the Proposed Development area. This is a result of topography restricting viable areas for siting of the substation. Nonetheless, the construction of the substation, SuDS pond, access tracks and movement of construction traffic, in the absence of construction good practice, could lead to the compaction of soil. This can reduce soil permeability, potentially leading to increased run-off and increased erosion. The superficial soils underlying the Proposed Development are of varying permeability, therefore the effects of compaction could result in a significant increase in the runoff from the baseline conditions.

Since infrastructure is located in areas with peat depths greater than 1.0 m and there is degraded peat on Site, peatland restoration will take place in order to minimise the loss and compaction of peat and soils. Therefore, with mitigation, the significance of effects associated with the compaction of peat and soils is negligible and **not significant**, in terms of the EIA Regulations.

Mining

There is no evidence of past mining or mineral deposits on the Site. This is as discussed in **Section 10.5**. Therefore, in the absence of any historic mining activities the significance of effects associated with mining is negligible and **not significant** in terms of the EIA Regulations.

Contamination of Soils

Contamination of soils usually occurs due to past contaminative land uses or pollution events. There is no history of contaminative land uses on Site, with an absence of mining, landfill or water / waste treatment facilities within the Site boundary.

There is a history of forestry activities and felling activities taking place on the Site. These activities may have lead to localised pollution activities from fuel spills or the use of pesticides, but this is unknown and, in any event, any fuel spills or use of pesticides that may have occurred would unlikely have resulted in any significant contamination. To date there has been no evidence of such contamination on the proposed development site.

Operational Phase

Potential effects from the operation of the Development include:

- Erosion and sedimentation from runoff from non-vegetated surfaces.

The nature of this event was discussed in relation to construction phase. As there will be less activity during operation than during construction, minimal or no effects upon peat and soils during the operational phase will take place and significant effects are not likely.

Cumulative Effects

A cumulative effect is considered to be an additional effect on peat and geology resources arising from the Proposed Development in addition to the combination of other developments likely to impact the peat and geological environment.

Since cumulative developments will not be built on the Proposed Development there will be no additional impact on the geology and peat resources on the Site.

In relation to cumulative effects, impacts on geology and soil is a site-specific consideration, and there will be no cumulative effects.

Mitigation

Mitigation in relation to peat disturbance is initiated through embedded mitigation in design and adopting best practices during construction. **Table 10.6** includes the mitigation measures that will be implemented.

Table 10.6 Table of Mitigation

Primary Mitigation (**Volume 2 Chapter 16** GP1)	Secondary Mitigation (**Volume 2 Chapter 16** GP2)	Tertiary Mitigation (**Volume 2 Chapter 16** GP3)
Avoiding construction on steep slopes that have deep peat deposits.	Avoid the loading of deep peat deposits.	Micrositing infrastructure and tracks in areas of deep peat.
	Visual inspections to be completed where points of moderate risk have been recorded during construction during and for a period after and during heavy rainfall events to ensure slope stability.	The use of floating tracks where track construction in areas of peat deeper than 1.0 m cannot be avoided.
		The reuse of peat and topsoil that is removed during the construction process in other areas of the development.

Residual Effects

Following the implementation of mitigation measures detailed in **Table 10.6**, residual effects associated with peat disturbance, peat stability, impact on geology, peat and soil losses will all be minor, and not significant in terms of the EIA Regulations.