Creachan Wind Farm

Environmental Impact Assessment Report
Volume 4: Appendices

Appendix 13.2: Preliminary Peat Landslide Hazard and Risk Assessment
RWE Renewables UK Onshore Wind Ltd

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Delivering a better world

Quality information

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13.2 Preliminary Peat Landslide Hazard and Risk Assessment

13.2.1 Introduction

General

AECOM Limited (AECOM) have been appointed by RWE Renewables UK Onshore Wind Ltd (the Applicant) to produce a Preliminary Peat Landslide Hazard and Risk Assessment (PLHRA) with respect to the proposed Creachan Wind Farm ('the Proposed Development').

Assessment Team

The assessment works were undertaken by a team of geotechnical engineers and engineering geologists, of whom have previous experience in undertaking peat assessments.

The team was led by a Chartered Engineering Geologist with over 28 years industry experience and in particular within the renewables energy sector. He has managed and assessed geotechnical risks and undertaken geohazard assessments within peatland environments and has experience in the checkers role on many PLHRA reports on behalf of the Energy Consents Unit (ECU).

The site walkovers and site works (i.e. peat probing) have been undertaken by various teams and personnel all of which have experience in working and assessing peatland environments.

Site Location and Description

The Development Site lies within Ross-shire in the Scottish Highlands, about 3.5 km north of Loch Marie with the nearest town, Alness, located approximately 13 km to the southeast. The Development Site includes land within which the turbines and battery storage will be sited (the Main Development Area (MDA)) and an area of undeveloped land, as well as an Existing Forestry Access Track leading from the B9176 to the MDA. The National Grid Reference (NGR) to the approximate centre of the MDA is NH 53283 81055. The location of the Development Site is as shown on **Figure 13.2.1**.

The majority of the Development Site is within open undulating moorland with some mountainous areas to the north. Review of aerial photographs also show drainage or weathering channels across much of the MDA and Development Site to the northwest, the majority of which are draining into watercourses. Forestry is present to the east of the MDA and on either side of the Existing Forestry Access Track (proposed to be upgraded) leading to the MDA from the B9176. Much of this woodland is noted as commercial and as such is in various phases of the forestry process (i.e. felled, recently replanted and mature), including localised areas of long-established woodland (of plantation origin) (LEPO), as shown in **Figure 13.2.3**.

Proposed Development and Assessed Areas

The Proposed Development will comprise the following:

- Up to 13 wind turbines consisting of 9 turbines with ground to tip height up to 200 m and 4 turbines with ground to tip height up to 180 m;
- Turbine foundations and associated crane pads, hard standing area/set down area at each turbine and blade laydown areas;
- Upgrade and widening of approximately 12 km Existing Forestry Access Track (with localised realignment);
- Approximately 17.5 km of MDA Access Tracks, passing places and turning heads, including 7.2 km of floating track;
- 5 no. temporary construction compounds, including space for site offices & welfare, concrete batching plant and storage & laydown areas. At one of the temporary compound locations (TC02) the Existing Forestry Access Track is to be widened to provide a 300m x 8m parking lane;
- Control building and electrical substation;
- A Battery Energy Storage System (BESS);

- Underground cabling typically adjacent to and following the MDA Access Tracks from turbines and BESS to the proposed substation;
- A permanent anemometer mast including associated foundations and hardstanding;
- 32 no. watercourse crossings, including 17 existing watercourse crossings and 15 new watercourse crossings (including the potential replacement or bypassing of two existing single-span bridges along the Existing Forestry Access Track);
- Up to 8 no. borrow pit search areas;
- Habitat Management Areas (including areas of peatland restoration);
- Aviation lighting; and
- Micrositing allowance for all proposed structures and infrastructure of up to 100 m.

Figure 13.2.2 presents the main infrastructure associated with the Proposed Development.

For the purposes of this assessment, the areas assessed are within the proposed MDA and along the Existing Forestry Access Track leading to the MDA from the U1907 (Strath Rusdale Road). All proposed infrastructure has been assessed as part of this document including Borrow Pit Search Areas (BP Search Areas) where blasting may be required. No works were proposed in the northwest of the Development Site throughout the design evolution process (i.e. to the northwest of the MDA), therefore no probing was undertaken and this area has not been included in the assessment.

The Development Site is underlain by peat, which will be excavated to accommodate the Proposed Development infrastructure. An outline Peat Management Plan (oPMP) has been produced for the Proposed Development to accompany the EIA (refer to **Appendix 13.4)** providing details of the peat management hierarchy implemented.

The excavated peat will be reused onsite for reinstatement. The oPMP provides further details as well as thicknesses and volumes of peat reuse. The oPMP should be referred to for further details on the actual peat reuse and reinstatement proposed. The preliminary proposals for peat reuse are split into the following areas:

- Creation and dressing of MDA Access Tracks and crane pad verges;
- Turbine foundation restoration;
- Temporary compound reinstatement; and,
- Borrow pit restoration

The following subsections discuss each of the above activities in relation to peat stability:

- **Dressing Verges**

The creation and dressing of verges are not generally anticipated to create a significant peat landslide risk, as the size/thickness of these are likely to be minimal and will be controlled with engineering measures incorporated by the Designer to ensure slope stability. As such, the potential peat landslide risk posed by reuse of the peat for these purposes is scoped out of this preliminary PLHRA. During the detailed design process the Designer shall ensure and prove stability of the peat reused in the dressing of verges and shall present this as part of the updated PLHRA completed post-consent.

- **Dressing Turbine Foundations**

The reuse of peat to dress the ground above turbine foundations is not anticipated to create a significant peat landslide risk, as a minimal thickness of peat is proposed to be reinstated on top of the foundation and its general infill; the peat is not proposed to be placed on top of already existing peat deposits thereby increasing overall thickness, in fact the peat thickness would be less at some turbine locations following dressing of the turbine foundations; and the more stable acrotelm is proposed to be reused for this purposes. It is also anticipated the peat reused to restore the ground at this location will be placed using best practice and methods to ensure successful restoration. As such, this Preliminary PLHRA does not assess the potential peat landslide risk posed by reuse of the peat for this purpose.

- **Temporary Compound Reinstatement**

The reuse of peat to reinstate temporary compound areas will be undertaken when the compounds are no longer required, with the peat reinstated to previous levels (on average). No excess peat is proposed

to be reinstated within the temporary compounds at this stage and as such would not result in an average increase in thickness. It is expected the peat would be reinstated using best practice methods, so for the purposes of this Preliminary PLHRA it is assumed the reinstatement of the peat would not result in an increased risk of peat instability above that which has been assessed for the peat in its current state. This Preliminary PLHRA therefore does not assess the reinstatement of peat within the temporary compounds as a separate item.

- **Borrow Pit Restoration**

Peat reuse within the borrow pits is not anticipated to create a significant peat instability risk, with the design of the borrow pit anticipated to create a bowl to contain the less stable catotelm and the acrotelm which is placed on top expected to be placed at stable angles. Therefore, it is anticipated the detailed design will ensure stability of the peat when reused within the borrow pits and as such would be revisited during the final PLHRA following completion of the detailed design. This preliminary PLHRA therefore does not assess the restoration of the peat within the borrow pits, as it is anticipated these will be designed to be stable during the detailed design process.

Scope of Report

The scope of this report comprises of:

- A summary of the methodology used for the Preliminary PLHRA;
- A review and assessment of the baseline conditions based on available geological, hydrogeological and topographic information for the Development Site;
- An estimate of the geotechnical hazards and risks associated with peat slides during and post construction;
- A Peat Landslide qualitative risk assessment;
- A summary and discussion of potential mitigation and control measures to reduce the risk caused by the presence of peat; and
- Conclusions and recommendations which can be drawn from the information and assessments undertaken as part of this preliminary PLHRA.

Available information includes:

- Digital topographic datasets showing the slope angles within the Development Site;
- Historic OS Mapping and Aerial photography;
- Geological datasets showing the published superficial and solid geology;
- Information collected during walkover surveys; and
- Peat depths recorded by peat probing surveys.

This Preliminary PLHRA was conducted in general accordance with the guidance provided in Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017). The guidance follows a staged approach methodology in relation to the peat stability risk as follows:

- Preliminary Assessment;
- Hazard and Risk Rating;
- Stability Analysis (if required); and
- Detailed Quantitative Risk Assessment (if required).

As part of this Preliminary PLHRA a qualitative hazard and risk ranking review was undertaken in accordance with the published guidance.

At present, the Proposed Development is in the early stages of design, with only the outline scheme developed. As such, minimal intrusive ground investigation (GI) has been undertaken, limited to peat depth estimated through peat probing. On this basis, a quantitative slope stability analysis to estimate Factors of Safety and a quantitative hazard and risk assessment have therefore not been undertaken. Following further development of the scheme, a targeted and planned GI shall be undertaken to inform the detailed design.

As blasting may be undertaken to form the borrow pits, this has been taken into account as part of the assessment.

The reuse of peat is proposed as part of the Proposed Development. However, this Preliminary PLHRA does not take into account any changes in thickness or condition of the peat as a result of the peat reuse or restoration areas (as discussed in the Proposed Development and Assessed Areas section of this report). Although peat reuse is not specifically taken into account in the analysis completed, a brief discussion on the reuse areas as relates to assessed peat slide Hazard is provided within Section 13.2.8 (mitigation measures) with any specific mitigation measures as relates to these provided there also..

Refinements of this Preliminary PLHRA will be required post-consent, based on the detailed design of the Proposed Development (inclusive of the peat reuse and restoration areas) and on the results of the GI exercise, along with any further pertinent information becoming available. Therefore, the results of this PLHRA are to be considered as preliminary.

Limitations

AECOM does not warrant or guarantee to any party in any way the completeness or accuracy of the documentary information submitted by third parties during the course of this study. Any assessment(s), interpretation(s), conclusion(s) or opinion(s) contained herein is or are made by AECOM in good faith based on information available at the time of compilation of the report and are made for the sole and exclusive use of the Applicant.

AECOM accepts no liability towards third parties for decisions made by any such based on information or statements contained herein. Third parties making use of any information or statement of any kind whatsoever presented or contained within this report or attachments hereto do so at their own risk.

Where peat depth has been determined through peat probing, it should be noted that due to the nature of the probing and as no sample is recovered during the advancement of the probe, the peat depth recorded is only an estimate based on the judgement of the probe operator. More intrusive ground investigation techniques, where samples are recovered, is required to more accurately determine the peat depth and truth the probed depths.

Ground surveys indicate likely conditions but investigate only a relatively small volume of the ground in relation to the size of the Development Site and can only provide a general indication of site conditions. The comments made and recommendations given in this report are based on AECOM’s understanding of the ground conditions at the time of the preparation of this report. There may be exceptional ground conditions on the Development Site which have not been disclosed, and which have therefore not been taken into account in this report.

The assessment of the peat slide hazard is based on the effect the proposed works could have on the surrounding peat in its current condition, situation and thickness. No allowance has been made for any change in peat thickness as a result of reuse or change in condition due to restoration works. The detailed design of the scheme will ensure stability of these aspects with the findings and any associated mitigation, where required, included in the final PLHRA, post consent and following design maturity.

13.2.2 Methodology

Desk Top Review

An initial desk top review was undertaken, comprising the review and analysis of available information from sources as detailed below:

- British Geological Survey (BGS) (BGS, 2025) for geology and hydrogeology;
- Scotland's Soil (Scotland's Soils, 2025) for soil coverage;
- Centre for Ecology and Hydrology (CEH), National River Flow Archive (NRFA) (NFRA, 2025) for flows and rainfall;
- SEPA (SEPA, 2025) for river basin management plans, groundwater classification, groundwater vulnerability, water quality and hydrogeology;
- Historic OS maps (National Library of Scotland, 2025) and Aerial Photography (Google Earth, 2025); and
- Digital Terrain Model (DTM) for topography.
- A summary of the information relevant to this Preliminary PLHRA Report can be found in **Section 13.2.3** of this Appendix.

Summary of Surveys

The following surveys have been undertaken for the Proposed Development:

- Phase 1 peat probing undertaken by AECOM in August 2024;
- Phase 2 peat probing undertaken by AECOM in March 2025;
- Further peat probing undertaken by AECOM in April 2025;
- Additional peat probing undertaken by AECOM in July 2025; and,
- Watercourse Crossing Walkover undertaken by AECOM in August 2025.

The peat probing locations from the surveys conducted, are shown on **Figure 13.2.7. Section 13.2.4** provides further details on the surveys undertaken and their findings. Other features as observed during the walkover survey and investigative works are shown on **Figure 13.2.3**.

Assessment Approach

A single stage assessment of the peat slide Hazard Ranking has been completed for the Proposed Development. The Hazard Ranking is based on the output from Geographic Information Systems (GIS) software using a weighted sum analysis, detailed in **Insert 13.2.1**. The outputs generated from the GIS assessment can be overly conservative in areas and therefore a review of the Hazard Rankings is also undertaken. This review considers the factors contributing to the peat landslide hazard in more detail and rationalises whether the Hazard Ranking can be reduced. The assessment of the Hazard Rankings inclusive of the review and any reduction considered appropriate is presented in **Section 13.2.6** of this PLHRA.

The outputs from the assessment of the Hazard Rankings form the basis of the overall PLHRA outcome and to whether any mitigation measures are required.

Good Practice Guidance

The following good practice guidance was used to inform this appendix:

- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017);
- SEPA Regulatory Guidance – Developments on Peat and Off-site Uses of Peat (SEPA, 2017);
- Floating Roads on Peat (SNH & FCS, 2010);
- Constructed Track in the Scottish Uplands (SNH, 2015);
- Good Practice during Wind Farm Construction (Scottish Renewables, et al, 2024);

- Guidance on Developments on Peatland, Peatland Survey (Scottish Government, et al, 2017); and
- Developments on Peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste (SR & SEPA, 2012).

Site Infrastructure Design

The Proposed Development was designed to avoid areas of peat great than 1.0 m in depth, wherever practicable. However, due to the widespread presence of peat across the Development Site, and in consideration of environmental and topographic constraints, this was not possible throughout. As such, limited infrastructure remains in areas of peat with depth > 1.0 m, with some very localised areas where peat depth is > 2.0 m. Where deposits > 2.0 m in depth are recorded underlying the Proposed Development, further consideration as to how these may affect the Proposed Development and how the removal of the deposits can be reduced has been considered; with floating MDA Access Tracks proposed. Further methods to reduce peat disturbance and excavation (e.g. micrositing) will also be considered during the detailed design, post-consent, once the GI information is available.

The design of the Proposed Development was developed considering a holistic approach to reducing impacts on peatlands. For instance, a proportion of infrastructure has been sited in peat with depth > 1.0 m, however, the topography is preferable for construction. While the alternative would show infrastructure in peat with depth < 1.0 m, greater earthworks may be required in construction, resulting in an overall greater impact on peatlands.

13.2.3 Baseline Environment

Topography and Slope Analysis

A general review of the topography of the Development Site was undertaken using the Ordnance Survey (OS) layer of Bing Maps [Microsoft, 2025] and from an OS Terrain 5 digital terrain model (DTM) obtained for the Development Site. The DTM obtained for the Development Site is presented along with the proposed infrastructure on **Figure 13.2.4**.

Review of these sources indicates the Development Site is characterised by the undulating and hilly terrain in the area. Within the MDA, the topography is generally sloping to the northeast with high points of Carn Cas nan Gabhar (605 m AOD), Clach namn Ban (552 m AOD) and Creachan an Fhiodha (665 m AOD) along the southwestern boundary and lower lying ground around Abhainn Glac an t-Seilich (between 380 m and 350 m AOD) along the northeastern boundary. Along the existing forestry track leading into the MDA, the topography typically slopes to the east or northeast with levels ranging from approximately 350 m AOD towards the MDA to 160 m AOD towards its southern extent when crossing the Black Water. Very locally in the southern extent of the existing forestry track between the Black Water and the B9176, the topography slopes to the south with a high point of approximately 190 m AOD at the B9176 and a low point of 160 m AOD at the Black Water.

The OS Terrain 5 DTM was used to create a slope assessment for the Development Site with this shown on **Figure 13.2.4**. Review of this indicates the Development Site inclusive of the MDA and Existing Forestry Access Track leading to the MDA, typically has slope gradients varying between around 3° and 14°. Locally throughout the Development Site, although generally encountered within the east of the MDA and along the existing forestry track from the B9176, slope gradients of up to around 21° are recorded, with very localised slope gradients of up to 31° also recorded generally along the existing forestry track from the B9176.

Historical OS Mapping and Aerial Photography Review

A review of the National Library of Scotland's Side by Side Map Viewer (National Library of Scotland, 2025) indicates that the land within the Development Site boundary has remained largely unchanged over time. The earliest available mapping (OS Six Inch, 1830s–1880s, county series) depicts the area as moorland with sloping topography and very localised areas of woodland along the existing forestry track from the B9176. The Abhainn Glac an t-Seilich and Black Water rivers are also shown generally within their current day alignment, as well as a track consistent with the alignment of the current day B9176 in the southern extent of the Development Site. Minimal change is then noted within the Development Site throughout the maps reviewed, with the largest changes being the presence of woodland within the southeastern corner of the MDA and along the majority of the existing forestry track from the B9176 being planted and managed sometime between the 1974 historic OS map and the most recent 2025 OS map as presented by Bing Maps (Microsoft, 2025). Some further minor development is also noted towards the southern extent of the existing forestry track in the vicinity of the B9176 with a gravel pit being recorded and some minor, presumably residential, buildings.

Historic aerial imagery of the Development Site, available via Google Earth (Google Earth. 2025), have been reviewed. The earliest available mapping from this source was from 1985. Although the quality of this image is poor and cannot be used to correlate all the features as identified by historic mapping, it does appear to show the forestry within the southeastern corner of the MDA and along the existing forestry track from the B9176 to be present. The first image of good resolution was from 2008 which showed the extent of the forestry was similar to that of present day and shows an access track from the B9176 to the southeast of the MDA similar in alignment to the present-day Existing Forestry Access Track. This access track is then shown to extend into the MDA, as per the present-day Existing Forestry Access Track by the 2010 image. Outwith these, the 2008 image typically agreed with the historic map review with minimal change, other than the state of forestry identified. The 2008 aerial image did also show several drainage or weathering channels within the MDA, all appearing to lead into a watercourse, and to the southeast of the MDA, however, still within the Development Site what appears to be man-made channels cut into the ground of unknown purpose. Both the weathering/drainage channels and assumed man-made channels are still shown in the most recent image from 2025. Furthermore, a borrow pit was identified in the 2015 aerial imagery roughly corresponding to the proposed borrow pit BP1 location for the Proposed Development, with this borrow pit still clearly visible in the most recent aerial image from 2025 and also shown on the most recent OS map.

No signs of historic peat instability were identified from review of either the historic mapping or aerial imagery.

Current Land Use

The current land use for the Development Site has been assessed based on recent ordnance survey mapping and aerial imagery available through Bing Maps (Microsoft, 2025).

The MDA comprises remote upland terrain in the Scottish Highlands, dominated by open moorland, rough grazing, and blanket bog. There is no existing built infrastructure within the MDA. Along the Existing Forestry Access Track the main land use comprises commercial forestry at various stages of production. Towards the southern extent of the Existing Forestry Access Track, development in the form of presumably residential buildings and the U1907, a paved single track public highway with passing places, is present. An existing borrow pit is noted to be present along the Existing Forestry Access Track from the B9176 at the location of proposed BP1.

NatureScot’s SiteLink map (NatureScot, 2025) was reviewed to determine if the Development Site falls within any environmental designated site (e.g. Sites of Special Scientific Interest, Special Area of Conservation, etc.). Review of this source found the Development Site did not fall within any designated area and that no designated area was present within 500 m.

Review of Historic Environmental Scotland (HES) interactive Pastmap Viewer (HES, 2025) was undertaken to understand any potential archaeological designations that may be present within the vicinity of the Development Site. This source identified no listed buildings, scheduled monuments or world heritage sites are present within the vicinity of the Development Site. There are, however, National Record of the Historic Environment (NRHE) and Historic Environment Records (HER) recorded downslope and within the vicinity of the Development Site, typically all along the existing forestry track from the B9176. The records all relate to historic buildings or farmsteads which are present along the Black Water. The locations of NRHE and HER (along with their specific reference numbers) are shown on **Figure 13.2.3**. Note not all these features will be assessed as part of the assessment undertaken, with some being located upslope and/or outwith influencing distance of the Proposed Development. Affected features will be detailed within the explanatory text of the assessment.

Geology and Soils

Superficial Geology (Drift Deposits)

A review of the British Geological Survey (BGS) Onshore GeoIndex Viewer (BGS, 2025) indicates the MDA to predominantly be underlain, from surface, by peat. Till and Morainic Deposits are also locally recorded within the MDA typically in the northwest. There are localised areas across the MDA where no superficial deposits are recorded by the BGS suggesting that bedrock is close to the surface in that area. Given the potential presence of shallow bedrock within the MDA, this may indicate that peat is directly overlying bedrock, which is likely to be weathered. Along the existing forestry track to the MDA from the B9176, the predominant superficial geology recorded is Till and Morainic Deposits, with localised alluvial deposits along the Black Water and very localised peat deposits located at various points along the track. Areas with no recorded superficial geology suggesting shallow bedrock are also recorded along the existing forestry track, with River Terrace deposits recorded just outwith the Development Site boundary to the south of the southern extent in the vicinity of the B9176. The extents and location of the recorded superficial deposits across the Development Site are shown on **Figure 13.2.6**.

Although not recorded by the BGS, as watercourses are recorded within the Development Site, there is potential for further alluvial deposits to be present in the immediate vicinity of these watercourses over and above what is already recorded by the BGS. Again, although not recorded by the BGS, made ground is also anticipated within the Development Site associated with existing developments (e.g. existing forestry track from the B9176, the B9176 itself and potentially within the existing borrow at proposed BP1).

The BGS provide the following descriptions of the recorded and possible superficial deposits:

- Till and Morainic Deposits – “diamicton, gravel and sand.” The BGS do not provide a description of diamicton, however, it is anticipated to consist of a variable proportion of clay, silt, sand and gravel with cobbles and boulders. Given the additional sand and gravel noted in the BGS description of this material, these deposits are anticipated to be more coarse-grained in nature.
- Peat – “partially decomposed mass of semi-carbonized vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps.”
- Alluvium – general term for clay, silt, sand and gravel deposited by a river, stream or other running water body. The deposit is typically described as “soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel.”
- River Terrace Deposits – “sand and gravel, locally with lenses of silt, clay or peat.” The BGS record this as a generic description of the deposits with these also identified as undifferentiated.
- Made Ground – the BGS do not provide a description of made ground, however, this is likely to be highly variable in its composition, dependant on its source and may contain anthropogenic material.
- The information obtained from the BGS was supplemented through review of the National Soil Map of Scotland Viewer (Scotland’s Soils, 2025). This source identified the following:
- The MDA is predominately underlain by Organic Soils consisting of dystrophic blanket peat.
- The northern extents of the MDA and the existing forestry track to the MDA are underlain by peaty gleys with dystrophic blanket peat with peaty gleyed podzols.
- The majority of the existing forestry track to the MDA is underlain by humus-iron podzols.

Review of the Carbon and Peatland 2016 Map layer of the National Soil Map of Scotland Interactive Map Viewer (Scotland's Soils, 2025) was also undertaken. This source indicated that the MDA is predominately underlain by Class 1 carbon and peatland soils with various small areas of Class 5 carbon and peatland soils recorded throughout the area. Class 2 carbon and peatland soils are also locally recorded towards the northeastern and western MDA boundaries. Along the existing forestry track to the MDA from the B9176, the northern half is predominately underlain by Class 5 carbon and peatland soils with the southern half predominately underlain mineral soils, although Class 5 carbon and peatland soils are in the immediate vicinity.

The 2016 Carbon and Peatland map provides further details on the classifications recorded as follows:

- Class 1 – Recorded as a peat soil which are nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value.
- Class 2 – Recorded as a peat soil with occasional peaty soil which are nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential
- Class 5 – Recorded as a peat soil where the soil information takes precedence over the vegetation data. No peatland habitat is recorded within the area; however, the soils are likely to be carbon-rich and contain deep peat. Bare soils may also be present within the area.

Based on the information reviewed, it is noted that peat deposits are likely to be present throughout the MDA and northern extent of the existing forestry track to the MDA. Peat deposits may then be present throughout the rest of the existing forestry track with the likelihood being lower towards the southern extent in the vicinity of the B9176.

Taking cognisance of the available information, the substrate is likely to vary between coarse-grained till and morainic deposits and bedrock (which is likely weathered). Localised substrate of alluvial, which for the purposes of the assessment are assumed to be fine-grained, and river terrace deposits, which for the purposes of this assessment are assumed to be coarse-grained.

A review of the landslide layer of the BGS Geoindex was undertaken as part of the superficial geology review, which indicated the BGS do not hold records of any landslides having occurred within or in close vicinity to the Development Site.

Solid Geology (Bedrock)

A review of the BGS Onshore GeoIndex Viewer indicates the MDA is predominately underlain by the granite and gneissose of the Carn Chuinneag and Inchbae Augen Gneiss. Also recorded within the southeastern half of the MDA is pelite and semi-pelite of the Diebidale Pelite Formation and hornfelsed pelite of the Diebidale Pelite Formation. Also very locally recorded between proposed borrow pit BP7 and BP8 is a deposit of hornblendite of the Caledonian Supersuite.

Along the existing forestry track leading to the MDA the predominant rock type underlying is recorded to be psammite of the Crom Psammite Formation. Pelite and semi-pelite of the Diebidale Pelite Formation and hornfelsed pelite of the Diebidale Pelite Formation are also recorded within the northern extent of the track. Psammite of the Tarvie Psammite Formation; sandstone, conglomerate and argillaceous rocks of the Braemore Mudstone Formation; pelite and semi-pelite of the Ben Wyvis Pelite Formation; and thin veins of semi-pelite from the Tarvie Psammite Formation are also recorded underlying the existing forestry track towards its southern extent. Furthermore, locally recorded along the existing forestry track and at proposed BP1 is pelite of the Crom Psammite Formation.

The extents and location of the recorded solid geology across the Development Site is shown on **Figure 13.2.5**.

Structural Geology

A review of the BGS Onshore GeoIndex Viewer indicates no faults are present within the MDA. An approximate northeast – southwest trending reverse or trust fault is recorded along the existing forestry track to the MDA at around Dalmore, along the boundary between the Ben Wyvis Pelite Formation and Crom Psammite Formation. An approximate northeast – southwest inferred fault is also recorded to be present within the southern extent of the existing forestry track at the B9176, at the boundary between the Tarvie Psammite Formation and the Braemore Mudstone Formation.

Mining and Quarrying

Coal Mining

The Mining Remediation Authority Interactive Map Viewer (MRA, 2025) indicates the Development Site is not within Coal Mining Reporting Area. Furthermore, there are no areas within the Development Site which fall within the Development High Risk Area designation and there are no mine entries recorded within 500 m of the boundary of the Development Site.

Quarrying

A review of the Mine and Quarries layer of the BGS Geoindex was undertaken, which indicated no mines or quarries within the MDA, although there are two locations recorded along the northeastern boundary of the Development Site in the vicinity of the Glac an t-Seilich watercourse; the Garbhan Mor Pit and the Garbhan Beag Pit. Along the existing forestry track into the MDA, two quarries have been recorded one towards Ruievard (at proposed TC02) and the other towards the southern extent. These were labelled as Ruievard and Inchlumpie Wood Pit, respectively. The quarried material is not noted as part of the source reviewed, however, is expected to be of the local geology. All these quarries are noted as having ceased operations.

Review of historic mapping through the National Library of Scotland's Side by Side Map Viewer and through the most recent OS map available through Bing Maps was also undertaken, along with review of aerial imagery available through Google Earth, to understand the potential for any further quarries or pits within the Development Site or its immediate vicinity. These sources identified an additional quarry at Cnoc an Ruigh'-choinnich (the proposed BP1).

Hydrogeology

An estimation of the groundwater productivity of the superficial deposits recorded within the Development Site was made using the guidance contained within the BGS Aquifer Productivity Report (BGS, 2015). The following superficial aquifer productivity estimations were therefore made:

- Till and Morainic Deposits – The guidance document typically indicates these deposits have a very low to low permeability and are generally classed as not a significant aquifer. However, these deposits appear to have more coarse-grained content and may not be dominated by clay and silt. As such, there is potential for these deposits to have a higher permeability with associated aquifer productivity code and estimated borehole yield range. As no records are available within the Development Site to provide data on the potential constituents of the deposits, at this stage the exact productivity of these deposits cannot be estimated.
- Alluvium & River Terrace Deposits – can have a varying permeability ranging from high to very low depending on the parent material making up the deposit. If the deposits are dominated by sand and gravel, then the deposits can be considered as a moderate to high productivity aquifer with potential yields from 1 to >10l/s. If the deposits are dominated by clay or silt, then they are likely to be classified as not a significant aquifer.
- Peat – peat is not covered within the guidance document; however, it is typically considered to have a relatively low permeability. Given this the peat is considered to not be a significant aquifer.

A review of the Hydrogeology 1:625,000 scale layer of the BGS Geoindex, provides information on the solid geology aquifer productivity. This source indicates all rock formations within the Development Site are low productivity aquifers. The BGS describe these as allowing 'Small amounts of groundwater in near surface weathered zone and secondary fractures'.

Hydrology

The recorded hydrology for the Development Site, as recorded by OS mapping, is shown on **Figure 13.2.3**.

The Development Site appears to be drained by the River Glac an t-Seilich which becomes the Black Water towards the borrow pit BP1 location when parallel with the existing forestry track to the MDA. These watercourses are located to the north of the MDA and to the east of the existing forestry track to the MDA. The River Glac an t-Seilich becomes the Black Water when within Strath Rusdale, with the Black Water flowing into the River Averon towards the southern extent of the existing forestry track in the vicinity of the B9176. The River Averon then discharges into the Cromarty Firth via Alness Point approximately 9.7 km southeast of the Development Site. Within the MDA the Allt Coire a' Chapuill, Allt Clach nam Ban and Allt Beithe as well as various unnamed watercourses all run southwest to northeast into the River Glac an t-Seilich. Also, within the MDA are what appears to be drainage or weathering channels which all trend towards one of the named or unnamed watercourses. Along the existing forestry track to the MDA various named and unnamed watercourses are present all of which typically flow to the east and into the River Glac an t-Seilich or Black Water.

Given the existing forestry track to the MDA is typically within a commercial forestry area, it is known and anticipated that several drainage ditches and channels are present within this area. These are generally assumed to drain into one of the watercourses within the Development Site before eventually draining into the River Glac an t-Seilich or Black Water.

Review of the main river and coastal catchments layer of Scotland's Environment Interactive Map Viewer (NatureScot, 2025) identifies the main river catchment associated with the Development Site is the river Averon, to which all watercourses and drainage ditches within the Development Site are anticipated to eventually drain into. As noted, the River Averon is located at the southern extent of the Development Site towards the B9176.

Review of SEPA's water classification hub (SEPA, 2025) indicates the River Glac an t-Seilich / Black Water has been classified by SEPA with an overall status of 'Good'. No further watercourses within the Development Site have been classified. As such, as all the watercourses within the Development Site eventually drain into the River Glac an t-Seilich / Black Water, it is assumed these have the same overall status classification as the River Glac an t-Seilich / Black Water (i.e. overall status of 'Good').

Review of the National River Flow Archive (NFRA) shows no flow gauges are present for the watercourses located within the Development Site.

Climate

The rainfall data for the site is obtained through review of the catchment information tab relating to specific measurement gauges along watercourses, available from the National River Flow Archive (NRFA) search data page (NFRA, 2025). This source indicated two gauging stations are located within 10 km of the Development Site as follows:

- Located on the River Averon at Alness, approximately 7.6 km southeast of the Development Site; and
- Located on the River Cannon at Sgodachail, approximately 8.8 km north of the MDA.

Table 13.2.1 shows the annual average rainfall recorded from each of these gauging stations.

Table 13.2.1 NRFA Rainfall Data

Catchment	NGR	Gauge ID	Station Level (AOD m)	Period of Record	Annual Average Rainfall (mm)
River Averon at Alness	NH 654695	4003	11.948	1991 – 2020	1,500
River Cannon at Sgodachail	NH 491921	3002	70.744	1991 – 2020	1,823

Flooding

Review of SEPAs flood risk mapping (SEPA, 2025) indicates a low to high risk of surface water flooding throughout the Development Site with the areas typically associated with smaller watercourses. Additionally, there is a low to high risk of river flooding in the immediate vicinity of the River Glac an t-Seilich / Black Water, Allt Loch Bad a' Bhathaich and the River Averon.

Geomorphology

The geomorphology of the Development Site is dominated by the topography and resulting drainage pattern. The topography of the MDA is dominated by undulating hills and slopes of Carn Cas nan Gabhar, Creachan an Fhòidha and Clach nam Ban as well as the corries; Coire a' Chapuill and Coire na Sgratha. The Drainage paths as a result of these hills is typically to the northeast into one of the various watercourses present. Between the various hills, within the coires and towards the River Glac an t-Seilich the ground is relatively flatter than the surroundings and are likely to represent wetter conditions which are more conducive to deeper peat accumulations. The BGS and National Soil Mapping of Scotland indicate peat is typically present throughout the MDA and as such it is likely the peat on the steeper lying slopes will be shallower.

The topography along the existing forestry track is typically steep with drainage paths generally flowing to the east. These steeper slopes would not generally be conducive to deep peat deposits with this confirmed by the BGS mapping with Till and Morainic deposits generally recorded throughout. The National Soil Mapping and 2016 Carbon and Peatland mapping generally agree with this also, however, indicate the possibility of peat deposits with peaty gleys and Class 5 soils and peatland recorded underlying or in the immediate vicinity. This may mean shallower peat deposits or peaty soils are present along the track on these steeper slopes. Areas of flatter lying ground are present along the existing forestry track leading to the MDA towards Allt Loch Bad a' Bhathaich, in the vicinity of proposed borrow pit BP1 and towards the southern extent of the track on approaching the B9176. Given the lower lying, flatter and likely wet conditions (given the presence of steep surrounding topography and the presence of watercourses) these areas present the potential for deep peat deposits to be present, although, except for proposed BP1, the various desk-based sources do not indicate the presence of peat in these areas.

13.2.4 Summary of Surveys

Five separate site surveys were undertaken within the Development Site to inform this report as follows:

- Peat Probing Phase I and Watercourse Crossing Walkover– August 2024;
- Peat Probing Phase II and Site Walkover – February 2025;
- Peat Probing Phase II – Additional Peat Probing 1, Site Walkover – April 2025;
- Peat Probing Phase II – Additional Peat Probing 2 – July 2025; and,
- Watercourse Crossing Walkover – August 2025.

The surveys are summarised as follows.

Site Walkover

Generally, the site walkovers observations agreed with the features as identified in the 'Current Land Use' Section of this PLHRA (**Section 13.2.3**). Additional features as identified during the various site walkovers are present on **Figure 13.2.3**. The Development Site typically has two zones with varying features: the MDA and the Existing Forestry Track from the B9176 leading to the MDA.

Within the MDA the land was typically observed to be undulating and sloping in-keeping with the highland terrain which is present. The surface is typically vegetated throughout with heathland. Along the northern extent of the WDA in the vicinity of the proposed BESS and along the steeper slopes of the surrounding hills, the ground was noted to be firmer. Where the coire's are present and along the higher flatter ground in the south of the MDA, the ground was noted to be much wetter, softer and boggy. Along the higher sections of the MDA and within the coire's peat erosion / drainage channels were noted along with pooling water. These peat channels were recorded up to around 3 m in depth.

Along the Existing Forestry Access Track to the MDA, an existing unbound track is present throughout the majority of the proposed alignment. This access track was observed to vary in width, between 3.5 m and 5 m and made up of unbound gravel construction and generally in good condition. Along the track, the predominant land use was observed as commercial forestry with the state of the forestry in various stages from felled to mature woodland. Steeper slopes were observed as identified within the topography section of this document. Ground conditions along the alignment were noted to be firm and dry with minimal peat exposures observed.

No peat instability features were observed during the site walkovers undertaken.

Watercourses

Numerous watercourses of varying size and water level were observed across the Development Site**.** All the watercourses observed were matched to those identified as part of the desk-based sources. Along the existing forestry track to the MDA, it is known closed pipe culverts and one bridge are present to allow watercourses to flow beneath, as detailed in **Appendix 13.1.**

Borrow Pit

The historic quarry - as identified by desk-based sources at the proposed borrow pit BP1 location - was observed as part of the walkovers. Based on observations made, it appears this quarry was used to provide the aggregate for the existing forestry track. Observations made also suggest the excavation of the aggregate may have involved blasting considering the quarries morphology and surrounding debris. In addition to BP01, a number of small borrow pits were observed along the Existing Forestry Track which were previously operated by FLS.

Peat Depth Surveys

A total on 4No. peat depth surveys were undertaken across the Development Site to ensure adequate coverage for use in the planning stage design. Note where peat investigations were undertaken, these were scoped taking cognisance of the Peatland Survey Guidance (Scottish Government, et al, 2017) and consultation with SEPA. The 4 No. surveys are described as follows:

Phase I – August 2024

The Phase I peat depth survey was undertaken across Site Boundary, with focus on the MDA. For this survey the following spacing was generally adopted:

- 100 m x 100 m grid targeting the MDA.

In total, 1,015 probes were attempted with estimated peat depths ranging from absent to 3.60 m.

Phase II Peat Probing – February 2025

The Phase II peat depth survey was undertaken along the Existing Forestry Access Track and the crane pad and laydown areas within the MDA. The scope of the Phase II survey was as follows:

- Existing Forestry Access Track and MDA Access Tracks: Probes at 50 m intervals at 10 m perpendicular offset from the track centreline
- Crane pad and laydown areas: 7 x 12 grid of points at 20 m spacing for areas of peat >1 m
- Crane pad and laydown areas: 5 x 10 grid of points at 25 m spacing for areas of peat <1 m

In total, 2,104 probes were attempted with estimated peat depths ranging from absent to 3.70 m.

Phase II - Additional Peat Probing 1 – April 2025

The Phase II – Additional Peat Probing 1 was undertaken in April 2025 following consultation with SEPA to inform the layout of the Proposed Development. During the consultation with SEPA, it was agreed that no further peat probing was required in areas of peat with recorded depth < 1.0 m or outside of the proposed 100 m micrositing boundary for infrastructure. As such, the scope of the additional peat probing was agreed as follows:

- MDA Access Tracks (peat > 1.0 m): 50 m centres and at 10 m offsets from the track centreline
- Large Hardstands and Borrow Pits: 50 m x 50 m grid
- New Turbine Locations: 1 No. probe at the centre with 100m offsets N, S, E and W
- Turbine Hardstands: 1 No. probe at the centre and edges

In total, 488 probes were attempted with estimated peat depths ranging from absent to 2.5 m.

Phase II - Additional Peat Probing 2 – July 2025

The Phase II – Additional Peat Probing 2 was undertaken in July 2025 along the Existing Forestry Track and the MDA. The additional probing was focused on the new borrow pit locations, met mast location and MDA Access Track. The scope of the survey was as follows:

- Met Mast: 25 m x 25 m grid
- 2 No. Borrow Pit: 25 m x 25 m grid
- Borrow Pit Existing Access: 100 m intervals at 10 m perpendicular offsets from the track centreline
- MDA Access Tracks: 50 m centres and 10 m offsets from the track centreline

In total, 187 probes were attempted with an estimated peat depths ranging from absent to 2.9 m.

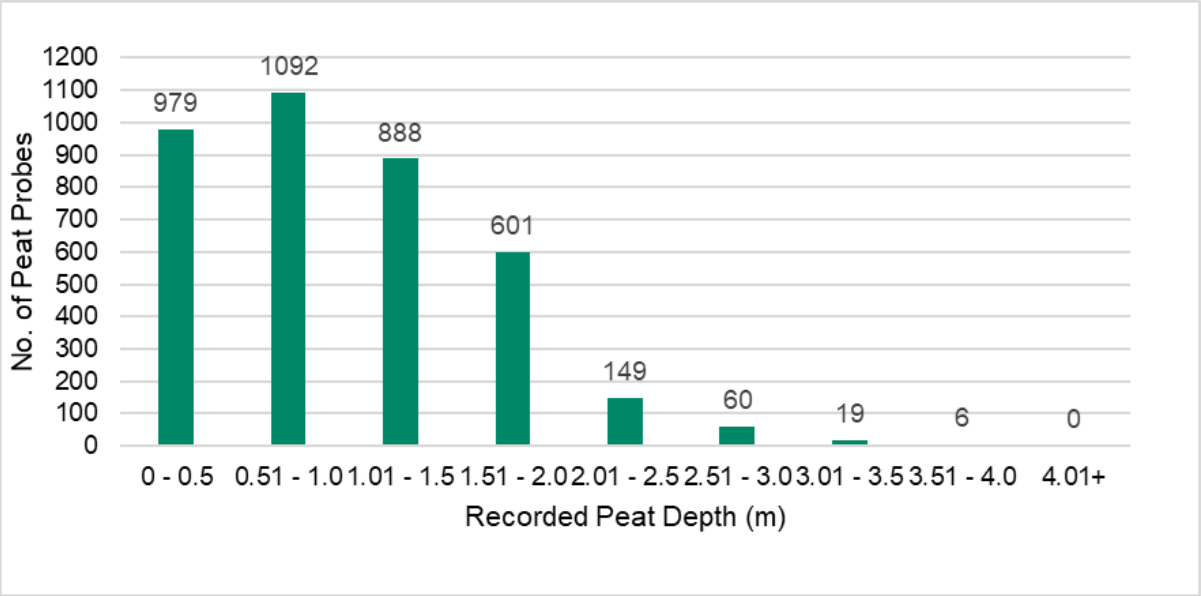
Peat Probing Summary

In total, 3,794 probes were carried out across the Development Site during the four peat probing exercises. The estimated peat depths from the peat probes and their locations can be seen in **Figure 13.2.7**. **Figure 13.2.8** uses the results of the peat probes to create a peat depth interpolation plan for the Development Site. Note the peat depth interpolation was undertaken using the Inverse Distance Weighting methodology.

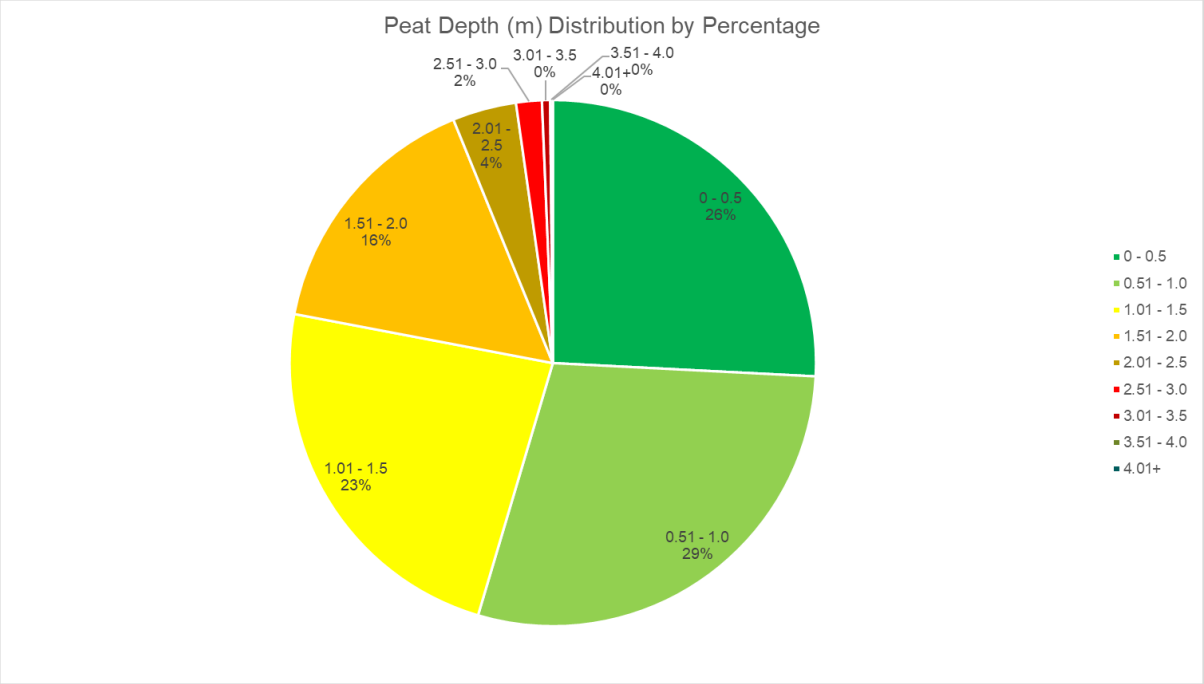
In general, the peat probing results within the MDA indicate peat depths ranging from absent (0 m) to 2.0 m, with localised areas indicating peat depths of up to 2.50 m and isolated probes indicating peat depths greater than 2.5 m. Areas of more significant deep peat deposits (>2.0 m) are recorded to the southeast of the MDA, however, no proposed infrastructure is located in this area. Infrastructure had

been located within this deeper area of peat to the southeast of the MDA, however, these were relocated to avoid the deep peat following the results of the probing becoming available. Along the existing forestry track to the MDA, the probes typically indicate up to 0.5 m peat depth, with very localised areas of peat up to 1.0 m depth and isolated probes up to 1.50 m depth.

Plot 13.2.1 and **Plot 13.2.2** below, present the distribution of peat probes against the thickness range recorded.



Plot 13.2.1 – Peat Thickness Distribution



Plot 13.2.2 – Percentage Per Peat Classification

The majority of the probes taken recorded peat depth < 1.0 m – 2,071 No. (55%). The remainder of the probes largely recorded a depth between 1 m and 2 m – 1,489 No. (39%), with only 234 No. (6%) with depth > 2.0 m. The deeper peat (> 2 m) is present in localised pockets within the MDA.

In relation to the Development Site, the deep deposits were typically located in the MDA with the majority located in the southern half and to the southeast, as shown in **Figure 13.2.8**. Peat deposits were generally encountered throughout the MDA typically within the northern half and to the northwestern extent with localised areas throughout the MDA also shown to have peaty soils.

Two isolated areas with peat depths exceeding 2.50 m were identified: a large area of peat at Coire a' Chapuill to the southeast of the MDA, and a smaller area of peat on the flat ground in the north of the MDA, south of the Abhainn Glac an t-Seilich river between BP2 and the substation/control building area. The areas of deeper peat generally agree with the understood geomorphology of the Development Site with the deeper peat deposits generally encountered in areas of flatter lying ground. Along the existing forestry track to the MDA, peaty soils were generally encountered with localised areas of peat and very isolated areas of deep peat also recorded.

13.2.5 Site Based Excavation & Management Assessment

General Information on Peat

The BGS describe peat as a "partially decomposed mass of semi-carbonized vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps."

Peat is characterised as generally having an extremely high-water content, high organic content, low bulk and dry densities, low shear strength and very high compressibility (O'Kelly, 2017). The Scottish Government guidance document (Scottish Government, 2017) provides further information on the characteristics of peat indicating that dry peat is typically 90 – 95% organic matter and that it has special hydrological properties with water contents of around 90%.

Peat deposits are split into two layers an upper acrotelm and a lower catotelm. The acrotelm is typically <0.6m deep and is where there is a living root system which helps to loosely bind the plant remains together with a normal level of water table fluctuations also within the layer. The catotelm is a more decomposed layer which is below the water table level and is waterlogged. The position of the water table therefore controls the level of acrotelm and catotelm deposits which therefore control the stability of the peat deposits. For the purposes of this assessment, it has been estimated that the simple accepted assumption of the upper 0.45 m peat thickness being acrotelm and the rest of the peat thickness being catotelm.

BS 5930 (BSI, 2020) provides a means for describing peat in the field in the form fibrous peat, pseudo-fibrous peat and amorphous peat. Fibrous peat is described as having clearly recognisable plant remains with the deposits also retaining some tensile strength. Pseudo-fibrous peat is described as a mixture of plant fibres and amorphous peat paste. Amorphous peat is described as having no recognisable plant remains with the deposits also having a 'mushy' consistency. The degree of decomposition of the peat can be further estimated in the field by applying the von Post Scale of humification (Von Post. L., 1924) which ranges from H1 (no decomposition) to H10 (totally decomposed).

The Scottish Government Guidance document records three different naming conventions depending on the depth of the peat deposits. These are listed as follows:

- Peaty Soil – a peat or surface organic soil with a depth of <0.5 m;
- Peat – a peat of >0.5 m but ≤1.0 m depth and which has an organic matter content of >60%; and
- Deep Peat – a peat that is >1.0 m depth.

The Scottish Government Guidance document (Scottish Government, 2017) also identifies three different types of peat deposits; raised bog, blanket bog and fen bog. The Wildlife Trust records that a raised bog is formed of deep peat which can be several metres higher than the surrounding ground level and covered with a surface layer of vegetation (Wildlife Trust, 2024a). Generally, raised bogs are significantly wetter than the surrounding land and are fed almost entirely by rainwater. The Wildlife Trust records that a blanket bog is generally an upland habitat with peat that has accumulated to a depth of at least 0.5 m, typically on flat or gently sloping land where drainage is poor, and the peat is predominately fed by rainwater (Wildlife Trust, 2024b). The International Peat Society records fen peatlands as being located in depressions which have strong connections with groundwater that have been in contact with mineral bedrock or soil (International Peat Society, 2024).

Peat accumulations are typically thickest in reasonably flat lying areas or topographic hollows where surface and groundwater drainage are often concentrated and thins as the local slope angle increases. On steep slopes the conditions are generally considered too steep for thick peat to form, although some peat may be present.

Factors Controlling Peat Instability

The Scottish Government Guidance document (Scottish Government, 2017) indicates that peat instability can manifest in a number of ways, which generally fall into two categories: minor instability and major instability. Minor instability are features which may be warning signs of major instability or possibly just simply represent a response to the land against drainage and gravity (e.g. creep). Localised and small tension cracks, tears in the acrotelm, compression ridges or bulges and thrusts in the peat deposits represent some features which represent minor instability. Major instability comprises an actual peat landslide which can vary in form and scale.

The Scottish Government Guidance document (Scottish Government, 2017) records that peat instability can be caused by a number of factors which can be split into two groups: preparatory factors and triggering factors. Preparatory factors increase the susceptibility of peat to become unstable (i.e. fail) without necessarily causing a peat landslide. As such, preparatory factors can influence peat stability over a long period of time. Triggering factors have an immediate or rapid effect on the peat changing its stability from stable to unstable. As such, triggering factors can be considered as being the cause of failure.

The main preparatory factors, which reduce the overall stability of peat include:

- Increase in the mass of peat (e.g. through vertical accumulation of peat, increase in water content and through afforestation within the peat);
- Reduction in shear strength of the peat or substrate through physical changes in its structure (e.g. creep or vertical fracturing), chemical or physical weathering or by clay dispersal in the substrate;
- Loss of surface vegetation (e.g. through burning, pollution or through deforestation) causing reduction in tensile strength;

- Increased buoyancy of the peat through increase in sub-surface water or wetting of desiccated areas; and
- Afforestation, which will reduce the water content of the peat body and increase the likelihood in the formation of desiccation cracks which are likely to be infiltrated by rainfall.

Triggering factors can be split into two types; natural events and man-made. Triggering factors covering the two types include:

- Natural Events:
  - High intensity and prolonged rainfall, in particular following a dry period, or melting of snow / ice causing a short-term high pore-water pressure at pre-existing or potential rupture surfaces;
  - Earthquakes causing rapid ground acceleration;
  - Erosion at the toe of a peat slope, reducing support to the upslope peat mass; and
  - Increased loading on the peat mass (e.g. through previous peat landslide debris).
- Man-made Events:
  - Alteration of hydrological regime by changing natural drainage paths;
  - Rapid ground accelerations caused by works (e.g. through blasting or vibrations of plant);
  - Extraction of peat at toe of slope, reducing support to the upslope peat mass;
  - Increased loading on the peat by plant, structures or overburden;
  - Earthworks including excavating, filling, stockpiling and embankment of material; and
  - Ground subsidence associated with mining.

While peat failures are often considered to originate in thick or extensive accumulations, it should be noted that instability can still occur in areas of limited peat thickness. The nature of the peat and the interface between the separate layers can also influence its stability. The plane of failure can be located at the interface between the upper, periodically saturated acrotelm layer and the underlying permanently saturated catotelm layer. The plane of failure can also be located at the interface between the peat and the underlying substrate.

Failure can occur due to heavy or prolonged rainfall or due to melting snow or ice which can cause short-term high pore-water pressure along pre-existing or potential rupture surface (e.g. between the substrate and the peat) and can increase the mass of the peat accumulation. This can be exacerbated by drying out of the peat (in summer months for example) leading to the formation of desiccation cracks which can in turn fill with water during rainfall resulting in a short-term increase in pore-water pressure and potentially cause failure. The influence of rainfall on potential peat failure is considered to be heavily dependent on the natural drainage regime within the peat. It should be noted that peat failures often occur after heavy rainfall events after the peat slope has been conditioned to fail after other processes. Given the effect of global warming and the anticipated greater frequency of extreme weather conditions, including more intense storms with heavy rainfall, the rainfall trigger of peat instability may be of more significant concern in the future.

Peat extraction can generate new drainage pathways, leading to a concentration of surface and / or groundwater flow and subsequently result in either increased erosion or concentration of water within localised areas of the accumulation, which can potentially increase the instability of the peat mass. Extraction or erosion can also have the effect of releasing the confining pressures acting on the peat, which can lead to the development of tension cracks in adjacent peat accumulations as a result of the loss in lateral support. Extraction or erosion of the peat mass at the toe of a slope also reduces the support to the upslope material which can result in peat slope failure.

Loading of peat causes an increase in the shear stress applied to the peat mass and can also generate the formation of tension cracks through compression and bulging of underlying or adjacent peat soils. In the case where tension cracks are formed, depending on the topography, the strength of the peat may be dramatically reduced and due to the alteration in loading, rainfall may not be required to initiate a failure.

Ground subsidence associated with the collapse of shallow underground workings and / or abandoned mine shafts may trigger localised peat slumps. Peat failures initiated by mining subsidence could be

expected to typically involve peat slumping in towards the area affected by subsidence and their scale would be dependent on a number of factors including the depth of the peat deposits, the nature of the local hydrological regime and the topography of the surrounding area.

Rapid ground accelerations caused by either man-made vibrations or earthquakes increases the shear stresses within the peat mass and may trigger a peat landslide.

Tree felling (even where affected areas are subsequently re-planted) and permanent deforestation can impact upon the hydrogeological regime of the peatland area through reduced groundwater extraction and altered drainage pathways. This can lead to increased peat erosion and focused drainage and short-terms high pore-water pressures within pre-existing or potential rupture surfaces in the peat accumulation, both of which can increase the risk of peat failure. Also, removal of trees can remove the potentially stabilising root systems, which can reduce the tensile strength of the peat mass.

Alteration of the hydrological regime can have long-term and far-reaching effects on the stability of peat accumulations. Alteration by diverting or blocking either man-made or natural surface drainage pathways or the proposed development of new ditches can transport and concentrate water into areas which can cause potential peat instability.

Within peat accumulations, groundwater will generally flow more readily within the upper acrotelm layer relative to the underlying less permeable catotelm. Excavations within peat will influence existing drainage paths and local permeability. The construction of the Proposed Development will potentially generate an area of hydrological sensitivity due to the free draining nature of the construction stone.

It should be noted that peat is a natural feature which under the correct conditions will grow. It is likely that, on sloping ground and where the peat has been growing, there will be a time when the stabilising forces (e.g. internal strength of the peat and the interface with the underlying substrate) will be outweighed by the destabilising forces (e.g. weight of the peat mass) and the peat accumulation will fail.

Peat Failures

Areas that have experienced historic peat instability are more likely to experience future instability issues during and post construction. It is therefore essential to identify and record any signs of past instability (e.g. cracking of the peat surface, any debris from past failures, peat creep, etc) as part of any peat instability assessment.

Peat failures can occur on gentle slopes, just as on steeper slopes, depending on the loading, drainage conditions and the condition of the peat structure. Changes in gradient, including the subsurface gradient of underlying strata, can also contribute to peat failure due to the potential short term excess pore-water pressures they can create within both concave and convex slope profiles and the gravitational effects on the peat mass.

Types of Peat Failure

Table 2.1 of the Scottish Government Guidance document (Scottish Government, 2017) identifies a number of different types of peat failures, as follows:

- Bog Bursts – failure of a raised bog which involves the emergence of liquid basal peat followed by the settlement of the previously overlying residual peat. Typically recorded to occur on slopes with gradients between 2° and 5° with a typical peat thickness of between 2 and 5 m;
- Bog Flow – failure of a blanket bog which involves the emergence of highly humified (decomposed) basal peat from a clearly defined source followed by the settlement of the previously overlying residual peat. Typically recorded to occur on slopes with gradients between 2° and 5° with a typical peat thickness of between 2 and 5 m;
- Bog Slide – failure of blanket bog involving the sliding of the peat along a shearing surface within the peat mass. Typically recorded to occur on slopes with gradients between 5° and 8° with a typical peat thickness of between 1 and 3 m;
- Peat Slide – failure of blanket bog involving sliding of entire peat mass on a shearing surface at the peat / substrate interface leading to a transitional type failure. Typically estimated to occur on slopes with gradients between 5° and 8° with a typical peat thickness of between 1 and 3 m;

- Peaty Debris Slide – Transitional failure in which the shearing surface is entirely located within the substrate. The covering layer of peat is part of the failure; however, the peat is only considered to be a secondary influence on the failure. Typically recorded to occur on slopes with gradients between 4.55° and 32° with a typical peat thickness of greater than 1.5 m; and
- Peat Flow – any other failure not covered by one of the above, in any other peat deposit (e.g. fen, basin bog, etc) and by any other failure mechanism.

13.2.6 Preliminary PLHRA Assessment Methodology

General

Due to the presence of peat accumulations across the Development Site, a preliminary PLHRA was carried out to assess the risks posed by such soils to the Proposed Development.

Peat slides can represent a significant hazard and can occur during the construction, operation and decommissioning phases of a development. The nature of electricity generation developments in Scotland often situates them in areas where peat moorland is typically found, and it is inevitable that some alteration of the local hydrological regime of a site will occur due to the design and construction practices of such a development.

It is widely considered that development in areas of peat accumulation can have an effect on the stability of these soft soils through alteration of the drainage regime, alteration of loadings (both temporary loads during construction and final working loads), alteration of land use (e.g. removal of surface vegetation) and alteration of the topography. Any proposed development within such an area requires a PLHRA to characterise the Development Site, identify issues and develop the required construction mitigation measures to reduce the risk of a failure occurring within the peat.

The key considerations of this assessment are that:

- Existing, historical or potential areas of instability are identified; and
- The Proposed Development, including construction works, does not result in an unacceptable risk of peat failure.

Triggering and Preparatory Factors Relevant to the Proposed Development

The following provides a summary of the relevant triggering and preparatory factors which relate to the Proposed Development:

- Rainfall is not a controllable factor. However, the assessment considers the potential effects of heavy rainfall at the Development Site;
- Peat loading, and peat extraction are potential hazards. However, both can be mitigated through good practice working methodologies (to be identified in the site-specific construction methodology documents to be prepared by the Contractor prior to construction);
- The topography of the Development Site is characterised by relatively elevated and sloping terrain and the assessment should take cognisance of the combined topography and peat thickness;
- The creation of new drainage paths may lead to the potential channelling and ponding of run-off in areas of the Development Site, posing a potential hazard. This hazard can be reduced through the adoption of good practice working methodologies (to be confirmed in site-specific construction methodology documents);
- The creation of rapid ground acceleration through plant, construction methods including blasting at borrow pits. This hazard can be reduced through the adoption of good practice working methodologies and practices (to be confirmed in site-specific construction methodology documents); and
- The removal of surface vegetation (i.e. through tree felling and vegetation clearance). This hazard can be reduced by only removing vegetation where required to construct the Proposed Development.

Working methodologies / mitigation measures referred to above are discussed further in **Section 13.2.8** Mitigation Measures.

Potential Consequences of Peat Failure

A key part of the risk assessment process is to identify the potential scale of peat failure should it occur and identify the receptors of the consequences. For the Development Site, the key potential sensitive receptors of peat failure are the following:

- The Proposed Development (e.g. turbines, MDA Access Tracks, borrow pits, met mast, substation, BESS, etc.)
- Existing development (e.g. Existing Forestry Access Track, U1907, etc.)
- Site workers and plant (risk of injury / death or damage to plant);
- Wildlife (disruption or destruction of habitat);
- Archaeological designated assets (e.g. Historic Environment Records, etc.)
- Watercourses and aquatic fauna;
- Site drainage (blocked drains / ditches leading to localised flooding / erosion); and
- Visual amenity (scarring of landscape).

Qualitative Risk Assessment

This preliminary PLHRA consists of a qualitative assessment based on an examination of available topographical maps and aerial photography, a digital terrain model, observations made during site visits, an assessment of peat probing results and engineering judgement.

The Qualitative Risk Assessment ('Hazard Ranking') was undertaken by identifying the factors that can cause landslide events and estimating the impact of such events on the Proposed Development. The Hazard Ranking has been undertaken in accordance with the Scottish Government Guidance (Scottish Government, 2017).

The Hazard Ranking was calculated using the following equation (Eq. 3 from the Scottish Government Guidance):

Hazard Ranking = Hazard x Exposure

The terms Hazard is defined in this case as "the likelihood of the peat landslide event occurring." The term Exposure is defined in this case as "the impact and consequences that the event may have" or its "adverse consequences."

The Hazard scale used in this assessment is shown in **Table 13.2.2**, which is based on the scale recommended in Table 5.1 of the Scottish Government Guidance.

Table 13.2.2 Peat Landslide Hazard Ranges of the Lifetime of the Proposed Development

Peat Landslide Hazard Scale	Likelihood	Probability of Occurrence
5	Almost certain	> 1 in 3
4	Probable	1 in 10 – 1 in 3
3	Likely	1 in 10^2 – 1 in 10
2	Unlikely	1 in 10^7 – 1 in 10^2
1	Negligible	< 1 in 10^7

The Exposure scale used in this assessment is shown in **Table 13.2.3**, which is based on the scale recommended in Table 5.2 of the Scottish Government Guidance.

Table 13.2.3 Peat Landslide Exposure Ranges over the Lifetime of the Proposed Development

Peat Landslide Exposure Scale	Exposure	Impact as % damage to (or loss) of receptor	Example Consequences
5	Extremely high	> 100% of the asset	Loss of life or serious injury, major pollution incident, complete destruction of property or infrastructure or public road, major loss of habitat.
4	Very high	10% – 100%	Minor or non-serious injury, significant damage to property, significant pollution incident or significant loss of habitat.
3	High	4% – 10%	Minor pollution incident, minor damage to property or temporary closure of infrastructure, destruction of access track locally, significant delay to construction, localised loss of habitat.
2	Low	1% – 4%	Temporary closure of forest roads, minor delay to construction.
1	Very low	< 1% of the asset	Minor remediation of infrastructure or habitat.

Once all areas within the Development Site have been assigned a peat landslide Hazard and degree of Exposure, a Hazard Ranking can be estimated for the Proposed Development. The indicative Hazard Ranking used in this assessment are shown in **Table 13.2.4**, which is based on the scale recommended in Table 5.3 of the Scottish Government Guidance.

Table 13.2.4 Indicative Hazard Ranking Levels

Peat landslide Hazard	Peat Landslide Exposure				
	Extremely High (5)	Very High (4)	High (3)	Low (2)	Very Low (1)
Almost Certain (5)	High (25)	High (20)	Moderate (15)	Moderate (10)	Low (5)
Probable (4)	High (20)	Moderate (16)	Moderate (12)	Low (8)	Negligible (4)
Likely (3)	Moderate (15)	Moderate (12)	Low (9)	Low (6)	Negligible (3)
Unlikely (2)	Low (10)	Low (8)	Low (6)	Negligible (4)	Negligible (2)
Negligible (1)	Low (5)	Negligible (4)	Negligible (3)	Negligible (2)	Negligible (1)

Where the Hazard Ranking for a zone is moderate or high, avoidance or specification of mitigation measures would normally be the only means by which project infrastructure could be considered acceptable within that zone at the Development Site.

The need for further investigation or specification of mitigation measures should be a function of the Hazard Rankings present on the Development Site. The Hazard Rankings and suggested actions used in this assessment are shown in **Table 13.2.5**, which is based on the scale recommended in Table 5.4 of the Scottish Government Guidance.

Table 13.2.5 Hazard Ranking and Suggested Actions

Hazard Ranking	Action suggested for each zone
High	Avoid project development at these locations
Moderate	Project should not proceed unless risk can be avoided or mitigated at these locations, without significant environmental impact, in order to reduce risk ranking to low or negligible.
Low	Project may proceed pending further investigation to refine assessment and mitigate hazard through relocated or re-design at these locations.

Negligible	Project should proceed with monitoring and mitigation of peat landslide hazards at these locations as appropriate.

Estimating the Hazard

To estimate the peatland landslide hazard, the inputs used have been based on the major factors that can affect slope stability at the Development Site, namely: slope angle, peat thickness, evidence of peat instability, substrate present within the Development Site, presence of forestry and hydrology. The selection of the ranges for ranking of these inputs was based on a literature review, site evidence and engineering judgment. A discussion on the rankings chosen for each of the main factors listed is given in the following sections.

Slope Angle

Gravity is the primary driving force of all landslides and as such, slope angle is a significant factor in controlling the stability of peat soils.

Boylan, et al., 2008, recorded although peat is known to have failed on relatively gentle sloping land, with the majority of failures occurring on ground sloping between 4° and 8°, this is likely to correspond to these slope angles being favourable to significant peat accumulation, and therefore more closely linked to the thickness of peat.

Shallower sloping ground is considered to have a reduced likelihood of failure, since there is less gravitational force to facilitate instability. As such, gentle slopes are not considered to be as susceptible to failure as steeper slopes.

As a result, assigned rankings relating to slope angle vary between 0.5 (where slopes are almost flat) and 5 (where steep slopes are present), as presented in **Table 13.2.6**.

Table 13.2.6 Slope Angle Ranking (Ranking Factor 1)

Slope Angle (°)	Ranking
0 – 2	0.5
< 2 – 5	1
< 5 – 10	2
<10 – 15	3
<15 – 20	4
≥ 20	5

Refer to **Figure 13.2.4** (end of this document) for the topography across the Development Site.

Peat Thickness

Mills, A.J, 2002, reports that peat slides most frequently occur in peat accumulations between 0.5m and 1.5m in thickness, while bog bursts commonly occur in peat ranging between 1.0m and 5.0m in depth. Warburton, et al., 2004, defined peat slides as “slab-like, shallow translational failures with a shear failure mechanism operating at, or just below, the peat and underlying substrate interface”. Mills, A.J, 2002, defined bog bursts as “involving large quantities of water and peat debris that flows downslope…usually associated with raised bogs” following bursting of peat in a near-liquid state through tears in the surface layers, possibly as a result of a build-up of hydrostatic pressures within the peat.

Peat failure may be facilitated through the development of weak layers within the peat mass which may either form naturally or by ‘hydrological factors. Peat has a natural anisotropic strength due to the process by which it is formed. In particular, the nature of the interface between the distinct layers within a peat mass is defined by hydrology. These distinct layers are:

- An upper vegetative mat consisting of the living vegetation of herbaceous plants, grasses and mosses;

- The acrotelm, which is the surface layer of an active peat forming mire; and
- The catotelm, which is the lower layer of an active peat forming mire.

The JNCC, 2011, considered that the nature of the boundary between the acrotelm and catotelm, and between the catotelm and the underlying substrate (e.g. mineral soil, weathered rock) influence the strength of the peat mass.

Peat stratification and thickness are associated with one another. This is because thin deposits of peat are unlikely to have a catotelm and may mainly be composed of a vegetative mat and acrotelm. As such, with inherent strength because of a more fibrous morphology, peat thicknesses of less than 0.5m are not reported to fail catastrophically. However, thicker deposits are more likely to contain weaker layers or bands of pseudo fibrous / amorphous peat, which are more likely to fail.

For the purposes of this assessment, peat thickness has been recorded from absent to 3.7 m, therefore, ranked between 0.5 and 4. The ranking increases with depth; increasing values relate to more onerous conditions and reflect the tendency for 'weaker' peat to be present as thickness increases, in addition to the presence of a greater disturbing force as a consequence of the increasing thickness. The ranking adopted for peat thickness is given in **Table 13.2.7**.

Table 13.2.7 Peat Thickness Ranking (Ranking Factor 2)

Peat Thickness (m)	Ranking
≤ 0.5	0.5
>0.5 - 1.0	1
>1.0 - 2.0	2
>2.0 - 3.0	3
> 3.0	4

Refer to **Figure 13.2.8** (end of this document) for the peat depths across the Development Site.

Evidence of Peat Instability

Evidence of previous or incipient peat instability may provide an indication that conditions at that location are favourable to peat instability and therefore the area may be prone to further instability. As such, it is considered that areas with evidence of peat instability will have a higher risk of failure than areas where no stability issues have been identified.

For the purposes of this assessment, where no peat instability is identified through the site visit or the peat probing activities, a ranking of 0 is applied. Where localised small-scale failures or instability features are identified, a ranking of 1 is used and where more widespread or large-scale failures are identified, a ranking of 2 is applied, as indicated in **Table 13.2.8**.

Table 13.2.8 Signs of Relic Failure Ranking (Ranking Factor 3)

Signs of Relic Failure in Vicinity	Ranking
Absent	0
Localised evidence of instability	1
Widespread evidence of instability	2

No peat instability features have been identified within the Development Site and as such for the purposes of this assessment have been assumed to be absent.

Substrate

As noted in the Peat thickness section above, it is considered that the nature of the boundary between the acrotelm and catotelm, and between the catotelm and the underlying substrate (e.g. mineral soil, weathered rock) influence the strength of the peat mass. The nature of the substrate can therefore play a part in the level of stability of a peat mass.

Where fine-grained deposits (e.g. clay or silt) are present at the interface, there is likely to be weathering and softening of the clay due to the peat likely being saturated, with poor or non-existent vertical drainage paths. This will result in a reduction of the undrained shear strength or effective shear strength parameters of the fine-grained deposits. This means failure could occur within the peat mass itself, at the interface with the fine-grained deposit or within the fine-grained deposit.

Where coarse-grained deposits (e.g. sand, sand & gravel or gravel) are present at the interface, the effective shear strength parameters are likely to be comparatively high compared to the fine-grained deposits. Where coarse-grained deposits are present failure is likely to occur in the peat mass itself.

Rock provides a high strength substrate, where encountered, however, the rock surface may be smooth and as such can provide a weak interface with the peat. Failure of the peat may therefore occur within the peat mass itself or at the interface with the rock. For the purposes of this preliminary assessment any rock interface has been given a higher risk rating similar to that of the fine-grained interface. **Table 13.2.9** presents the ranking for the possible substrates which can be encountered at the Development Site.

Table 13.2.9 Substrate Ranking (Ranking Factor 4)

Substrate	Ranking
Coarse-grained (fine to coarse sand, sand & gravel, Gravel)	1
Fine-grained (silt or clay) & very clayey/silty fine to medium sand	2
Rock	2

As no intrusive investigation has been undertaken within the Development Site to prove the substrate present, the selection of the substrate is entirely reliant on desk based sources with the geology identified as presented within **Section 13.2.3**. The superficial deposits identified across the Development Site were given rankings based on their anticipated composition as defined in **Table 13.2.10** below. The locations and extent of the superficial deposits across the Development Site can be seen on **Figure 13.2.6** (end of this document).

Table 13.2.10 Superficial Substrate Rankings

Superficial Deposit	Assumed Substrate	Ranking
Alluvium	Fine-grained	2
Till and Morainic Deposits	Coarse-grained	1
Peat	Rockhead directly underlying	2
River Terrace Deposits	Coarse-grained	1
Where no superficial deposits mapped	Peat or peaty soils directly overlying bedrock	2

Presence of Forestry

The process of afforestation and subsequent deforestation can have significant effects on the structure and hydrological properties of peat soils, which may in turn result in an increased risk of peat failure.

During the planting operations, a series of drains are generally cut into the peat soil across the area to be afforested (Wilson & Hegarty, 1993). These drains are typically between 0.4 m and 0.6 m deep and are cut perpendicular to the surface contours to allow drainage of the soils to fall away from the plantation. This process initially affects the structure and hydrology of the upper acrotelmic layer of peat.

Drains were noted to have been installed within the forestry in the Development Site, as described, during the site walkover surveys undertaken.

Over the years and decades following initial planting, drying out and degradation of the peat adjacent to the furrows results in their widening. As the trees mature and their canopies grow, an increase in the capacity of the trees to intercept rainfall and for evapotranspiration to occur, results in further drying of the peat. Dry summers can also exacerbate the drying effects on the peat, with water uptake by root systems replacing drainage as the main cause of peat drying, resulting in the water table falling below the base of the furrows and causing cracking to extend deeper into the catotelmic layer. Eventually, the drying effects can cause the peat to crack, with the cracks typically following the lines of drains / furrows.

As the plantation matures, the peat is subject to progressive loading from the growing trees, and the water table generally decreases in level. Over the lifetime of the forest, drainage ditches can become blocked due to the trees shedding their needle/leaves, ground vegetation cover infiltrating them and soils washing into them causing them to 'silt up'. This can prevent water draining away as intended and can cause a short-term high pore-water pressure build-up following periods of heavy rainfall.

As such, the process of afforestation can have a negative effect on the stability of peat.

Following deforestation, peat loading from the trees is largely removed and there is typically a rise in the water table. However, with the reintroduction of a higher water table level, a short-term increase of pore-water pressure may be established within the peat mass. Deforestation is considered to have a negative effect on peat stability but is considered less of a concern than when recently forested due to the overall reduction of peat loading.

Forestry is present along the Existing Forestry Access Track. The MDA largely comprises of moorland with a small area of felled forestry in the southwestern most portion within which scattered pockets of trees are present. **Figure 13.2.3** illustrates the areas of forestry within the Development Site. Where forestry is not shown on the figure (i.e. across the majority of the MDA), it is assumed to be absent.

Based on the above discussion, ranking for the presence of forestry is considered (where relevant) and is shown in **Table 13.2.11**.

Table 13.2.11 Presence of Forestry Ranking (Ranking Factor 5)

Presence of Forestry in the Area	Ranking
Absent	0
Recently deforested / afforested	1
Present	2

Hydrology

Carling (1986) highlighted an increase in pore-water pressures generated by intense rainfall is a significant potential 'triggering mechanism' for peat slides. However, prolonged periods of heavy rainfall are not necessarily related to instability. Both the distribution and intensity of precipitation have a complex influence on the mass movement of peat.

In many cases of peat failures, a relatively dry period has been followed by intense rainfall. Although intense rainfall appears to be an important factor, it is important to recognise that the occurrence of an extreme event does not necessarily directly result in peat instability; this being a function of many factors and a combination of climatic preparatory events. For the purpose of this assessment, rainfall has been considered to be a constant for the entire Development Site.

It has been noted that peat slides have been initiated along natural drainage lines or in association with artificial drainage (Wildlife Trust, 2024a). Blocking of existing drainage paths could create a buoyancy effect which may reduce the strength of the peat or cause liquefaction due to raised pore-water pressures at the base of the peat.

Poorly drained areas (such as boggy ground with few/ no drainage channels) are considered to be more susceptible to instability due to higher groundwater tables than well-drained areas.

Where drainage ditches become blocked with vegetation for example, water can build up in them allowing pore-water pressures to develop and exceed critical levels during or immediately following intense rainfall.

The parameter for hydrology has been given a ranking value of between 0.5 and 2 as shown in **Table 13.2.12**. Increasing values relate to relatively poorer drainage conditions that are considered likely to increase the probability of instability occurring.

Table 13.2.12 Hydrology Ranking (Ranking Factor 6)

Hydrology description	Ranking
Well drained with a good drainage system in working order	0.5
Boggy or saturated ground	1
Blocked drainage paths	2

For this preliminary assessment, the entire Development Site is assumed to consist of boggy or saturated ground, based on site observations that did not identify any well-drained soils or blocked drainage paths. Although some areas show evidence of historical drainage (drained bog), these locations are still assessed as boggy or saturated under current conditions

Weightings

The factors affecting peat instability are not considered to contribute equally and as such, weightings have been applied based on AECOMs understanding of the Development Site and experience of assessing peat slide risk.

For example, as slope angle is considered to represent one of the main driving forces for peat instability, a weighting of 6 has been applied to the factor to capture its importance in the mobility of peat. Likewise, evidence of peat instability is considered to be equally influential, as if the conditions in areas have resulted in failures in the past, similar failures could initiate in the future and therefore a weighting of 6 has also been applied to this factor.

Peat depth is also considered to play a significant role in the stability of peat. As the thickness of peat increases, so does the weight of the peat, which could result in the activation of a slip plane. Also, due to the anisotropic nature and highly variable structure of peat, the thicker the deposits are, the more likely they are to have a greater number of weaker zones throughout its profile affecting the overall stability of the peat mass. This factor is, however, considered less influential to peat instability than the slope angle and evidence of peat instability and has therefore been given a lower weighting value of 4.

The type of substrate present within the Development Site can be significant as relates to the peat landslide risk. The presence of fine-grained or rock substrate can mean there is multiple potential failure zones and hence more chance of a peat landslide. The peat thickness can play an important role as to the increased risk of peat instability depending on the substrate present. This factor is, however, considered less influential than peat thickness and has therefore been given a lower weighting value of 3.

Forestry plays a significant role on the peat stability within the Development Site due to its extensive coverage. The planting process will likely have caused damage to the structure of the upper peat layer, additional loading on the peat from the weight of the trees and degradation of the peat by their drying out all of which can result in an increased risk of peat instability. However, this is not considered to be as significant a factor as peat thickness, slope angle and evidence of peat instability and has therefore a weighting value of 3 has been applied.

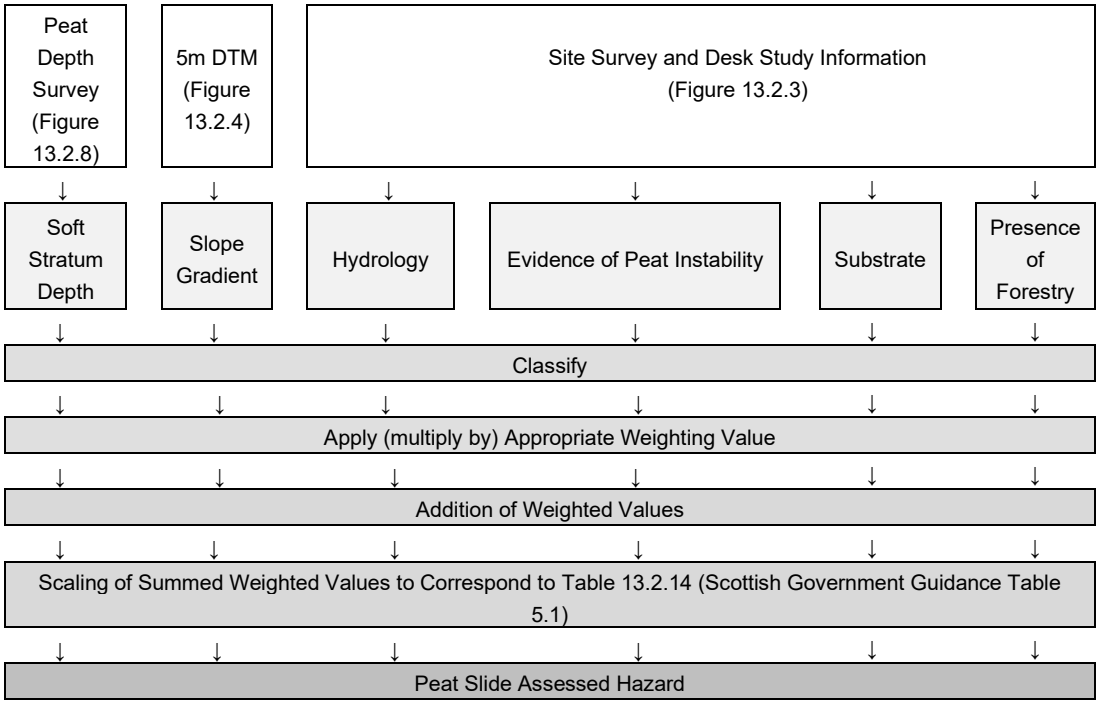
Finally, the hydrology of the peat is also considered to contribute to its stability. However, due to the extent of the forestry across the Development Site, hydrology is considered to be less influential. This is because the hydrology is closely related to the drainage network throughout the forestry and this factor is therefore linked to and largely covered under the weighting applied to the forestry. However, it is still important to consider this factor, and as such a weighting value of 2 has been applied.

The weightings applied to each of the parameters are summarised in **Table 13.2.13**.

Table 13.2.13 Weighting Values for Each Parameter

Parameter	Ranking Factor	Weighting
Slope Angle	1	6
Signs of Relic Failure	2	6
Peat Thickness	3	4
Substrate	4	3
Forestry	5	3
Hydrology	6	2

To estimate the level of hazard across the Development Site and produce the Peat Slide Assessed Hazard (PSAH) plan, the classification and weighting was carried out in Geographic Information Systems (GIS) software using a multi-criteria analysis. The processed used is illustrated in **Insert 13.2.1**.



Insert 13.2.1 GIS Weighted Sum Analysis

The scaling of the Weighted Totals corresponds to **Table 13.2.14** (and the Scottish Government Guidance Table 5.1) and is shown in below.

Table 13.2.14 Weighted Total vs Scale

Weighted Total	Scale	Likelihood	Probability of Occurrence
> 50	5	Almost certain	> 1 in 3
41 – 50	4	Probable	1 in 10 – 1 in 3
31 – 40	3	Likely	1 in 10^2 – 1 in 10
21 – 30	2	Unlikely	1 in 10^7 – 1 in 10^2
< 20	1	Negligible	< 1 in 10^7

Blasting

Blasting is being considered as part of the Proposed Development to facilitate formation of the borrow pits.

Blasting may increase the probability of a peat landslide through initiation of ground accelerations through the peat which could cause the structure to destabilise. Estimating the effects blasting can have on the structure of the peat and its risk in relation to stability is complex. As such, for the purposes of this preliminary assessment, it is considered where blasting may be undertaken, this will increase the peat slide hazard in that area by a ranking factor of one, e.g. ‘unlikely’ would become ‘likely’. Note for the purposes of this Preliminary assessment a 100m zone of influence has been considered for the areas where blasting is proposed. A more detailed assessment would be undertaken as part of the Final PLHRA undertaken post-consent following GI, design maturity and further understanding of the blasting that may be required.

Blasting is not taken into account as part of the Geographic Information Systems Multi-criteria Analysis described above. Instead, the increase in peat slide hazard will be assigned as part of the assessment. The effects of blasting will not affect all areas, instead blasting is considered to affect the areas where it is undertaken and any receptors which are downslope within influencing distance. Areas where the effects of blasting have been taken into account are explicitly highlighted within the assessment. The effect of the blasting will only be considered as part of the assessment on the actual infrastructure to which it is being considered, e.g. on the borrow pits assessment. The borrow pit assessments will consider any potential effects on receptors which may be impacted by peat landslide as a result of formation of the borrow pit.

Estimating the Exposure

Following assessment of the potential peat slide Hazard, the potential impact and the consequences (i.e. Exposure) of a peat landslide has been assessed for both environmental exposure and infrastructure exposure.

The Exposure of a peat slide to the environmental receptors (e.g. watercourses, designated sites, ecologically important areas, etc) are based on the likely environmental impact resulting from a peat slide.

When considering the potential exposure of a peat failure, the presence of any existing structures or infrastructure (e.g. forestry tracks etc.), future development (i.e. proposed infrastructure) and / or sensitive receptors (e.g. watercourses, designated sites, etc.) are considered.

When considering the baseline condition (i.e. the site prior to construction), where no receptors are present the exposure is typically considered to be ‘very low’ (i.e. Exposure rating of 1). Where existing forestry tracks are present and no change is proposed along these, an exposure of ‘very low’ is also considered sufficient, due to the potential impact as a percentage of the total project cost likely to be less than 1% (i.e. Exposure rating of 1). Where infrastructure is located within 50m of a watercourse, the exposure is raised to ‘high’ (i.e. Exposure rating of 3 – minor pollution incident may occur). Where archaeological designated assets (e.g. Historic Monument Records) are present within influencing distance, the exposure has been considered to be ‘low’ given the anticipated significance and as the findings from these assets have typically been recorded.

When considering the potential exposure, a peat failure during construction could have on the Proposed Development, the following was taken into account. Generally, where access tracks, temporary compounds, borrow pits or met masts are proposed, the exposure is considered to be ‘very low’ or ‘low’ (i.e. Exposure rating of 1 or 2 – e.g. minor remediation of infrastructure or temporary closure of access roads, minor delay to construction). In the case of floating MDA Access Tracks, the exposure is dependent on the proposed infrastructure it could affect should an access track section be lost. For example, should the floating MDA Access Tracks be completely lost due to peat failure and remove access to one turbine then the exposure is considered to be ‘low’ (i.e. exposure rating of 2). However, should access be restricted to 2 or more turbines then the exposure is considered to be ‘high’ (i.e. exposure rating of 3 – significant delay to construction, destruction of access track locally). At the site of a proposed turbine an exposure of ‘low’ is considered appropriate due to the increased impact on the cost of the Proposed Development (Exposure rating of 2 – i.e. 1% to 4% of the total project cost). A ‘low’ exposure is also considered sufficient for the BESS and control building and substation.

13.2.7 Hazard Ranking (Pre-mitigation)

This section summarised the results of the Peat Landslide Potential Hazard, Exposure and the resulting Hazard Ranking associated to the Proposed Development (pre-mitigation).

Table 13.2.15 presents the qualitative assessment undertaken for the Development Site in a tabular format for each individual infrastructure component. The inputs to **Table 13.2.15** are explained as follows.

For ease of review, access track sections have been created and borrow pit search areas temporary compounds labelled, as shown on **Figure 13.2.10** (end of this document). These have been referenced in Column 1 of **Table 13.2.15**.

Assessed Potential Hazard & Assessed Hazard (Worst Case)

The assessed potential peat slide Hazard is presented in **Figure 13.2.9 and** indicates that the potential peat slide Hazard across the Development Site is generally assessed to be 'Unlikely' (2) with areas of 'Negligible' (1) and 'Likely' (3) also having been assessed. Localised areas of 'Probable' (4) peat slide Hazard have also been assessed in the MDA and along the existing forestry track to the MDA. The largest areas of 'Likely' and where the 'Probable' peat slide Hazards are assessed, typically correspond to the steeper areas of the Development Site.

The Proposed Development has been designed by locating the footprint of the infrastructure in areas predominantly characterised by 'Unlikely' peat slide hazard, with some infrastructure falling into the 'Likely' classification (this is shown on **Figure 13.2.9**).

Column 2 of the **Table 13.2.15** is to be cross-referenced with **Table 13.2.2** and refers to the assessed peat slide Hazard value assigned to infrastructure. The peat slide Hazard classification may be reduced or increased during the evaluation process based on engineering judgement. Where any reduction or increase has taken place, this will be discussed in the text within the table.

The assigned peat slide hazard has been obtained by taking account of the Assessed Hazard within the footprint of each infrastructure component, an associated 100 m micrositing buffer (50 m on either side) around every infrastructure component (to allow for potential relocation post-consent) and an additional 50 m buffer beyond the micrositing zone (to account for the "impact zone" where the Proposed Development could affect peat stability). For borrow pits, where blasting may occur, the "impact zone" is extended by a further 100 m beyond the micrositing buffer.

Therefore the assigned slide Assessed Hazard has been evaluated within a zone extending up to 100 m from each proposed infrastructure location (or 150 m for borrow pits where blasting may occur). The corresponding hazard values are presented in Column 2 of **Table 13.2.15** and form the basis of calculation the Worst-Case Hazard Ranking shown in Columns 5 and 6.

Additionally, it should be noted that the Worst-Case Hazard Ranking (Column 5 and 6) is based on the impact with no engineering mitigation included. Where mitigation is required to reduce the Hazard this is considered in **Table 13.2.16**.

Assessed Exposure

Column 3 of **Table 13.2.15** presents the assessed Exposure (see **Table 13.2.3**) relating to the individual proposed infrastructure components and any existing infrastructure (i.e. existing forestry tracks).

Column 4 of **Table 13.2.15** presents the assessed Exposure (see **Table 13.2.3**) relating to the environmental receptors.

Assessed Hazard Ranking

Column 5 of **Table 13.2.15** is to be cross-referenced with **Table 13.2.4** and **Table 13.2.5**, and gives the worst-case Hazard Ranking (i.e. Hazard Ranking = Hazard Scale x Exposure Scale), whereby the value given in Column 2 (the Hazard) is multiplied by the higher value of the two Exposure ratings given in Columns 3 and 4 and expressed as a number.

Column 6 of **Table 13.2.15** expresses the worst-case Hazard Ranking value as one of the four terms defined in **Table 13.2.5**. When considering the Worst-Case Hazard Ranking this is considering what the worst-case combination of peat slide Assessed Hazard and infrastructure / environmental Exposure is. I.e. the Worst-Case Peat Slide Hazard may not interact with the Worst-Case Infrastructure /

Environmental Exposure. Therefore, the selected rankings reflects the most realistic combination of these factors rather than a purely theoretical maximum Worst-Case Hazard Ranking.

A summary of the findings in **Table 13.2.15**, which should be read in conjunction with **Figure 13.2.9**, are as follows:

- Of the 13 Turbine locations (including cranes and laydown areas), 2 have a Negligible Hazard ranking, 8 are ranked as Low, and 3 are ranked as Moderate.
- Of the 5 Temporary Compounds, 1 has a Negligible Hazard ranking and are ranked as Low.
- For the 8 Borrow Pits, 4 have a Low Hazard ranking and 4 are Moderate. The BESS site is grouped with Borrow Pit 2, and together they have a Moderate Hazard ranking.
- The Control Building, Substation, and Met Mast all have a Low Hazard ranking.
- Of the 8 access track sections (see **Figure 13.2.10**), 4 sections have a Low Hazard ranking and 4 sections are ranked as Moderate.

For any infrastructure with an assessed Hazard ranking of moderate or above, please refer to **Section 13.2.8** and **Section 13.2.9** for mitigation measures and post-mitigation Hazard ranking.

Table 13.2.15 Qualitative Assessment of Peat Landslide Hazard, Exposure and Hazard Ranking

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 1 (including crane pad and laydown area)	4	3	3	12	Moderate	The turbine area associated micrositing boundary and subsequent 50m buffer is underlain predominantly by 'Unlikely' and 'Likely' peat slide Hazard. Areas of 'Probable' peat slide Hazard are also present within 50m of the micrositing boundary. The worst-case peat slide Hazard applied to T1 is therefore 'Probable'. The worst-case Infrastructure Exposure relates to the MDA Access Tracks which is downslope of the turbine location. As the proposed access track is the only track leading into the MDA the Infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine. However, lying downslope, there is a watercourse within 50 m of the turbine micrositing boundary. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'High' gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 2 (including crane pad and laydown area)	4	3	3	12	Moderate	The turbine area, associated micrositing boundary and subsequent 50m buffer is underlain predominantly by 'Unlikely' peat slide Hazard with a few localised 'Likely' areas. 'Probable' peat slide Hazard is located within 50m of the micrositing boundary to the north. The worst-case peat slide Hazard applied to T2 is therefore 'Probable'. The worst-case Infrastructure Exposure relates to the proposed floating section of MDA Access Track downslope of T2. Given this access track is the only one leading to the wind turbines and therefore if lost would cause more significant delays and costs, an exposure ranking of 'High' would apply. Note, the turbine itself and the MDA Access Tracks leading to T2 have been assessed with an exposure of 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine. However, lying downslope, there is a watercourse within 50m of the turbine micrositing boundary. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to both the infrastructure and the environment, of 'High' gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 3 (including crane pad and laydown area)	3 (2)	1 (2)	3	9	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer is predominately underlain by 'Unlikely' peat slide Hazard. Within the micrositing boundary lies a small area of 'Likely' peat slide hazard and a very small area of 'Probable' peat slide Hazard. Given the size of the 'Probable' peat slide Hazard, this is not considered representative of the surroundings and as such has been discounted for the purposes of this preliminary assessment. The worst-case peat slide Hazard applied to T3 is therefore 'Likely'. The worst-case Infrastructure Exposure relates to the turbine itself and the proposed MDA Access Track. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine. However, lying downslope, there is a watercourse within 50 m of the turbine micrositing boundary. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'. Given the location of the 'Likely' peat slide Hazard, immediately adjacent to a watercourse, this would not interact with the worst-case infrastructure ranking of the turbine or access track. The worst-case infrastructure exposure of 'Low' would instead interact with an 'Unlikely' peat slide Hazard as shown by the assessment presented in brackets. However, even ignoring the 'likely' peat slide Hazard, would produce a ''Low' Hazard Ranking as an 'Unlikely' peat slide Hazard would still be applied to the 'High' environmental exposure relating to the watercourse.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 4 (including crane pad and laydown area)	3	2	2	6	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer is underlain by 'Unlikely' and 'Likely' peat slide hazards. The worst-case peat slide Hazard applied to T4 is therefore 'Likely'. The worst-case Infrastructure Exposure relates to the turbine itself and the MDA Access Track. Therefore, the infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine and no watercourse recorded within 50 m. However, there is a watercourse located downslope of the turbine within 250 m of the micrositing boundary. Therefore, environmental exposure of 'low' has been assigned. Although the majority of the 'Likely' peat slide Hazard is downslope of proposed infrastructure, as the micrositing boundary allows the movement of this to be more within this higher risk zone and for the 'Likely' peat slide Hazard to be upslope, this higher risk needs to be assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 5 (including crane pad and laydown area)	2	2	3	6	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer is predominately underlain by 'Unlikely' peat slide hazard with some areas of 'Negligible' and a few spots of 'Likely'. Given the size of the 'Likely' peat slide Hazard areas, these are not considered representative of the surroundings and as such have been discounted for the purposes of this preliminary assessment. The worst-case peat slide Hazard applied to T5 is therefore 'Unlikely'. The worst-case Infrastructure Exposure relates to the turbine itself and the MDA Access Track. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine. However, lying downslope, there is a watercourse within 50 m of the turbine micrositing boundary. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Unlikely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 6 (including crane pad and laydown area)	2	2	2	4	Negligible	The turbine area, associated micrositing boundary and subsequent 50m buffer are predominately underlain by 'Unlikely' peat slide hazard with some areas of 'Negligible' and very localised very small areas of 'Likely'. Given the size of the 'Likely' peat slide Hazard areas, these are not considered representative of the surroundings and as such have been discounted for the purposes of this preliminary assessment. The worst-case peat slide Hazard applied to T6 is therefore 'Unlikely'. The worst-case Infrastructure Exposure relates to the turbine itself and the MDA Access Track. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine and no watercourse recorded within 50m. However, there is a watercourse located downslope of the turbine within 250 m, therefore an environmental exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Unlikely' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Negligible'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 7 (including crane pad and laydown area)	3	2	3	9	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer are predominately underlain by 'Unlikely' peat slide hazard with some areas of 'Likely'. The worst-case peat slide Hazard applied to T7 is therefore 'Likely'. The worst-case Infrastructure Exposure relates to the turbine itself and the MDA Access Track. Note floating MDA Access Track is recorded within 50m of the proposed turbine, however, any increased Exposure as a result of this floating section will be covered in the access track assessment. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine. However, a watercourse is present within 50 m of the turbine micrositing boundary and downslope of the turbine. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 8 (including crane pad and laydown area)	2	2	3	6	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer are predominately underlain by 'Unlikely' peat slide hazard with some areas of 'Negligible'. The worst-case peat slide Hazard applied to T8 is therefore 'Unlikely'. The worst-case Infrastructure Exposure relates to the turbine itself and the MDA Access Track. Note floating MDA Access Track is recorded within 50m of the proposed turbine, however, any increased Exposure as a result of this floating section will be covered in the access track assessment. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine. However, lying downslope, there is a watercourse within the micrositing boundary. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Unlikely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 9 (including crane pad and laydown area)	2	2	1	4	Negligible	The turbine area, associated micrositing boundary and subsequent 50m buffer is underlain by 'Unlikely' and 'Negligible' peat slide Hazards. The worst-case peat slide Hazard applied to T9 is therefore 'Unlikely'. The worst-case Infrastructure Exposure relates to the turbine itself and the MDA Access Track. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine and no watercourse recorded downslope within 250m. Therefore, an environmental exposure of 'very low' has been assigned. Combining the worst-case peat slide Hazard of 'Unlikely' with the worst-case Exposure, which relates to the infrastructure of 'Low', gives the worst-case Hazard Ranking of 'Negligible'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 10 (including crane pad and laydown area)	3	3	3	9	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer is predominately underlain by 'Unlikely' peat slide hazard with localised areas of 'Likely' also noted. The worst-case peat slide Hazard applied to T10 is therefore 'Likely'. The worst-case Infrastructure Exposure relates to the proposed floating MDA Access Track downslope of T10. As the access track is floating and any peat slide may mean complete loss of the access track with no further access to T11, T12 or T13 proposed, an Infrastructure Exposure of 'High' has been assigned. No existing environmentally significant designation recorded within or in close vicinity to the proposed turbine. However, lying downslope, there is a watercourse within 50m of the turbine micrositing boundary. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to both the infrastructure and environment of 'High', gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 11 (including crane pad and laydown area)	3	3	2	9	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer are underlain by 'Unlikely' and 'Likely' peat slide Hazard. The worst-case peat slide Hazard applied to T11 is therefore 'Likely'. The worst-case Infrastructure Exposure relates to the proposed floating MDA Access Track downslope of T11. As the access track is floating and any peat slide may mean complete loss of the access track with no further access to T11, T12 or T13 proposed, an Infrastructure Exposure rating of 'High' has been assigned. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine and no watercourse recorded within 50m. However, there is a watercourse located downslope of the turbine within 250 m, therefore an environmental exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the infrastructure of 'High', gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 12 (including crane pad and laydown area	4	3	1	12	Moderate	The turbine area, associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Likely' peat slide Hazard with 'Unlikely' peat slide Hazard to the south and smaller areas of 'Probable' to the north. The worst-case peat slide Hazard applied to T12 is therefore 'Probable'. The worst-case Infrastructure Exposure relates to the MDA Access Track which is downslope of the turbine location to the northeast. As the access track is the only track leading into the MDA, the Infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine and no watercourse recorded within 250 m downslope. Therefore, an environmental exposure of 'Very Low' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to the infrastructure of 'High', gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Turbine 13 (including crane pad and laydown area)	4	2	2	8	Low	The turbine area, associated micrositing boundary and subsequent 50m buffer is underlain by 'Unlikely' and 'Likely' peat slide Hazard with small, localised areas of 'Probable' peat slide Hazard also present. The worst-case peat slide Hazard applied to T13 is therefore 'Probable'. The worst-case Infrastructure Exposure relates to the turbine itself. Therefore, the Infrastructure Exposure has been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new turbine and no watercourse recorded within 50m. However, there is a watercourse located downslope of the turbine within 250 m, therefore, environmental exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Control Building & Substation	3	3	3	9	Low	The control building & substation, associated micrositing and subsequent 50m buffer are underlain by 'Likely' and 'Unlikely' peat slide Hazards. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure relates to the proposed floating MDA Access Track leading to the control building & substation. As this is the only proposed access track leading to this critical piece of infrastructure and as a peat slide is anticipated to result in complete loss of the access track, the infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the proposed new control building & substation. There is a watercourse located within 50m of the micrositing boundary and is located downslope. Therefore, an environmental exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 1	4	1	3	12	Moderate	BP1, associated micrositing boundary and subsequent 100m buffer are underlain by 'Negligible' and 'Unlikely' peat slide Hazard with areas of 'Likely' also present. There is a very small area of 'Probable' peat slide Hazard also identified within the borrow pit search area, however, given its size and the surrounding peat slide Hazard the 'Probable' area is not considered representative and as such has been neglected as part of this preliminary assessment. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Likely'. Blasting may be undertaken to form BP1 and as such, the peat slide hazard has been increased by a ranking of one to 'Probable'. The worst-case infrastructure exposure relates to the proposed borrow pit and associated Existing Forestry Access Track leading to this. The infrastructure Exposure has therefore been assessed as 'very low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit. However, lying downslope, there is a watercourse within 50m of the proposed location. Therefore, an environmental Exposure of 'High' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 2 and BESS Site	5 (3)	2	2 (3)	10 (9)	Moderate (Low)	BP2 & the BESS, associated micrositing boundary and subsequent 100m buffer are predominately underlain by 'Unlikely' peat slide Hazard with some 'Negligible' areas and localised 'Likely' areas to the west and southwest. There are also 2 small areas of 'Probable' peat slide Hazard within the micrositing and 100m buffer to the southwest of the proposed BP2 area. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Probable'. Blasting may be undertaken to form BP2 and as such, the peat slide hazard has been increased by a ranking of one to 'Almost Certain'. The worst-case infrastructure exposure relates to the proposed BESS. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and BESS. There is a watercourse located within 50 m to the north. Therefore, an environmental exposure of 'high' has been assigned. Given the locations of the 'Almost Certain' peat slide Hazard are not within 50m upslope of a watercourse, these are not considered to interact with the worst-case environmental Exposure of 'high'. Instead, the worst-case peat slide Hazard of 'Almost Certain' would interact with an environmental Exposure of 'Low' due to the watercourses being located further downslope. Combining the worst-case peat slide Hazard with the worst-case infrastructure Exposure or reduced environmental Exposure gives a Hazard Ranking of 'Moderate'. Combining the peat slide Hazard of 'Likely' (considering an increase in ranking to account for blasting), which would interact with the worst-case environmental Exposure, with the worst-case environmental Exposure would provide the Hazard Ranking of 'Low', as shown by the assessment within the brackets. Considering the BESS is within the borrow pit, this would be formed following completion of the blasting activities to form the borrow pit itself. As

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
						such, during construction of this, blasting would not be considered, meaning the peat slide Hazard would be reduced to the worst-case as identified within the GIS analysis of 'Probable'. Combining this peat slide Hazard with the worst-case exposure which would interact with the worst-case peat slide Hazard relating to the infrastructure would produce the Hazard Ranking as a result of the BESS itself of 'Low'.
Borrow Pit Search Area 3	4	2	2	8	Low	BP3, associated micrositing boundary and subsequent 100m buffer are predominately underlain by 'Unlikely' peat slide Hazard with small, localised areas of 'Likely'. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Likely'. Blasting may be undertaken to form BP3 and as such, the peat slide hazard has been increased by a ranking of one to 'Probable'. The worst-case infrastructure exposure relates to the MDA Access Track. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and no watercourse located within 50 m of the proposed location or micrositing boundary. However, there is a watercourse located within 250 m downslope, therefore an environmental exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 4	4 (3)	0 (2)	2	8 (6)	Low	BP4, associated micrositing boundary and subsequent 100m buffer is predominately underlain by 'Unlikely' peat slide Hazard, although areas of 'likely' peat slide Hazard are recorded to the northeast within the 100m buffer zone to the micrositing boundary. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Likely'. Blasting may be undertaken to form BP4 and as such, the peat slide hazard has been increased by a ranking of one to 'Probable'. The worst-case infrastructure exposure relates to the MDA Access Track. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and no watercourse located within 250 m downslope of the proposed location or associated micrositing boundary. However, there is a watercourse located downslope within 100m of 'Likely' peat slide Hazard which may be influenced by blasting. Therefore, an environmental exposure of 'low' has been assigned. Given the 'likely' peat slide Hazard is downslope of the BP4 and associated micrositing, and even if the borrow pit was moved to the edge of the micrositing boundary to northeast, the 'Probable' peat slide Hazard would still be downslope, the worst-case peat slide Hazard and worst-case infrastructure Exposure would not interact. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to the environment, of 'Low', gives the worst-case Hazard Ranking of 'Low'. The worst-case infrastructure Exposure can be combined with the 'Likely' peat slide Hazard (increased from the GIS model which indicates 'unlikely' to take account of blasting affects), present upslope regardless of micrositing, gives a Hazard Ranking of 'Low' as presented by the assessment in brackets.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 5	4	2	2	8	Low	BP5, associated micrositing boundary and subsequent 100m buffer is predominately underlain by 'Unlikely' peat slide Hazard with large areas of 'Negligible' and smaller localised areas of 'Likely' also present. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Likely'. Blasting may be undertaken to form BP5 and as such, the peat slide hazard has been increased by a ranking of one to 'Probable'. The worst-case infrastructure exposure relates to the MDA Access Track and T5. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and no watercourse recorded within 50m of the micrositing boundary. However, there is watercourse located downslope within 250 m of the micrositing boundary to the north. Therefore, an environmental exposure of 'Low' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 6	3	2	2	6	Low	BP6, associated micrositing boundary and subsequent 100m buffer is predominantly underlain by 'Unlikely' peat slide Hazard with very localised areas of 'Negligible'. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Unlikely'. Blasting may be undertaken to form BP6 and as such, the peat slide hazard has been increased by a ranking of one to 'Likely'. The worst-case infrastructure exposure relates to the MDA Access Track and T6. The infrastructure Exposure has therefore been assessed as 'Low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and no watercourse located within 50m. However, there is a watercourse located within 250 m downslope of the micrositing boundary. Therefore, an environmental Exposure of 'Low' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 7	4	3	2	12	Moderate	BP7, associated micrositing boundary and subsequent 100m buffer is predominately underlain by 'Unlikely' peat slide Hazard with areas of 'Likely' peat slide Hazards also present. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Likely'. Blasting may be undertaken to form BP7 and as such, the peat slide hazard has been increased by a ranking of one to 'Probable'. The worst-case Infrastructure Exposure relates to the proposed floating MDA Access Track which is downslope of T11. As the access track is floating and any peat slide may mean complete loss of the access track with no further access to T11, T12 or T13 proposed, an Infrastructure Exposure rating of 'High' has been assigned. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and no watercourse located within 50m. However, there is a watercourse located within 250 m downslope of the micrositing boundary. Therefore, an environmental Exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to the infrastructure, of 'High' gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Borrow Pit Search Area 8	5	2	2	10	Moderate	BP8, associated micrositing boundary and subsequent 100m buffer is predominately underlain by 'Likely' peat slide Hazard with some areas of 'Unlikely' and localised small areas of 'Probable'. The worst-case peat slide Hazard applied from the GIS analysis is therefore 'Probable'. Blasting may be undertaken to form BP8 and as such, the peat slide hazard has been increased by a ranking of one to 'Almost Certain'. The worst-case infrastructure exposure relates to T13. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed borrow pit and no watercourse located within 50m. However, there is a watercourse located within 250 m downslope of the micrositing boundary. Therefore, an environmental Exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Almost Certain' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Temporary Compound 1	2	3	1	6	Low	TC01, associated micrositing boundary and subsequent 50m buffer is underlain by 'Negligible' and 'Unlikely' peat slide Hazard. A very small, localised area of 'Likely' peat slide Hazard is also recorded, however, given its size and the surrounding peat slide Hazard, this higher risk zone is not considered representative and as such has been neglected for this preliminary assessment. The worst-case peat slide Hazard applied is therefore 'Unlikely'. The worst-case infrastructure exposure relates to the Existing Forestry Access Track which is currently positioned to the north of TC01. As this access track is the only proposed access to the MDA, damage to this track would cause more significant delays and as such the infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the proposed temporary compound and no watercourse recorded within 250m. Therefore, an environmental Exposure of 'very low' has been assigned. Combining the worst-case peat slide Hazard of 'Unlikely' with the worst-case Exposure, which relates to the infrastructure, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Temporary Compound 2 and parking lane along existing forestry track	3	3	1	9	Low	TC02, associated micrositing boundary and subsequent 50m buffer is predominately underlain by 'Unlikely' peat slide Hazard, although directly underlying the proposed compound and to the southeast areas of 'Likely' peat slide Hazard are also present. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure relates to the Existing Forestry Access Track which is currently positioned to the northeast of TC02. As this access track is the only proposed access to the MDA, damage to this track would cause more significant delays and as such the infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the proposed temporary compound and no watercourse recorded within 250m downslope. Therefore, an environmental Exposure of 'Very Low' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the infrastructure, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Temporary Compound 3	3	2	2	6	Low	TC03, associated micrositing boundary and subsequent 50m buffer are predominately underlain by 'Unlikely' peat slide Hazard with small, localised areas of 'Likely'. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure relates to the proposed access track. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed temporary compound and no watercourse located within 50 m of the proposed location or micrositing boundary. However, there is a watercourse located within 250 m downslope, therefore an environmental exposure of 'low' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Temporary Compound 4	2	2	3	6	Low	TC04, associated micrositing boundary and subsequent 50m buffer are predominately underlain 'Unlikely' peat slide Hazard with areas of 'Negligible' also estimated to be present. There is an area of 'Likely' peat slide Hazard present within 50m of the micrositing for TC04, however, given the topography this higher risk hazard would not interact with the proposed infrastructure and in relation to the environmental Exposure, would not combine to create a more significant worst-case than if neglected. As such, for the purposes of this preliminary assessment, the area of 'Likely' peat slide Hazard has been neglected. The worst-case peat slide Hazard applied is therefore 'Unlikely'. The worst-case infrastructure exposure relates to the proposed access track. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed temporary compound. However, there is a watercourse located within 50m of the micrositing boundary and therefore possibly within 50m of TC04, if micro-sited. As such, an environmental Exposure of 'high' has been assigned. Combining the worst-case peat slide Hazard of 'Unlikely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Temporary Compound 5	2	2	2	4	Negligible	TC05, associated micrositing boundary and subsequent 50m buffer are underlain by 'Negligible' and 'Unlikely' peat slide Hazard. The worst-case peat slide Hazard applied is therefore 'Unlikely'. The worst-case infrastructure exposure relates to the proposed floating MDA Access Track and T9. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed temporary compound and no watercourse located within 50m. However, there is a watercourse located within 250m of the downslope of the micrositing boundary at its eastern extent. Therefore, an environmental exposure of 'Low' has been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'Low' gives the worst-case Hazard Ranking of 'Negligible'. Note, the worst-case peat slide Hazard would not interact with proposed turbine T9 due to the distance between the two and as the topography has any peat slide at the 'Likely' peat slide Hazard running away from T9. The worst-case peat slide Hazard would, however, interact and potentially damage the MDA Access Track, with this reflected in the worst-case Hazard Ranking.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Met Mast	3	2	2	6	Low	The Met Mast, associated micrositing boundary and subsequent 50m buffer is predominately underlain by 'Unlikely' peat slide Hazard with some localised areas of 'Negligible'. Very small, localised areas of 'Likely' peat slide Hazard are also present. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure relates to the met mast and associated MDA Access Track leading to it. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the proposed met mast and no watercourse located within 50 m of the proposed location or micrositing boundary. However, there is a watercourse located within 250 m downslope of the micrositing boundary, therefore an environmental exposure of 'low' has been assigned. The worst case peat slide Hazard would not interact with the worst case infrastructure Exposure as this is located across or downslope of the possible met mast location. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the environment, of 'Low' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 1	4 (3)	3	2 (3)	12 (9)	Moderate (Low)	The access track section, which covers the entirety of the Existing Forestry Access Track, and the associated 50m buffer is predominately underlain by 'Unlikely' peat slide Hazard with frequent areas of 'Negligible'. More localised areas of 'Likely' peat slide Hazard are present throughout the access track section, with discrete areas of 'Probable' also present. The worst-case peat slide Hazard applied is therefore 'Probable'. The worst-case infrastructure exposure relates to the Existing Forestry Access Track itself. As this access track is the only proposed access to the MDA, damage to this track would cause more significant delays and as such the infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the access track section. Watercourses are crossed by the access track section as well as being present within 250m throughout. A worst-case environmental Exposure of 'High' has therefore been assigned. Combining the worst-case peat slide Hazard of 'Moderate' with the worst-case Exposure, which relates to the infrastructure, of 'High' gives the worst-case Hazard Ranking of 'Moderate'. Note the worst-case environmental Exposure does not interact with the worst-case peat slide Hazard, as no watercourses are present within 50m of 'Probable' peat slide Hazard. Instead 'Likely' peat slide Hazard would interact with the worst-case environmental Exposure of 'High', to give a Hazard Ranking of 'Low', as shown by the assessment presented in brackets.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 2	4 (3)	3	2 (3)	12 (9)	Moderate (Low)	Access track section 2, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Unlikely' peat slide Hazard with large areas of 'Likely' and more localised areas of 'Probable' also present. The worst-case peat slide Hazard applied is therefore 'Probable'. The worst-case infrastructure exposure within this section relates to the eastern half, as this access track alignment is the only proposed access to the MDA. Damage to this track would cause more significant delays and as such the infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the access track section. Watercourses are crossed by the access track section as well as being present within 250m throughout. A worst-case environmental Exposure of 'High' has therefore been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to the infrastructure, of 'High' gives the worst-case Hazard Ranking of 'Moderate'. The worst-case peat slide Hazard of 'Probable' would not interact with the worst-case environmental Exposure as none of the identified 'Probable' areas are within 50m of a watercourse. Instead the worst-case environmental Exposure would interact with a 'Likely' peat slide Hazard giving a Hazard Ranking of 'Low', as shown by the assessment in brackets.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 3	4	3	3	12	Moderate	Access track section 3, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Unlikely' peat slide Hazard, with areas of 'Likely' and small, localised areas of 'Probable'. The worst-case peat slide Hazard applied is therefore 'Probable'. The worst-case infrastructure exposure within this section relates to the access track itself, as this represents the only proposed alignment leading to the turbines. Damage to this track would cause more significant delays and as such the infrastructure Exposure has been assessed as 'High'. No existing environmentally significant designation recorded within or in close vicinity to the access track section. Watercourses are crossed by the access track section as well as being present within 250m throughout. A worst-case environmental Exposure of 'High' has therefore been assigned. Combining the worst-case peat slide Hazard of 'Probable' with the worst-case Exposure, which relates to both the infrastructure and environment, of 'High' gives the worst-case Hazard Ranking of 'Moderate'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 4	3	2	3	9	Low	Access track section 4, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Unlikely' peat slide Hazard with areas of 'Likely' also present. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure within this section relates to the access track itself and the proposed turbines along the access track section. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the access track section. A watercourse is crossed by the access track section as well as watercourses being present within 250m. A worst-case environmental Exposure of 'High' has therefore been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 5	3 (2)	2	2 (3)	6	Low	Access track section 5, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Unlikely' peat slide Hazard with small, localised areas of 'Likely' present throughout. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure within this section relates to the access track itself and the proposed turbines along the access track section. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the access track section. A watercourse is crossed by the access track section as well as watercourses being present within 250m. A worst-case environmental Exposure of 'High' has therefore been assigned. It is noted that the worst-case peat slide Hazard is not anticipated to interact with the worst-case Exposure, relating to the environment as no 'Likely' peat slide Hazard considered representative are present within 50m of the watercourse crossed. As such, the worst-case Hazard Ranking of 'Low' has been determined by combining the worst-case infrastructure Exposure and a reduced environmental Exposure, both of which have been assessed as 'Low', with the worst-case peat slide Hazard of 'Likely'. The worst-case environmental Exposure of 'High' would interact with an 'unlikely' peat slide Hazard to also provide a Hazard Ranking of 'Low' as shown by the assessment in brackets.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 6	3	2	3	9	Low	Access track section 6, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Unlikely' peat slide Hazard with large areas of 'Negligible' and smaller, localised areas of 'Likely' also present. The worst-case peat slide Hazard applied is therefore 'Likely'. The worst-case infrastructure exposure within this section relates to the access track itself and the proposed turbines along the access track section. The infrastructure Exposure has therefore been assessed as 'low'. No existing environmentally significant designation recorded within or in close vicinity to the access track section. Watercourses are crossed by the access track section as well as watercourses being present within 250m. A worst-case environmental Exposure of 'High' has therefore been assigned. Combining the worst-case peat slide Hazard of 'Likely' with the worst-case Exposure, which relates to the environment, of 'High' gives the worst-case Hazard Ranking of 'Low'.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 7	4 (3)	2 (3)	3	12 (9)	Moderate (Low)	Access track section 7, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is predominantly underlain by 'Unlikely' peat slide Hazard with areas of 'Likely' and a small, localised area of 'Probable' towards the northern extent. The worst-case peat slide Hazard applied is therefore 'Probable'. The worst-case Infrastructure Exposure relates to the floating MDA Access Track between T10 & T11. As the access track is floating and any peat slide may mean complete loss of the access track with no further access to T11, T12 or T13 proposed, an Infrastructure Exposure rating of 'High' has been assigned. Elsewhere the worst-case infrastructure Exposure would relate to the proposed turbines and rest of the access track section, with an Exposure of 'Low' assigned. No existing environmentally significant designation recorded within or in close vicinity to the access track section. Watercourses are crossed by the access track section as well as watercourses being present within 250m. A worst-case environmental Exposure of 'High' has therefore been assigned. It is noted that the worst-case peat slide Hazard is not anticipated to interact with the worst-case Exposure relating to the infrastructure as no 'Probable' peat slide Hazard is estimated within 50m of the critical access track section between T10 & T11. As such, the worst-case Hazard Ranking of 'Moderate' has been determined by combining the worst-case environmental Exposure 'High', with the worst-case peat slide Hazard of 'Probable'. Note this 'Moderate' Hazard Ranking only affects the access track section towards WC30, where the probable peat slide Hazard and watercourse is present. Elsewhere along the access track section, the Hazard Ranking is reduced to 'Low'. The worst-case infrastructure Exposure of 'High' would interact with a 'Likely' peat slide Hazard to provide a Hazard Ranking of 'Low' as shown by the assessment in brackets.

Area	Assessed Hazard	Assessed Infrastructure Exposure	Assessed Environmental Exposure	Worst-Case Hazard Ranking	Worst-Case Hazard Ranking	Comment
See Figure 13.2.9 for reference of infrastructure locations and assessed peat slide Hazard						
Access Track Section 8	3 (4)	3 (2)	2	9 (8)	Low	Access track section 8, all of which covers MDA Access Tracks, the associated micrositing boundary and subsequent 50m buffer is underlain by both 'Unlikely' and 'Likely' peat slide Hazards, with small, localised areas of 'Probable' also present. The worst-case peat slide Hazard applied is therefore 'Probable'. The worst-case Infrastructure Exposure relates to the floating MDA Access Track between T10 & T11 and between T11 & T12. As the access track is floating and any peat slide may mean complete loss of the access track with no further access to T12 or T13 proposed, an Infrastructure Exposure rating of 'High' has been assigned. Elsewhere the worst-case infrastructure Exposure would relate to the proposed turbines and rest of access track section, with an Exposure of 'Low' assigned. No existing environmentally significant designation recorded within or in close vicinity to the proposed access track section and no watercourse present within 50m of the micrositing boundary. There is a watercourse located downslope within 250m of the access track section. Therefore, an environmental exposure of 'Low' is considered suitable. It is noted that the worst-case peat slide Hazard is not anticipated to interact with the worst-case Exposure, relating to the infrastructure, as no 'Probable' peat slide Hazard is estimated within 50m of the critical access track section between T11 & T12. As such, the worst-case Hazard Ranking of 'Low' has been determined by combining the worst-case infrastructure Exposure 'High', with a 'Likely' peat slide Hazard as these would interact. The worst-case peat slide Hazard of 'Probable' would interact within a reduced infrastructure Exposure and the worst-case environmental Exposure, both of which are 'Low', to also provide a Hazard Ranking of 'Low' as shown by the assessment in brackets.

13.2.8 Mitigation Measures

General

Construction activities (e.g. excavation, drainage, etc.) are known to have a potential destabilising effect on peat deposits. The detailed design of the Proposed Development should consider the weak and susceptible nature of peat.

Although no historic peat instability has been noted within the Development Site, appropriate good practice and, where required, mitigation measures should be used to reduce the destabilising effects on the peat and its habitat.

As part of the Proposed Development, a Construction Method Statement (CMS) will be prepared an implemented as par to the standard construction practice. In addition, a Construction and Environment Management Plan (CEMP) will be prepared incorporating good practice measures for the construction of electricity generating schemes in peatland environments. These documents will continue to be updated through pre-construction and construction in accordance with good practice guidance, of which a non-exhaustive list is provided in **Section 13.2.2**.

It should be noted that intrusive GI will be carried out prior to construction of the Proposed Development to inform the design to its maturity. The GI information will also be used to update the PLHRA, following the Scottish Government Guidance (Scottish Government, 2017).

Mitigation Measures

Mitigation measures and good practice procedures are ultimately the responsibility of the Principal Contractor. During the construction phase, good practice measures may include but are not limited to:

- Maintaining and updating a Geotechnical Risk Register throughout the works;
- Provision of a Geotechnical specialist on-site during the construction phase to undertake advance inspection, carry out regular monitoring and provide advice when required;
- Supervision of construction work by suitably qualified and experienced personnel;
- Identification of areas of deep peat, physical demarcation of such areas and instruction to site personnel to avoid these areas or minimise activities in these locations, where practical;
- Identification of approved areas for stockpiling of any excavated rock or soils including peat;
- Side-casting of material during construction only in appropriate areas identified following risk assessment and agreed with all relevant parties (Environmental Clerk of Works / Geotechnical Clerk of Works, SEPA, NatureScot etc.);
- Avoid placing excavated material or other forms of loading on breaks of slope or other potentially unstable slopes;
- Any excavations in peat should be risk assessed, and measures adopted to reduce the risk of failure within excavation side slopes and surrounding materials (e.g. shoring);
- Excavation on side slopes within peat should be as shallow an angle as possible and care should be taken to stabilise sides;
- Upslope drainage ditches should be included on all earthworks which are constructed through side-long ground;
- The camber of the access track should be such as to encourage surface water drainage to the upslope drainage ditch;
- The construction plant should minimise the extent and duration of open excavations and bare ground;
- Earthmoving activities should be restricted during and immediately after heavy and prolonged rainfall events;
- Establish / re-establish vegetation as soon as possible to improve slope stability and provide sediment transport control;

- Design and construction of a suitable drainage system for tracks and hardstanding's that does not significantly affect the hydrological regime of the peat and would require minimal maintenance;
- Include measures to ensure drainage systems (including existing) are well maintained, including identification of sensitive drainage areas;
- Prevent artificial drainage from concentrated flows onto slopes or into excavations;
- Where deep peat excavations require dewatering, discharges of the pumped water will require to be controlled in a manner which does not adversely affect habitats on-site (due to potential silt content etc.) and does not lead to the creation of saturated, and hence very soft, areas of peat;
- Design of appropriate sediment control measures including the use of silt traps / barriers where necessary and cut-off ditches in particular at appropriate locations along site tracks and earthworks;
- Identification of drainage areas and areas of run-off which could potentially be affected by the development and appropriate stand-off distances established;
- Monitoring of slope and peat stability both in the vicinity and down slope of infrastructure (both existing and proposed) during construction by suitably experienced and qualified personnel;
- Appropriate track construction methods to take cognisance of local topography, peat thickness and peat features (such as peat pipes, slumps, hags, etc.);
- Development of working methodologies that ensure that any exposed peat is protected to limit the potential for degradation, erosion or failure of the accumulation;
- Where excavated tracks are constructed, the peat and any soft soils should be removed and replaced with granular material placed in layers and compacted;
- Where floating tracks are constructed, a suitable geogrid and separator geotextile (where required) should be laid over the existing ground surface with graded stone (nominally 75mm down) placed over this in layers and compacted. However, a geotextile specialist should be sought regarding this;
- Any floating track design should take into account the properties of the peat soils at the Development Site;
- Construction staff should be made aware of peat slide indicators and emergency procedures; and
- Emergency procedures should include steps to be taken on detection of an incipient peat slide or of the event occurring.

Many of the measures provided above serve both to mitigate and reduce the likelihood of a peat slide occurring, as well as being good construction practice.

In line with the Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017), discussion of mitigation measures relevant to each potential peat landslide hazard identified is required.

A final PLHRA will be required for the Proposed Development at design maturity post-consent, which includes the findings of intrusive works to characterise the peat, which targets more sensitive areas and that provides peat data (e.g. prove extents, depths, composition and characteristics throughout the Development Site).

Preliminary mitigation measures recommended are based on the Hazard Ranking and area as follows:

- Infrastructure with a 'Negligible' Hazard Ranking – ground conditions in these areas may be considered acceptable provided that all infrastructure and access roads are constructed in line with good practice guidelines which will be set out in the CMS / CEMP. However, even in negligible areas, intrusive works should be undertaken to assist in the overall characterisation of the peat, as well as for monitoring for signs of potential instability.
- Infrastructure with a 'Low' to 'Moderate' Hazard Ranking, will require additional peat thickness and characteristic information by intrusive investigation and engineering measures may be required and should be considered during the ground investigation, detailed design and

construction to reduce risks of triggering a peat landslide in the short term (during construction) or long term (during operation and decommissioning) such as:

- Micrositing – Taking cognisance of the areas of 'Probable' and where possible 'Likely' peat slide Hazard when micrositing the infrastructure locations. By moving proposed infrastructure away from higher peat slide Hazard, it is noted this could reduce the worst-case Hazard Ranking. It is noted that by avoiding areas of 'Probable' peat slide Hazard during the micrositing process, this would in many of the infrastructure locations reduce the Hazard Ranking from 'Moderate' to 'Low'. Also, by micrositing proposed infrastructure away from watercourses, a minimum of 50m where possible, this would also help to reduce the worst-case Hazard Rankings.
- Installation of drainage - Installation of targeted drainage would aim to isolate the areas of peat from upslope surface water. Specific consideration should be given to those areas identified with 'probable' or 'likely' peat slide Hazard. If applicable, re-routing surface (flushes/gullies) and subsurface (pipes) drainage around critical areas will also help control surface water. Drainage measures need to be carefully planned to reduce any negative impacts.
- Monitoring of water levels within existing watercourses, drainage channels and groundwater levels throughout the Development Site during construction.
- Monitoring of slope and peat stability both in the vicinity and down slope of proposed infrastructure during construction and at regular intervals post construction, especially after extreme rainfall or snow events, by suitably experienced and qualified personnel.

- For 'Moderate' Hazard Ranking areas only (in addition to the mitigation set out above):
  - Catch Wall Fences – Installation of catch wall fences for areas in which the peat landslide will affect watercourses or where 'Moderate' peat slide Hazard cannot be avoided by micrositing (e.g. along access track section 1, which is the only proposed access into the MDA) should be considered. These fences will need to be engineered in such a way that they are adequately founded into the bedrock and should be inspected periodically and, if required, debris removed.
  - Catch Wall Ditches - A softer engineering approach to catch wall fences are catch ditches. These could be installed between the watercourse or 'Moderate' peat slide Hazard (where this cannot be avoided by micrositing) and proposed infrastructure.

As blasting is highlighted as typically increasing the overall peat slide hazard surrounding the borrow pits, it has been considered in this assessment. However, the actual requirement to blast and the actual blasting methodology will be confirmed post-consent, following site-specific ground investigation whereby the strength and discontinuities of the rock will be identified and where possible lower disturbance methods (e.g. lower vibration measures) would be considered. Where blasting is identified as required, prior to the blasting itself, all personnel and plant should be moved from the general area and all access tracks the vicinity closed in-case a peat slide is detected. Following the blasting activities, the peat surrounding the area shall be monitored and inspected for any signs of potential peat failure prior to re-opening working areas, including all nearby, closed, access tracks.

It is considered that such engineering measures would only be used in localised areas where a particular hazard could not be avoided or reduced, and which could not be dealt with adequately by other measures (such as engineered out during the detailed design process following site specific ground investigation). A more detailed peat stability assessment and possibly a quantitative (if not qualitative) PLHRA is required (post consent) following intrusive ground investigation and detailed design to design maturity.

Construction Management – as part of the final CEMP will include but is not limited to:

- Specific work method statements to monitor compliance of activities in susceptible areas.
- Reviewing the weather forecast to prevent working in areas of peat during or immediately following heavy rainfall.
- Construction plant should be operated from the areas already constructed where practicable. Should there be no alternative to plant accessing areas of peat, low ground pressure equipment should be used.

- Spoil disposal areas (both peat and mineral soils) should be located where the risk of erosion, mass movement and water quality deterioration are minimal.
- Continual monitoring of groundwater and ground movement should be maintained.
- Drainage Measures – the installation of drainage measures such as soakaways and gullies (surface water) and pipes (subsurface water) can be used to re-route upslope surface water and groundwater around potential critical areas.
- Localised Slope Re-profiling – this measure would only be recommended where environmental costs have been outweighed by the reduction in the Hazard Ranking.

As noted, peat reuse and restoration areas are proposed as part of the works, and these have been indicatively described as part of this PLHRA, although not assessed. Although the peat reuse and restoration areas may increase the risk of peat instability in those areas, design and construction techniques to mitigate against the instability of the areas for reuse or restoration will be developed as part of the detailed design and where appropriate this will be presented as part of the final PLHRA.

In addition to the details set out above relating to mitigation measures, **Table 13.2.16** considers location specific mitigation for all areas of worst-case hazard ranking of 'Moderate'. Note, as the assessment considers the 50 m micrositing boundary and an additional 50 m study area on top of the micrositing to represent an area where the works may influence peat stability, the assessed Hazard Ranking is likely to be conservative. When considering the infrastructure in their current location, the Moderate Hazard Rankings in many of the infrastructure locations would be considered Low as their current proposed locations take into consideration the assessed peat slide Hazard and avoids areas of probable, where practicable. The micrositing was brought into the assessment to allow consideration of all areas the infrastructure could be located and identify locations where placing the infrastructure could result in a higher risk. This allows for migration to be proposed to avoid these higher risk areas.

13.2.9 Hazard Ranking (Post-mitigation)

This section summarised the results of **Table 13.2.16**, which considers the Worst-Case Hazard Ranking after mitigation is considered. **Table 13.2.16** considers all areas of 'Moderate' Worst-Case Hazard Ranking (Pre-Mitigation) and considers the mitigation set out in **Section 13.2.8** and location-specific mitigation.

In line with Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments, location-specific mitigation has been identified at each of the infrastructure locations, to reduce the Worst-Case Hazard Ranking from 'Moderate'. The location-specific mitigation has been developed for each location noted above, with the mitigation considered cumulatively to reduce the Worst-Case Hazard Ranking, as follows:

- Micrositing: Micrositing restrictions are places on infrastructure that show the presence of 'Probable' peat slide hazard within the micrositing boundary (resulting in a worst-case hazard of 'Probable' in the initial assessment). Restrictions will ensure that infrastructure is not micro-sited into 'Probable' peat slide hazard, thus reducing the worst-case hazard from 'Probable' to 'Likely'.
- Installation of targeted drainage: Installation of drainage upslope of the identified probable peat slide hazards would look to isolate the area from upslope surface water. In conjunction with implementation of best practice during construction, installation of targeted drainage would further support the reduction of peat slide hazards.
- Installation of catch ditches and catch fences: Installing catch ditches and catch fences would aim to prevent or reduce any peat flow onto downhill infrastructure. In conjunction with implementation of best practice during construction, installation of catch ditches and fences would further support the reduction of peat slide hazards.
- Blasting: A site and location specific blasting strategy will be developed for the Proposed Development following GI. Additionally, investigation to whether blasting is required at the location will be investigated. Where blasting is considered required, cognisance of the peat instability risk will be taken into consideration when planning the size of blast and associated influencing zone of the ground acceleration created. The development of a location specific blasting strategy considering the requirement for blasting, based on specific ground investigation, and reducing the influence zone of the blasting, as well as following good construction practices, would also reduce the overall Hazard Ranking into 'Low' or potentially 'Negligible'.

- Peat Stripping: Stripping all peat within the borrow pit search area, prior to any blasting. Stripping of peat identified with ‘Likely’ peat slide Hazard prior to blasting, would remove the ‘Probable’ risk associated with blasting and reduce the overall worst-case Hazard Ranking to ‘Low’.

Therefore, all 11 No. areas of infrastructure identified as ‘Moderate’ Worst-Case Hazard Ranking (**Table 13.2.15**) can be reduced to ‘Low’ Worst-Case Hazard Ranking though the inclusion of best-practice (**Section 13.2.8**) and site-specific mitigation. **Table 13.2.16** details the infrastructure locations and assessment considering mitigation.

Table 13.2.16 Qualitative Assessment of Moderate Hazard Rankings (Post Mitigation)

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
Turbine 1 (including crane pad and laydown area)	Moderate	Turbine T1 has been located in an area predominantly underlain by 'Unlikely' and 'Likely' peat slide hazard. However, due to the presence of 'Probable' peat slide hazard within 50m of the micrositing buffer, a worst-case assessed hazard of 'Probable' has been considered. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed.	**Micrositing:** Turbine T1 will not be micro-sited to be within 50m of the identified areas of 'Probable' peat slide hazard, unless this peat slide hazard is proven to be lower through site specific ground investigation and a further assessment (possibly inclusive of quantitative analysis). **Installation of targeted drainage –** Installation of drainage upslope of the identified probable peat slide hazards would look to isolate the area from upslope surface water. Follow good construction practices as identified at the start of Section 13.2.8.	Low	If this restriction on micrositing is considered, the worst-case peat slide hazard would reduce from 'Probable' to 'Likely', resulting in an overall worst-case hazard ranking of 'Low'. The installation of targeted drainage and following good practice as identified would also reduce the overall peat slide Hazard, although this would still likely fall under the Low Hazard Ranking.
Turbine 2 (including crane pad and laydown area)	Moderate	Turbine T2 has been located in an area predominantly underlain by 'Unlikely' peat slide hazard, with isolated areas of 'Likely' hazard. However, due to the presence of 'Probable' peat slide hazard within 50m of the micrositing buffer, a worst-case assessed hazard of 'Probable' has been considered. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed.	**Micrositing:** Turbine T2 will not be micro-sited to be within the 50m of the of 'Probable' peat slide hazard, unless this peat slide hazard is proven to be lower through site specific ground investigation and a further assessment (possibly inclusive of quantitative analysis). **Installation of targeted drainage –** Installation of drainage upslope of the identified probable peat slide hazards would look to isolate the area from upslope surface water.	Low	If this restriction on micrositing is considered, the worst-case peat slide hazard would reduce from 'Probable' to 'Likely', resulting in an overall worst-case hazard ranking of 'Low'. The installation of targeted drainage and following good practice as identified would also reduce the overall peat slide Hazard, although this would still likely fall under the Low Hazard Ranking.

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
			Follow good construction practices as identified at the start of Section 13.2.8.		
Turbine T12 (including crane pad and laydown area)	Moderate	Turbine T12 has been located in an area predominantly underlain by 'Likely' and 'Unlikely' peat slide hazard, with an isolated area of 'Probable' hazard within 50m of the current proposed location, as well as within 50m of the micrositing boundary to the northeast. Due to the presence of 'Probable' peat slide hazard within 50m of the current and 50m of the micrositing buffer, a worst-case assessed hazard of 'Probable' has been considered. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed.	**Micrositing:** Micrositing the turbine location to the southeast outwith 50m from the 'Probable' peat slide hazard, unless this peat slide hazard is proven to be lower through site specific ground investigation and a further assessment (possibly inclusive of quantitative analysis). **Installation of targeted drainage –** Installation of drainage upslope of the identified probable peat slide hazards would look to isolate the area from upslope surface water. **Installation of catch ditches and catch fences** – Installing catch ditches and catch fences on the southern side of Existing Forestry Track / MDA Access Track into the MDA which is downslope of T12 would aim to prevent or reduce any peat flow onto the track itself and a reduction in the damage caused. Follow good construction practices as identified at the start of Section 13.2.8	Low	If the micrositing of the turbine to the southeast is considered, the worst-case peat slide Hazard would reduce from 'Probable' to 'Likely', resulting in an overall worst-case hazard of 'Low'. The installation of the targeted drainage, catch fence and/or ditches and the following of good construction practices would also reduce the overall peat slide hazard as well as the potential consequences, however, overall the Hazard Ranking would likely still be 'Low'.
Borrow Pit Search Area 1	Moderate	Borrow Pit Search Area 1 is currently located in an area predominantly underlain by 'Negligible' and 'Unlikely' peat slide hazard, with an isolated area of 'Likely' also present. Accordingly, there is a worst-case assessed hazard of 'Likely' has been considered	**Blasting**: A site and location specific blasting strategy will be developed for the Proposed Development following GI. Additionally, investigation to whether blasting is required at the	Low	Stripping of peat identified with 'Likely' peat slide Hazard prior to blasting, would remove the 'Probable' risk associated with blasting and reduce the overall worst-case Hazard Ranking to 'Low'.

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
		and upgraded to 'Probable' due to the inclusion of blasting at the location. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed.	location will be investigated. Where blasting is considered required, cognisance of the peat instability risk will be taken into consideration when planning the size of blast and associated influencing zone of the ground acceleration created. **Peat stripping:** Stripping all peat within the borrow pit search area, prior to any blasting. Follow good construction practices as identified at the start of Section 13.2.8		The development of a location specific blasting strategy considering the requirement for blasting, based on specific ground investigation, and reducing the influence zone of the blasting, as well as following good construction practices, would also reduce the overall Hazard Ranking into 'Low' or potentially 'Negligible'.
Borrow Pit Search Area 2	Moderate	Borrow Pit Search Area 2 is currently located in an area predominantly underlain by 'Unlikely' peat slide hazard, with localised areas of 'Likely' also present. However, due to the presence of 'Probable' peat slide hazard within both the 50m micrositing buffer and additional 100m impact zone, a worst-case assessed hazard of 'Probable' has been considered and upgraded to 'Almost Certain' due to the inclusion of blasting at the location. Accordingly, a worst-case hazard ranking of 'Moderate' is considered.	**Micrositing**: Micrositing the borrow pit to the northwest or altering the shape to increase distance to the 'Probable' peat slide Hazard could be undertaken. **Blasting**: A site and location specific blasting strategy will be developed for the Proposed Development following GI. Additionally, investigation to whether blasting is required at the location will be investigated. Where blasting is considered required, cognisance of the peat instability risk will be taken into consideration when planning the size of blast and associated influencing zone of the ground acceleration created. **Peat stripping:** Stripping 'Probable' and 'Likely' peat slide hazards	Low	If the micrositing is considered, the worst-case peat slide hazard could reduce from "Almost Certain" to "Probable" or even 'Likely' depending on its final location, resulting in an overall worst-case hazard ranking of 'Moderate' or 'Low'. Stripping of peat identified with 'Probable' or 'Likely' peat slide Hazard within influencing distance from the blast, prior to blasting, would remove the 'Almost certain' and 'probable' risk associated with blasting and reduce the overall worst-case Hazard Ranking to 'Low'. The development of a location specific blasting strategy considering the requirement for blasting, based on specific ground investigation, and reducing the influence zone of the

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
			identified within influencing of the blasting, prior to any blasting. **Installation of targeted drainage –** Installation of drainage upslope of the identified probable and likely peat slide hazards would look to isolate the area from upslope surface water. Follow good construction practices as identified at the start of Section 13.2.8		blasting, as well as installing targeted drainage and following good construction practices, would also reduce the overall Hazard Ranking although probably would still be within the 'Low' category.
Borrow Pit Search Area 7	Moderate	Borrow Pit Search Area 7 is currently located in an area predominantly underlain by 'Unlikely' peat slide hazard, with areas of 'Likely' also present. Accordingly, there is a worst-case assessed hazard of 'Likely' has been considered and upgraded to 'Probable' due to the inclusion of blasting at the location. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed.	**Micrositing:** Avoiding **micrositing** the borrow pit to the south and within influencing distance of the large areas of 'Likely' peat slide Hazard are indicated near the floating access track to T11 – T13 could be undertaken. **Blasting**: A site and location specific blasting strategy will be developed for the Proposed Development following GI. Additionally, investigation to whether blasting is required at the location will be investigated. Where blasting is considered required, cognisance of the peat instability risk will be taken into consideration when planning the size of blast and associated influencing zone of the ground acceleration created. **Peat stripping:** Stripping and 'Likely' peat slide hazards identified within influencing of the blasting, prior to any blasting.	Low	If the micrositing is considered, although this wouldn't reduce the worst-case peat slide hazard this would reduce the overall area of 'Likely' peat slide hazard which could be influenced/affected by the borrow pit operations. Stripping of peat identified with a 'Likely' peat slide Hazard within influencing distance from the blast, prior to blasting, would remove the 'Probable' risk associated with blasting and reduce the overall worst-case Hazard Ranking to 'Low'. The development of a location specific blasting strategy considering the requirement for blasting, based on specific ground investigation, and reducing the influence zone of the blasting, as well as installing targeted drainage and following good construction practices, would also reduce the overall Hazard Ranking

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
			Installation of targeted drainage – Installation of drainage upslope of the identified areas of likely peat slide hazards would look to isolate the areas from upslope surface water. Follow good construction practices as identified at the start of Section 13.2.8		although probably would still be within the 'Low' category.
Borrow Pit Search Area 8	Moderate	Borrow Pit Search Area 8 is currently located in an area predominantly underlain by 'Likely' and 'Unlikely' peat slide hazard. However, due to the presence of 'Probable' peat slide hazard within the 50m micrositing, a worst-case assessed hazard of 'Probable' has been considered and upgraded to 'Almost Certain' due to the inclusion of blasting at the location. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed.	**Micrositing**: Micro-siting the borrow pit to avoid being within influencing distance of identified 'Probable' peat slide hazard may be difficult given the presence of these to the northeast and southwest. It may be possible to microsite the borrow pit to the west to avoid the areas of 'probable', however, this would be dependent on assessed influencing zone of the blast. **Blasting**: A site and location specific blasting strategy will be developed for the Proposed Development following GI. Additionally, investigation to whether blasting is required at the location will be investigated. Where blasting is considered required, cognisance of the peat instability risk will be taken into consideration when planning the size of blast and associated influencing zone of the ground acceleration created. **Peat stripping:** Stripping 'Probable' peat slide hazards identified within	Low	If a suitable location for micrositing to the west can be found outwith influencing distance of the potential blast ground acceleration, the worst-case peat slide hazard would reduce from "Almost Certain" to "Probable", resulting in an overall worst-case hazard ranking of 'Low'. Stripping of peat identified with a 'Probable' peat slide Hazard within influencing distance from the blast, prior to blasting, would remove the 'Almost certain' risk associated with blasting and reduce the overall worst-case Hazard Ranking to 'Low'. The development of a location specific blasting strategy considering the requirement for blasting, based on specific ground investigation, and reducing the influence zone of the blasting, as well as installing targeted drainage, catch ditches and following good construction practices, would also reduce the overall Hazard Ranking

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
			influencing of the blasting, prior to any blasting. **Installation of targeted drainage –** Installation of drainage upslope of the identified areas of likely peat slide hazards would look to isolate the areas from upslope surface water. **Installation of catch ditches** – Installing catch ditches both on the upslope and downslope side of T13 and access track within anticipated influencing distance of possible peat slides would aim to prevent or reduce any peat flow onto T13 and further downslope towards the watercourse. Follow good construction practices as identified at the start of Section 13.2.8		although probably would still be within the 'Low' category.
Access Track Section 1	Moderate	Access Track Section 1 is located across areas predominately surrounded by 'Negligible' and 'Unlikely' peat slide hazard. However, large areas of 'Likely' and more localised areas of 'Probable' peat slide hazard are also identified. Given the peat slide hazards estimated and the exposure levels identified for the access track, a worst-case peat slide hazard ranking of 'Moderate' has been assessed. The whole track would not have this Hazard Ranking assigned, this ranking relates to areas where 'Probable' peat slide hazard has been identified upslope of the track. It should be noted that Access Track Section 1 is an existing and active track used as part of the forestry operations. No instances of peat slides or signs of	No widening of the access track will be undertaken in areas of upslope 'Probable' peat slide risk, unless the risk can be reduced through site specific ground investigation and a further assessment (possibly inclusive of quantitative analysis). **Installation of targeted drainage –** Installation of drainage upslope of the identified probable peat slide hazards would look to isolate the area from upslope surface water. **Installation of catch ditches and catch fences** – Installing catch	Low	By undertaking no widening works in areas identified with 'Probable' peat slide hazard, this would reduce the works which may act as a triggering event. Given this would not remove the 'Probable' peat slide hazard, rather reduce the events which may trigger, this would not reduce the Hazard Rnaking assigned. The installation of the targeted drainage, catch fence and/or ditches and the following of good construction practices would look to reduce the overall peat slide hazard as well as the potential consequences. Given the access track

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
		peat slides have been identified or communicated by the FLS as part of the development of the scheme.	ditches and catch fences on the upslope side of the access track where 'probable' peat slide is identified would aim to prevent or reduce any peat flow onto the track itself and a reduction in the damage caused. Follow good construction practices as identified at the start of Section 13.2.8		section is existing with no previous peat slide noted, although it is acknowledged there will likely be upgrade works and an increase in traffic, it is considered with the mitigation measures proposed being installed (where the peat slide hazard cannot be reduced during detailed design and quantitative assessment), that the overall Hazard Ranking would reduce to 'Low'.
Access Track Section 2	Moderate	Access Track Section 2 is currently located across areas predominantly underlain by 'Likely' and 'Unlikely' peat slide hazard. However, due to the presence of 'Probable' peat slide hazard within the 50m micrositing and the 50m impact zone, a worst-case assessed hazard of 'Probable' has been considered. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed. The whole track section would not have this Hazard Ranking assigned. This ranking relates to areas where 'Probable' peat slide hazard has been identified which is within 2 areas in the eastern half of the section.	**Micrositing:** Ensuring the track section is not moved within influencing distance of identified 'Probable' peat slide hazard, unless the risk can be reduced through site specific ground investigation and a further assessment (possibly inclusive of quantitative analysis). **Peat stripping:** Stripping 'Probable' peat slide hazards identified immediately adjacent to the infrastructure proposed. **Installation of targeted drainage –** Installation of drainage upslope of the identified areas of Probable peat slide hazards would look to isolate the areas from upslope surface water. Follow good construction practices as identified at the start of Section 13.2.8	Low	Considering the mitigation measures of micrositing and peat stripping together, as it may be difficult to microsite the track section away from influencing distance of 'probable' peat slide hazards, the worst-case peat slide hazard would reduce to 'Likely' thereby reducing the overall worst-case Hazard Ranking to 'Low'. Considering the current location of the access track section, this alignment and location seems the most reasonable when looking into peat stability alone. The installation of the targeted drainage and the following of good construction practices would also reduce the overall peat slide hazard as well as the potential consequences, however, overall the Hazard Ranking would likely still be 'Low'.
Access Track Section 3	Moderate	Access Track Section 3 is currently located across areas predominantly underlain by 'Unlikely' and peat slide hazard, with areas of 'Likely' hazard noted. However, due to the presence of 'Probable' peat slide	**Installation of targeted drainage –** Installation of drainage upslope of the identified probable peat slide hazards	Low	The installation of the targeted drainage, catch fence and/or ditches and the following of good construction practices would look to reduce the overall peat

Area	Worst-Case Hazard Ranking (Pre-Mitigation)	Comment (Table 13.2.15)	Location Specific Mitigation	Worst-Case Hazard Ranking (After Mitigation)	Comments
		hazard within the 50m micrositing and the 50m impact zone, a worst-case assessed hazard of 'Probable' has been considered. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed. The whole track section would not have this Hazard Ranking assigned. This ranking relates to areas where 'Probable' peat slide hazard has been identified which relates to three watercourse crossing locations across the section..	would look to isolate the area from upslope surface water. **Installation of catch ditches and catch fences** – Installing catch ditches and catch fences around the watercourses where probable peat slide was identified as well as on the upslope side of the access track which is affected by this would aim to prevent or reduce any peat flow into the watercourse or onto the track itself. Follow good construction practices as identified at the start of Section 13.2.8		slide hazard as well as the potential consequences. Given these mitigation measures (where the peat slide hazard cannot be reduced during detailed design and quantitative assessment), it is considered that the overall Hazard Ranking would reduce to 'Low'.
Access Track Section 7	Moderate	Access Track Section 7 is currently located across areas predominantly underlain by 'Unlikely' and peat slide hazard, with areas of 'Likely' hazard noted. However, due to the presence of 'Probable' peat slide hazard within the 50m micrositing and the 50m impact zone, a worst-case assessed hazard of 'Probable' has been considered. Accordingly, a worst-case hazard ranking of 'Moderate' has been assessed. Note this 'Moderate' Hazard Ranking only affects the access track section towards WC30, where the probable peat slide Hazard and watercourse is present. Elsewhere along the access track section, the Hazard Ranking is reduced to 'Low'.	**Installation of targeted drainage –** Installation of drainage upslope of the identified probable peat slide hazards would look to isolate the area from upslope surface water. **Installation of catch ditches and catch fences –** Installing catch ditches and catch fences around the watercourses where probable peat slide was identified as well as on the upslope side of the access track which is affected by this would aim to prevent or reduce any peat flow into the watercourse or onto the track itself. Follow good construction practices as identified at the start of Section 13.2.8	Low	The installation of the targeted drainage, catch fence and/or ditches and the following of good construction practices would look to reduce the overall peat slide hazard as well as the potential consequences. Given these mitigation measures (where the peat slide hazard cannot be reduced during detailed design and quantitative assessment), it is considered that the overall Hazard Ranking would reduce to 'Low'.

Peat Reuse and Restoration Areas

As noted in part of **Section 13.2.1** of this document, peat reuse and restoration has not specifically been taken into consideration as part of the peat slide hazard analysis or assessment completed. However, based on a review of the peat slide assessed, as presented on **Figure 13.2.9**, it is clear there are areas where the proposed reuse of peat may increase the peat slide hazard to unacceptable levels. A summary of the mitigations as relates to the reuse, and the assessed peat slide hazard is therefore presented below:

- Peat Reuse for Dressing Verges – No peat should be reused to dress verges within areas of 'Likely' or above peat slide hazard identified, unless it can be proven through site specific ground investigation and further assessment (potentially quantitative, if considered required) that the peat slide hazard is lower than currently identified. The detailed design of the reuse shall also clearly show peat stability and present this as part of the final PLHRA generated post-consent.
- Peat Reuse for Dressing Turbine Foundations – No new mitigations proposed at this stage with the text as provided in **Section 13.2.1** providing the necessary detail. The detailed design of the Development and the reuse of peat for this purpose shall be further considered and assessed at that stage following ground investigation which can be used to provide a more in-depth assessment, where required.
- Peat Reuse for Reinstatement of Temporary Compounds – No new mitigations proposed at this stage with the text as provided in **Section 13.2.1** providing the necessary detail. The detailed design of the Development and the reuse of peat for this purpose shall be further considered and assessed at that stage following ground investigation which can be used to provide a more in-depth assessment, where required.
- Peat Reuse for Borrow Pit Restoration – No new mitigations proposed at this stage with the text as provided in **Section 13.2.1** providing the necessary detail. The detailed design of the Development and the reuse of peat for this purpose shall be further considered and assessed at that stage following ground investigation which can be used to provide a more in-depth assessment, where required.

Potential Peat Slide Indicators

During the site works (i.e. GI works or construction works), site staff should be made aware of the slope failure indicators, how to recognise them and the importance and mechanism for reporting these. They should also receive training and instruction in emergency procedures in the event of a peat slide. This will reduce the impact should a peat slide occur.

There are a number of recognised indicators for slope failures, and these can also indicate the potential of a peat slide event. The factors below are particularly applicable to low velocity events:

- The development of tension cracks across the slope or in semi-circular patterns showing progressive development;
- Boggy ground or new springs appearing at the base of slopes;
- Sudden reactivation / drying up of spring lines, drainage channels or streams;
- Creep and bulging of ground;
- Displacement and leaning of trees, fence posts, dykes, etc.; and
- Breaking of underground services.

13.2.10 Conclusions and Recommendations

Conclusions

The general approach to the infrastructure design has been to design the Proposed Development to avoid areas of deeper peat deposits (>2.0 m thickness), wherever possible.

As indicated in **Figure 13.2.9**, the peat slide assessed Hazard for the Development Site is generally assessed to 'Unlikely' with areas of 'Negligible' and 'Likely' present and occasional localised areas 'Probable'. The Proposed Development has been designed by locating the footprint of the infrastructure in areas predominantly characterised by 'Unlikely' peat slide hazard, with some infrastructure falling into the 'Likely' classification (this is shown on **Figure 13.2.9**) hence avoiding area with 'Probable' Hazard.

Based on the worst-case assessment approach, the proposed infrastructure, micrositing boundary and associated 100 m buffer is predominately underlain by 'Unlikely' peat slide Hazard. However, some localised areas of 'Likely' peat slide Hazard are present within this 110 m zone, with some also having localised 'Probable' peat slide Hazard within influencing distance.

The assessment has also taken into consideration blasting activities which may be undertaken to form borrow pits. The effects of blasting resulted in the increase in Peat Slide Hazard, localised to the immediate surroundings of the borrow pits and potential blasting influencing zone, generally increasing the peat slide Hazard to 'Likely' or 'Probable', although very locally where 'Probable' peat slide Hazard was already identified through the GIS analysis this increased hazard to 'Almost Certain'.

From the qualitative assessment (**Table 13.2.15**) of the infrastructure components of the Proposed Development, the following has been determined, pre-mitigation:

- For the Turbine locations (and associated infrastructure e.g. hardstanding, laydown area, crane areas, etc.):
  - 2 of the 13 turbines were assessed with a 'Negligible' Hazard Ranking.
  - 8 of the 13 turbines were assessed with a 'Low' Hazard Ranking.
  - 3 of the 13 turbines were assessed with a 'Moderate' Hazard Ranking.
- For the Borrow Pit Search Areas:
  - 4 of the 8 borrow pits were assessed with a 'Low' Hazard Ranking.
  - 4 of the 8 borrow pits were assessed with a 'Moderate' Hazard Ranking.
  - The BESS located within Borrow Pit Search Area 2 was also assessed with a 'Low' Hazard Ranking.
- For the Control Building and Substation, the area was assessed with a 'Low' Hazard Ranking.
- For the Meteorological Mast, the area was assessed with a 'Low' Hazard Ranking.
- For the Temporary Compound Areas, all were assessed with a 'Low' Hazard Ranking, except for TC05 which was assessed with a 'Negligible' Hazard Ranking.
- For the Access Track Sections:
  - 4 of the 8 sections were assessed with a 'Low' Hazard Ranking.
  - 4 of the 8 sections were assessed with a 'Moderate' Hazard Ranking.

The majority of the proposed infrastructure is located in areas assessed as having a Hazard Ranking of 'Low' or less, meaning that the project can proceed as long as further investigation and design, to refine the assessment and mitigate the hazard is undertaken. However, as noted above and shown in **Table 13.2.15**, there are eleven components that have been assigned a Hazard Ranking of 'Moderate'.

Where location specific mitigation is considered for areas assessed with a 'Moderate' Hazard Ranking, all areas are anticipated to be able to reduce to 'Low' Hazard Ranking. This has been shown indicatively in **Table 13.2.16**. AECOM have also outlined general mitigation measures (**Section 13.2.8**) which should be considered as part of the detailed design and construction of the Development.

This means further refinement of the design (inclusive of micrositing where possible to avoid higher ranked peat slide hazard areas and higher ranked receptors) and investigation is required to assess

the peat slide Hazard and confirm whether the Hazard determined in this preliminary PLHRA is accurate. If after the ground investigation and development of the detailed design and subsequent completion of the Final PLHRA, the Hazard Ranking is still 'Moderate', robust mitigation measures will be required to be designed into the affected areas to reduce the overall Hazard Ranking. It should be noted that even after this preliminary PLHRA, the Hazard Ranking is considered to be relatively conservative given the approach undertaken. As such, it is considered that following a quantitative assessment, which incorporates detailed GI data, micrositing of infrastructure locations and further details on the design and construction, the Hazard Rankings will reduce.

As highlighted the Proposed Development will include the reuse and restoration of peat in some form as part of the works. The extent of reuse / restoration is still in the design and development stage and as such has not been assessed. This Preliminary PLHRA does, however, review the proposed reuse in relation to the assessed peat slide hazard and provides mitigations as relates to areas where peat reuse should not be undertaken, unless the peat slide hazard can be proven to be lower than presented as part of this document through ground investigation and a further, more refined assessment. It is acknowledged that this reuse/restoration of the peat may increase the peat instability risk on the Development Site, however, as part of the development and detailed design of these areas, the Designer will ensure and prove stability, whether that be through engineered solutions within the areas or through the implementation of mitigation measures. As such, this should reduce the likelihood of a peat slide as a result of the reuse/restoration and/or reduce its exposure to acceptable levels, if not prevented all together. The final PLHRA shall consider the effect that the reuse and restoration areas have on the peat stability within the Development Site and present the detailed design of these areas as relates to the peat stability and how instability has been prevented, reduced or mitigated, if not proven to be stable.

The Principal Contractor will be required to produce a CEMP for the construction of the Proposed Development. This should include the results of any updated PLHRA, considering the detailed procedures and methods intended to be used by the Principal Contractor to reduce any environmental impact, including the risk of any peat slide events.

Recommendations

Post-consent, the following should be undertaken to refine the preliminary PLHRA:

- Undertake a comprehensive ground investigation for the Proposed Development. This should include exploratory holes to confirm peat extent and depth as indicated by probing, and obtain characteristic properties through laboratory testing, including determination of the acrotelm / catotelm boundary.
- Prioritize investigation in higher-risk areas, specifically those with Hazard Rankings of Low or Moderate, and locations where GIS analysis identified peat slide hazards as 'Likely' or 'Probable'. The aim is to determine whether these hazards can be reduced or if infrastructure should be micro-sited to more favourable positions within the designated micrositing boundary.
- Collect sufficient hydrogeological data, including groundwater levels within peat and underlying substrates, to enable a robust quantitative assessment of peat slide hazard where required.
- Following completion of ground investigation and progression of the design to maturity, prepare a Final PLHRA. This assessment must:
  - Confirm the stability of peat across the Development Site.
  - Incorporate detailed design information.
  - Specify any additional mitigation measures necessary to manage residual risks.

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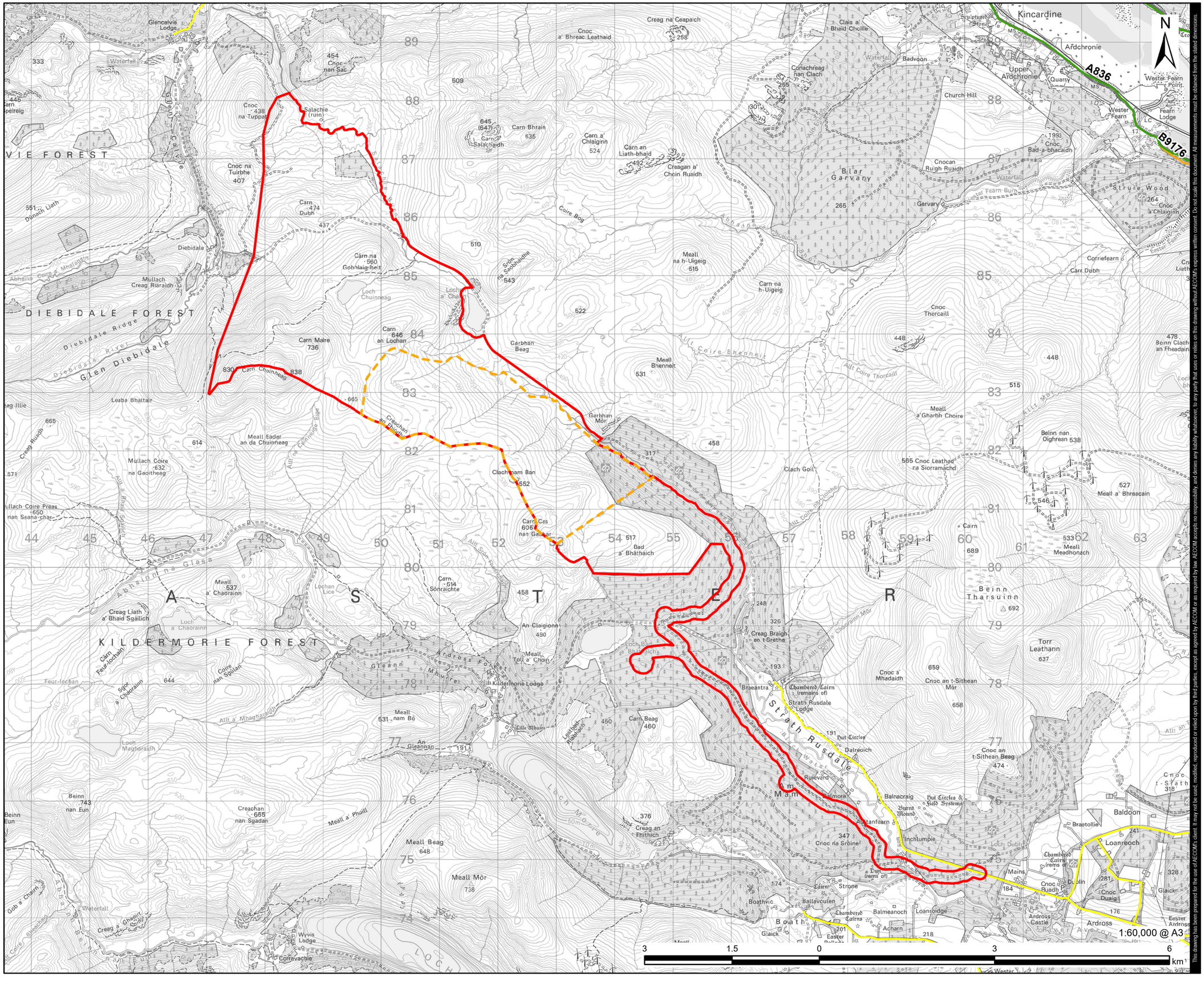
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Figures

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Figure 13.2.2: Site Plan
Figure 13.2.3: Site Visit Features
Figure 13.2.4: Topography
Figure 13.2.5: Bedrock Geology
Figure 13.2.6: Superficial Geology
Figure 13.2.7: Peat Probe Locations and Depths
Figure 13.2.8: Peat Depth Interpolation
Figure 13.2.9: Peat Slide Assessed Hazard
Figure 13.2.10: Access Track Groupings and Borrow Pits

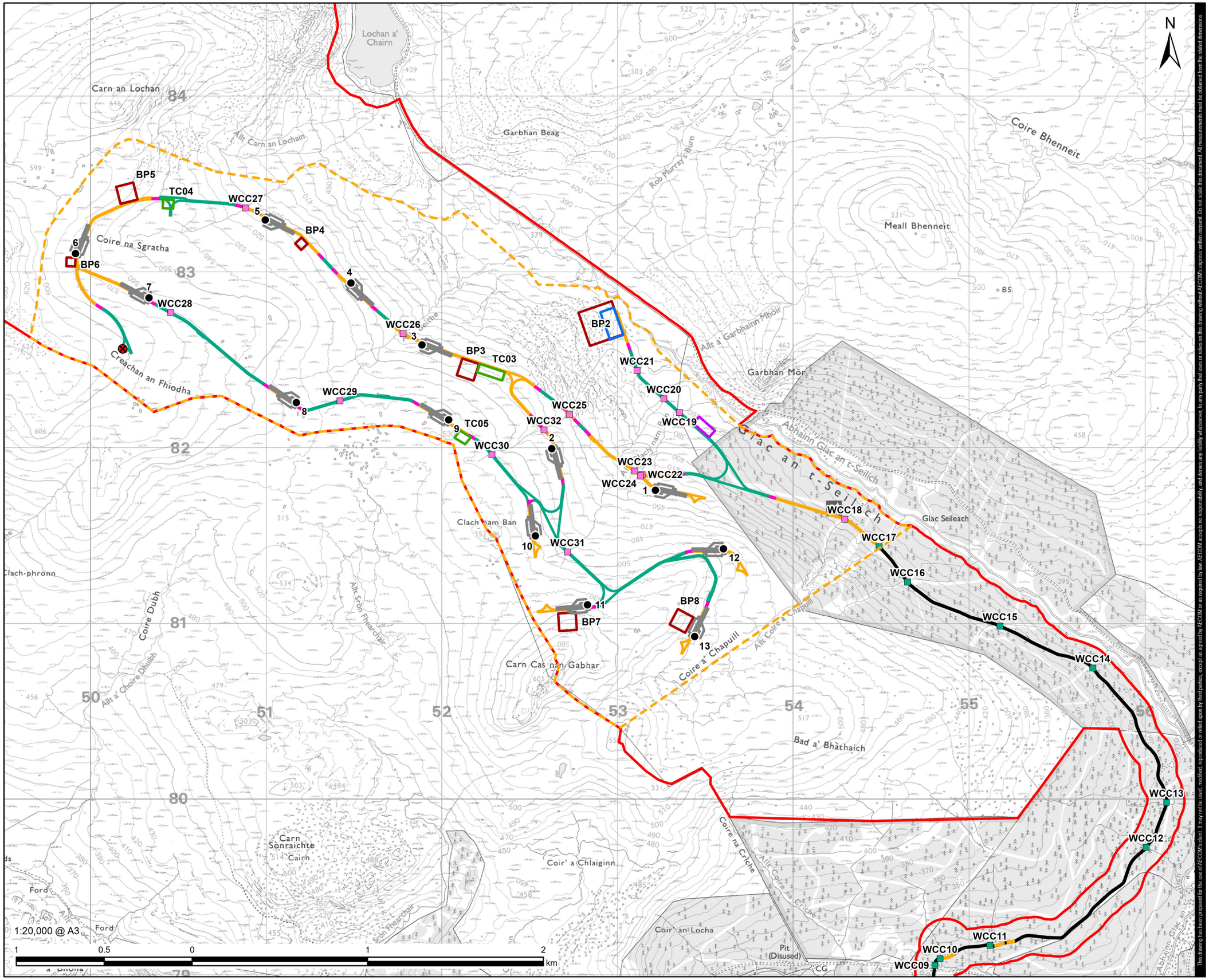
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Glencalvie Lodge
Waterfall
Glen Calvie
454 Cnoc nan Sac
Cnoc a' Bhreac Leathaid
Creag na Ceapaich
258
Clais a' Bhaid Choille
Kincardine
Sculptured Stone
Ardchronie
Badvoon
Conachreag nan Clach
Upper Ardchronie
Quarry
A836
Church Hill
Wester Fearn Point
Wester Fearn
Fearn Lodge
B9176
Cnoc na Tuirbhe 407
Cnoc 438 na Tuppan
Salachie (ruin)
645 (647)
Carn Salachaidh
Carn Bhrain 635
Carn a' Chlaiginn 524
Carn an Liath-bhaid 492
Craegan a' Choin Ruaidh
Cnoc Bad-a-bhacaidh
Cnocan Ruigh Ruaidh
Blar Garvary
Garvary
Struie Wood
Cnoc a' Chlaiginn
VIE FOREST
Dunch Liath
Carn 474 Dubh
Coire Bog
Diebidale
Carn na 560 Gobhlaig-beil
Meall na h-Uigeig 515
Carn na h-Uigeig
Corriefearn
Carr Dubh
Mullach Creag Riaraidh
Loch Chuinneag
DIEBIDALE FOREST
Diebidale Ridge
Diebidale River
Glen Diebidale
Carn Maire 736
Carn 646 an Lochan
Garbhan Beag
Meall Bhennet 531
Cnoc Thorcaill
Beinn Clach an Fheadain 478
Carn Chuinneag 838
830
Leaba Bhattair
Meall a' Gharbh Choire
Creachan an Fhuirich
Garbhan Mòr
Meall Eadar an da Chuinneag
Beinn nan Oighrean 538
Mullach Coire na Gaoitheag 632
Clach nam Ban 552
Clach Goil
565 Cnoc Leathad na Siorramachd
Meall a' Bhreacain 527
Carn Ces 606
Bad a' Bhathaich 517
Cairn
689
Meall Meadhonach 533
Mullach Coire Preas 650
Meall a' Chaorainn 537
Carn 514 Sònraichte
Lochan Lice
Beinn Tharsuinn 692
Creag Liath a' Bhaid Sgàilich
An Claigionn 490
Creag Braigh an t-Srathe
Torr Leathann 637
KILDERMORIE FOREST
Carn Feur-lochan
Meall Tolla Choin
Kildermorie Lodge
Cnoc a' Mhadaidh
Cnoc an t-Sithean Mòr
Braeantra
Chambered Cairn (remains of)
Strath Rusdale Lodge
Strath Rusdale
Carn Beag 460
Meall 531 nam Bò
Hut Circles
Dalroich
Cnoc an t-Sithean Beag 474
Ruievard
Dalmore
Balnacraig
Hut Circles & Field Systems
Burnt Mound
Auchtanfearn
Inchlumpie
Baldoon
Braetollie
Loanreoch
Beinn Eun
Beinn 743 nan Eun
Creachan 665 nan Sgadan
Meall a' Phuill
Meall Beag 648
Meall Mòr 738
Creag an Fhithich 376
Cnoc na Sroine 347
Loch Dubh
Mains
Cnoc Ruadh
Cnoc Dubh
Glaick
Boathvic
Ballavoulen
Balmeanoch
Loanfoidge
Acharn
Ardross Castle
Ardross
Easter Ardross
Creag a' Ghaoir
Wyvis Lodge
Corravachie
Loch Morie
Allt Coire Bheannaich
Allt Coire Thorcaill
Allt Coire Ghaoir
Allt a' Mhagharaidh
Abhainn Coire Mhalagain
Abhainn nan Glas-allt
Allt Coire Dhiolaire
Allt Coire Ghaoir
Allt Coire Ghamhnaidh Beag
Allt a' Bhlair Sgàilich
Allt Sgàin Ruadh
Allt Coire Dhiolaire
Allt Coire Ghamhnaidh Mòr
Allt Coire Chaorainn Mòr
Abhainn Coire Mhalagain
Abhainn nan Glas-allt
Allt Coire Bheannaich
Allt Coire Ghaoir
Allt Coire Ghamhnaidh Beag
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Allt Sgàin Ruadh
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Allt Coire Ghamhnaidh Mòr
Allt Coire Chaorainn Mòr
Allt Coire Ghaoir
Allt a' Mhagharaidh

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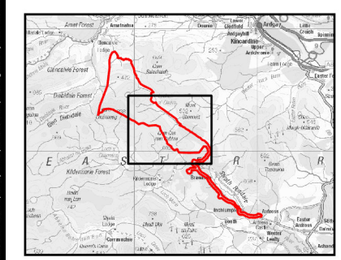
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LEGEND

- Site Boundary
- Main Development Area
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Existing Watercourse Crossing
- Proposed New Watercourse Crossing
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area



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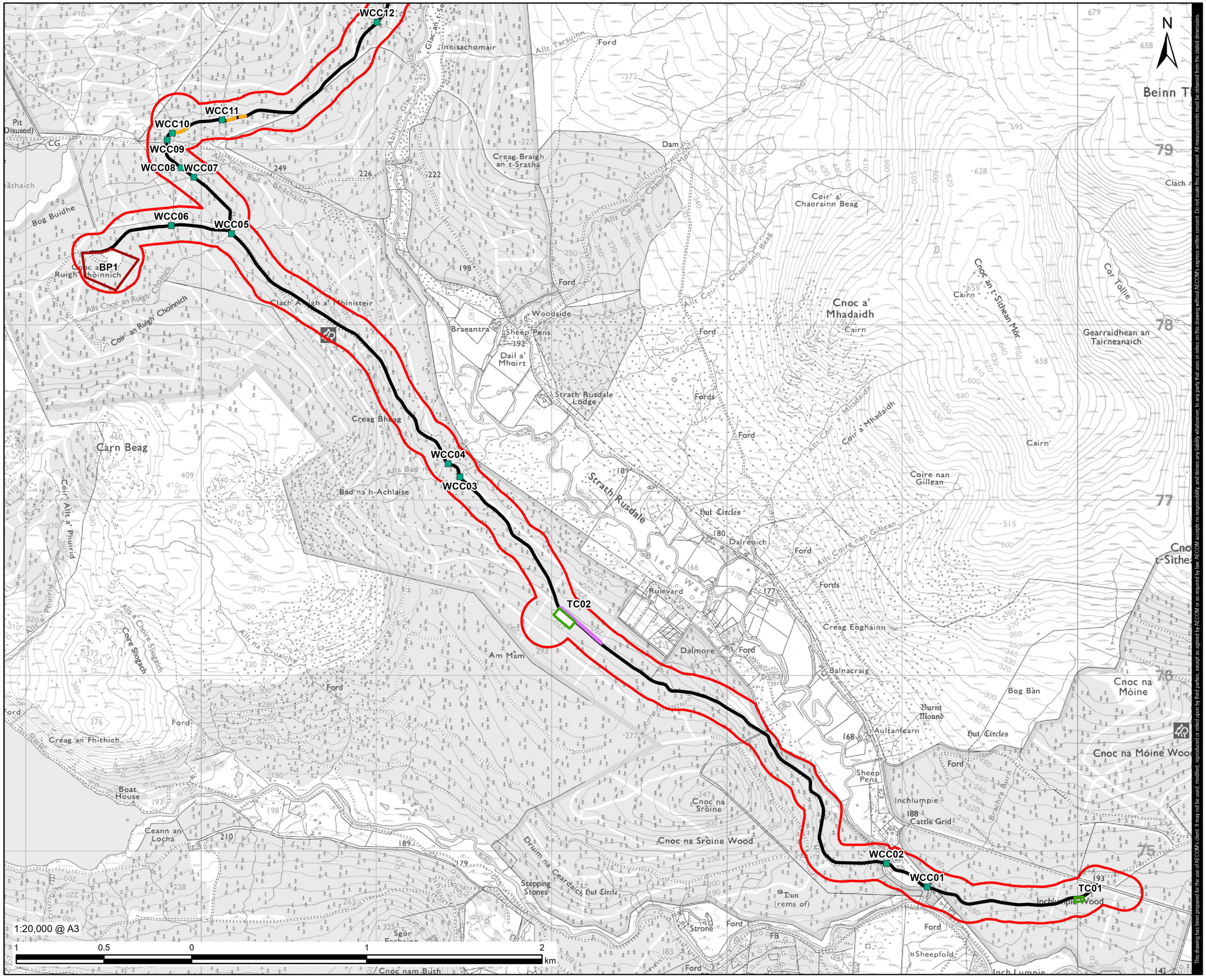
Site Plan

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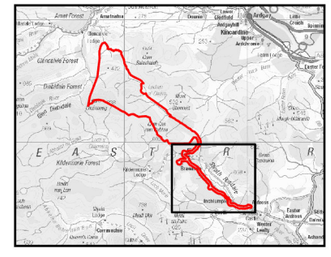
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LEGEND

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- Existing Watercourse Crossing
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- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area



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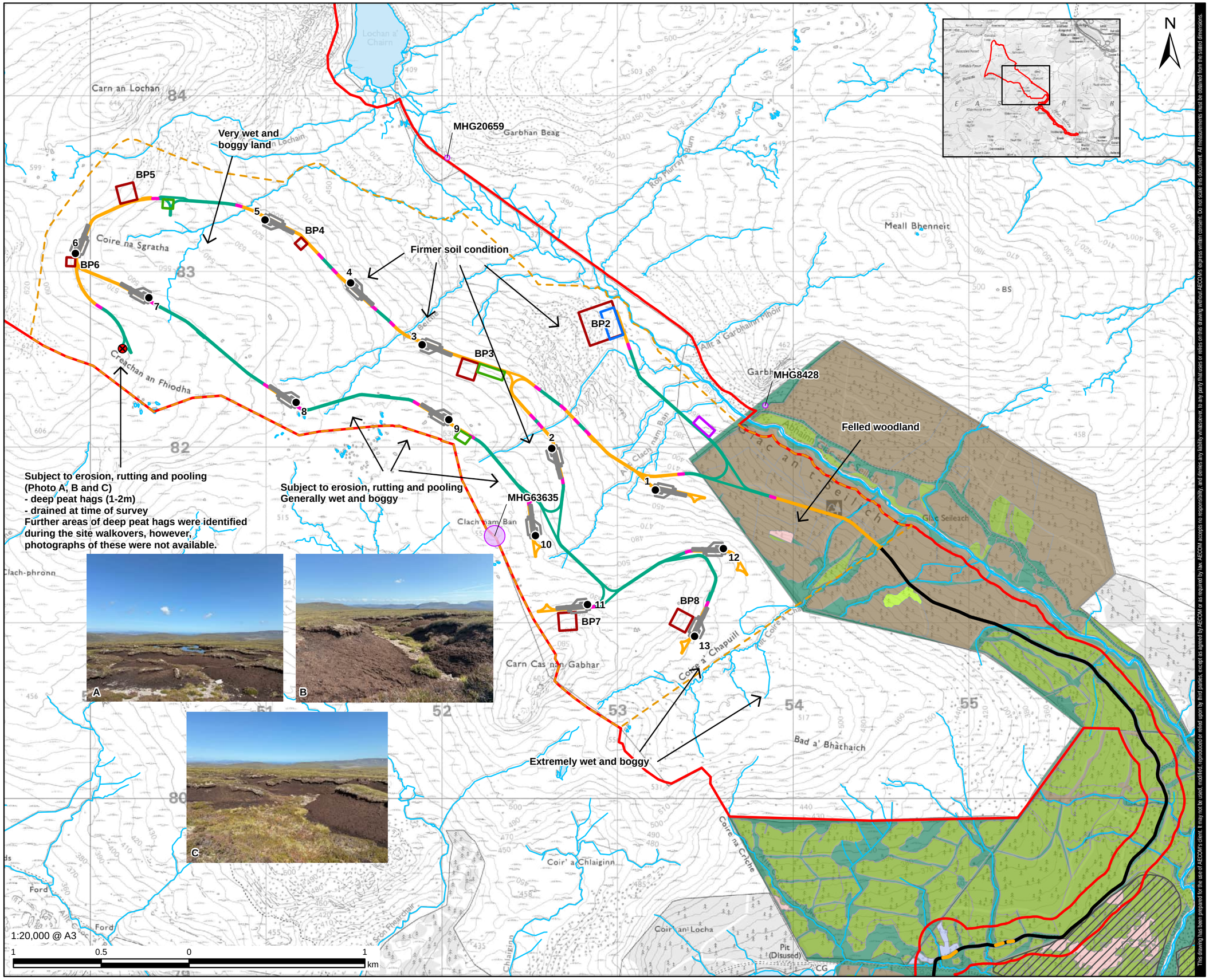
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- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area
- Watercourse
- Waterbody
- HER Monument - Area
- Ancient Woodland - Long-Established (of plantation origin)

Forestry State

- Dead High Forest
- Open
- Failed
- Felled
- High Forest
- Windblow

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FIGURE NUMBER

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Block of dense conifers with ~10m wide clearings featuring bracken/ reeds

Fenceline

Photo I

Photo J and K

Photo D and E

Passing place (Photo F)

Dense conifers lining forest

Gorse/immature trees (1-2m tall) (Photo G)

Photo H

BP1

Existing FLS borrow pit. Not active at time of survey

Area of felled trees

MHG8421

MHG8412

MHG8413

MHG8411

MHG8419

MHG6350

MHG20957

MHG8167

MHG20930

F

I

G

J

H

K

D

E

1:20,000 @ A3

1 0.5 0 1 km

N

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- Open
- Failed
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- High Forest
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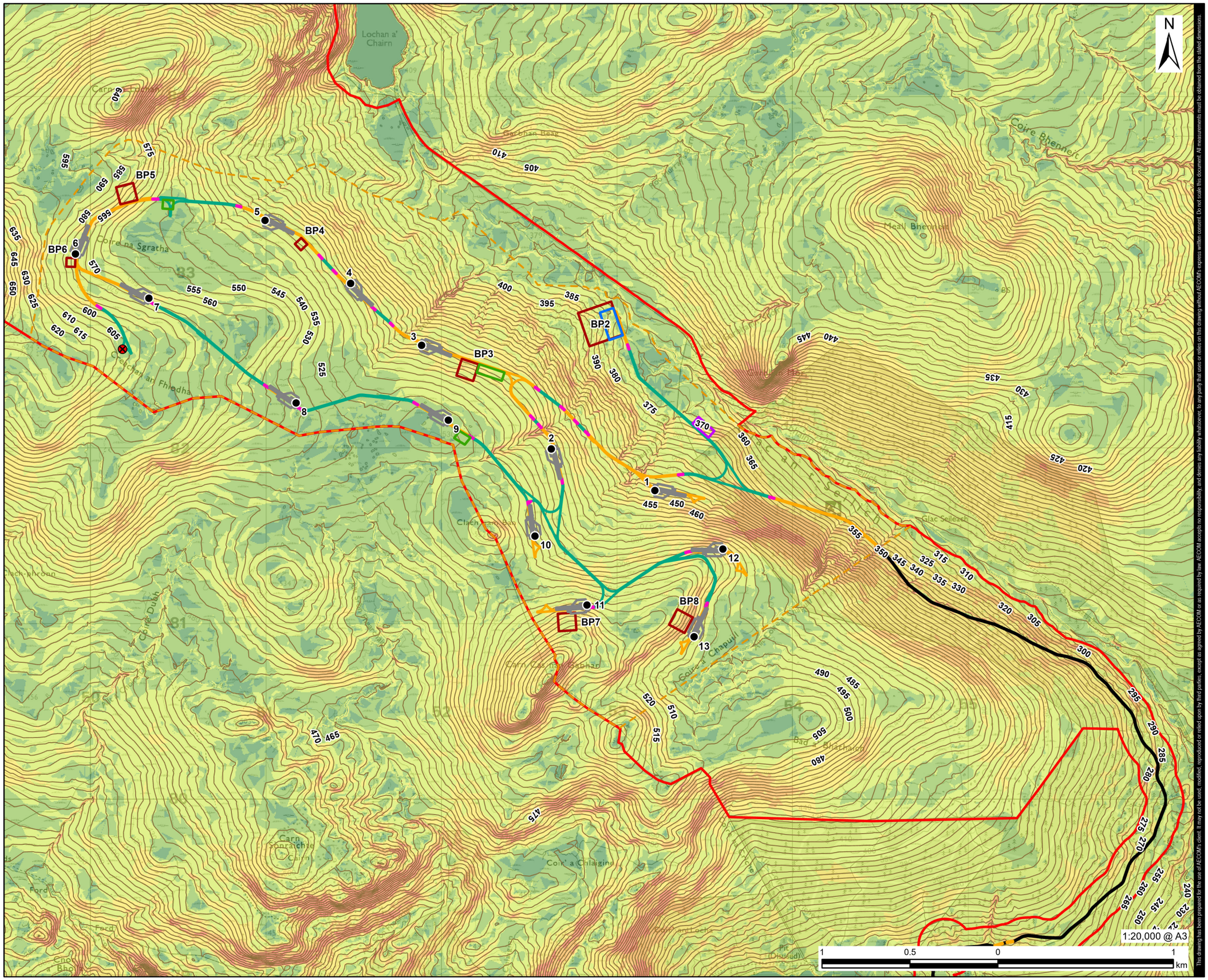
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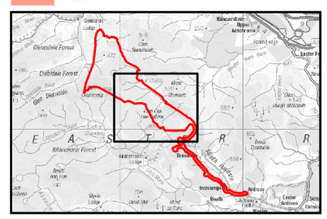
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- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area
- Contours (5m Intervals)

Slope (Degrees) - OS Terrain 5

- 0 - 2
- >2 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20



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Slope Angle and Contours derived from OS Terrain 5 dataset

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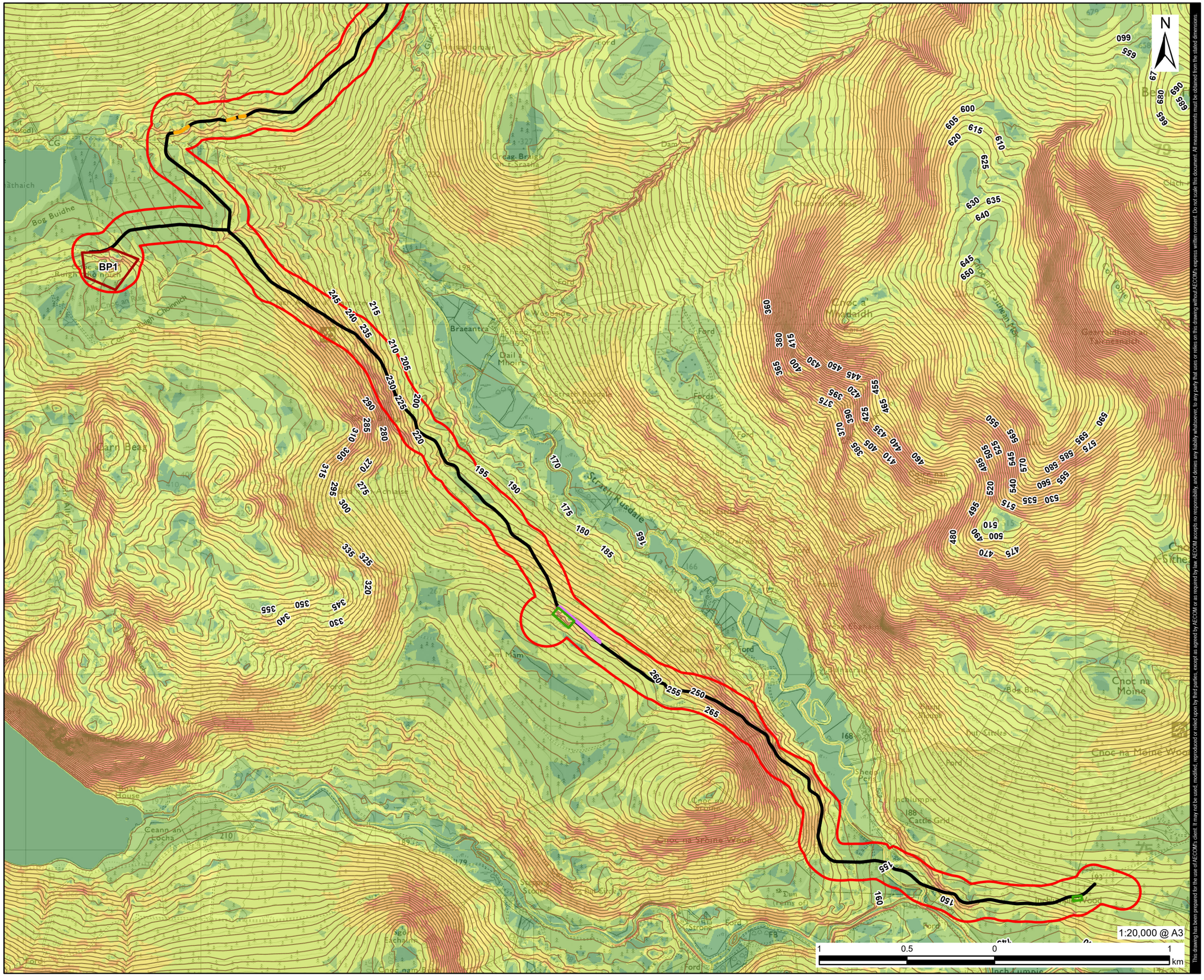
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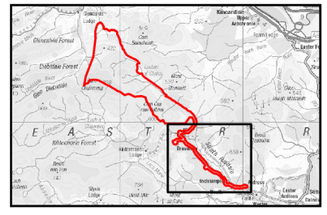
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LEGEND

- Site Boundary
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area
- Contours (5m Intervals)

Slope (Degrees) - OS Terrain 5

- 0 - 2
- >2 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20



NOTES

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Slope Angle and Contours derived from OS Terrain 5 dataset

ISSUE PURPOSE

EIAR

PROJECT NUMBER

60728056

FIGURE TITLE

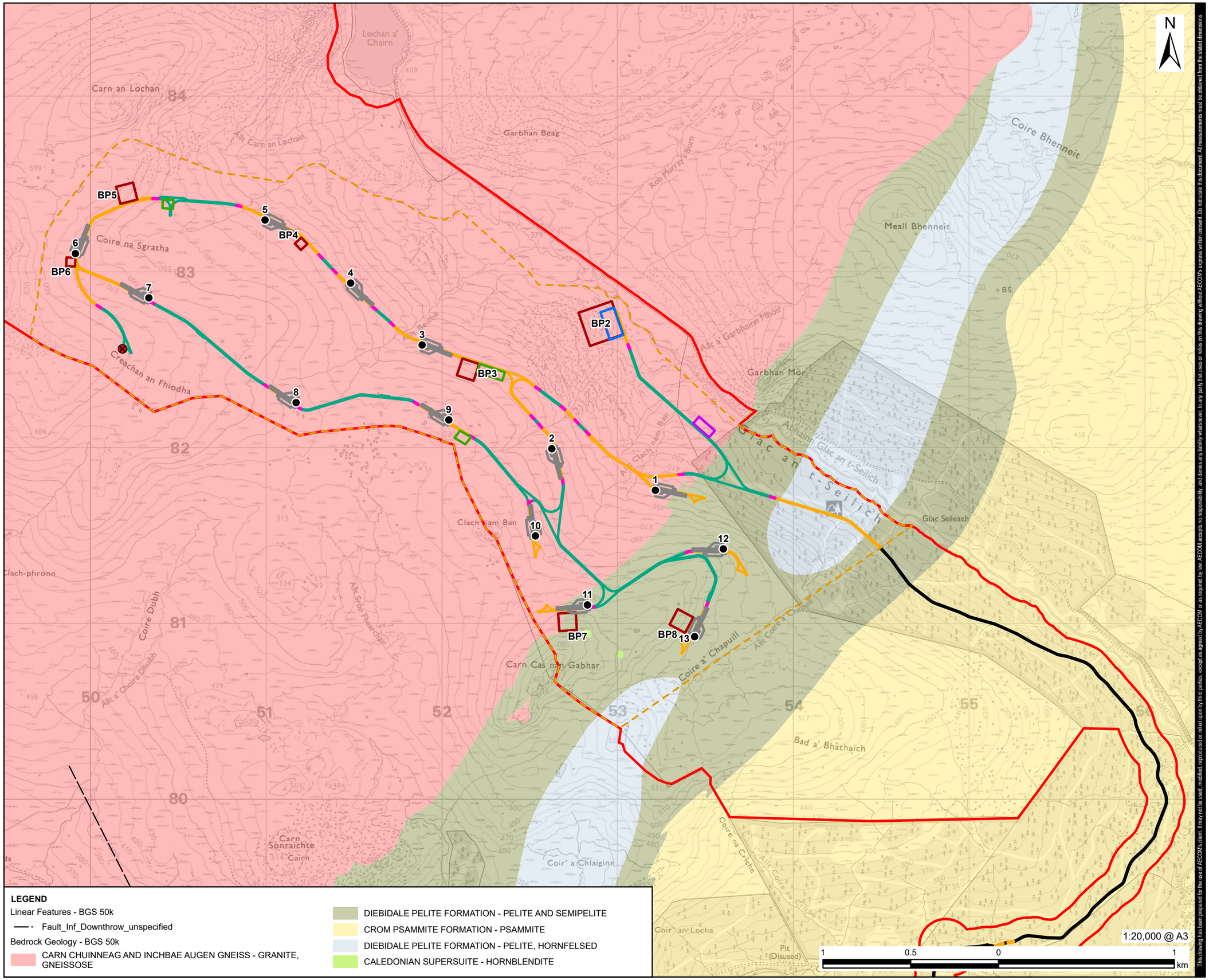
Topography

FIGURE NUMBER

Figure 13.2.4 (2 of 2)

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-12-08

Filename: C:\Users\craggst\Downloads_Creachan Wind Farm_Local\02_Maps\EIAR\CWF_EIAR_Appendix_Ch13_Geology.aprx



LEGEND

Linear Features - BGS 50k

- Fault_Inf_Downthrow_unspecified

Bedrock Geology - BGS 50k

- CARN CHUINNEAG AND INCHBAE AUGEN GNEISS - GRANITE, GNEISSOSE
- DIEBIDALE PELITE FORMATION - PELITE AND SEMIPELITE
- CROM PSAMMITE FORMATION - PSAMMITE
- DIEBIDALE PELITE FORMATION - PELITE, HORNFELSED
- CALEDONIAN SUPERSUITE - HORNBLENDITE

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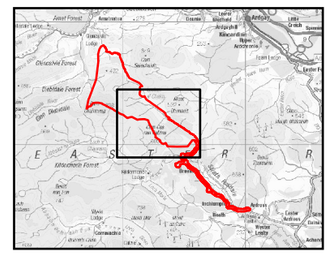
RWE

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LEGEND

- Site Boundary
- Main Development Area
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area



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ISSUE PURPOSE

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PROJECT NUMBER

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FIGURE TITLE

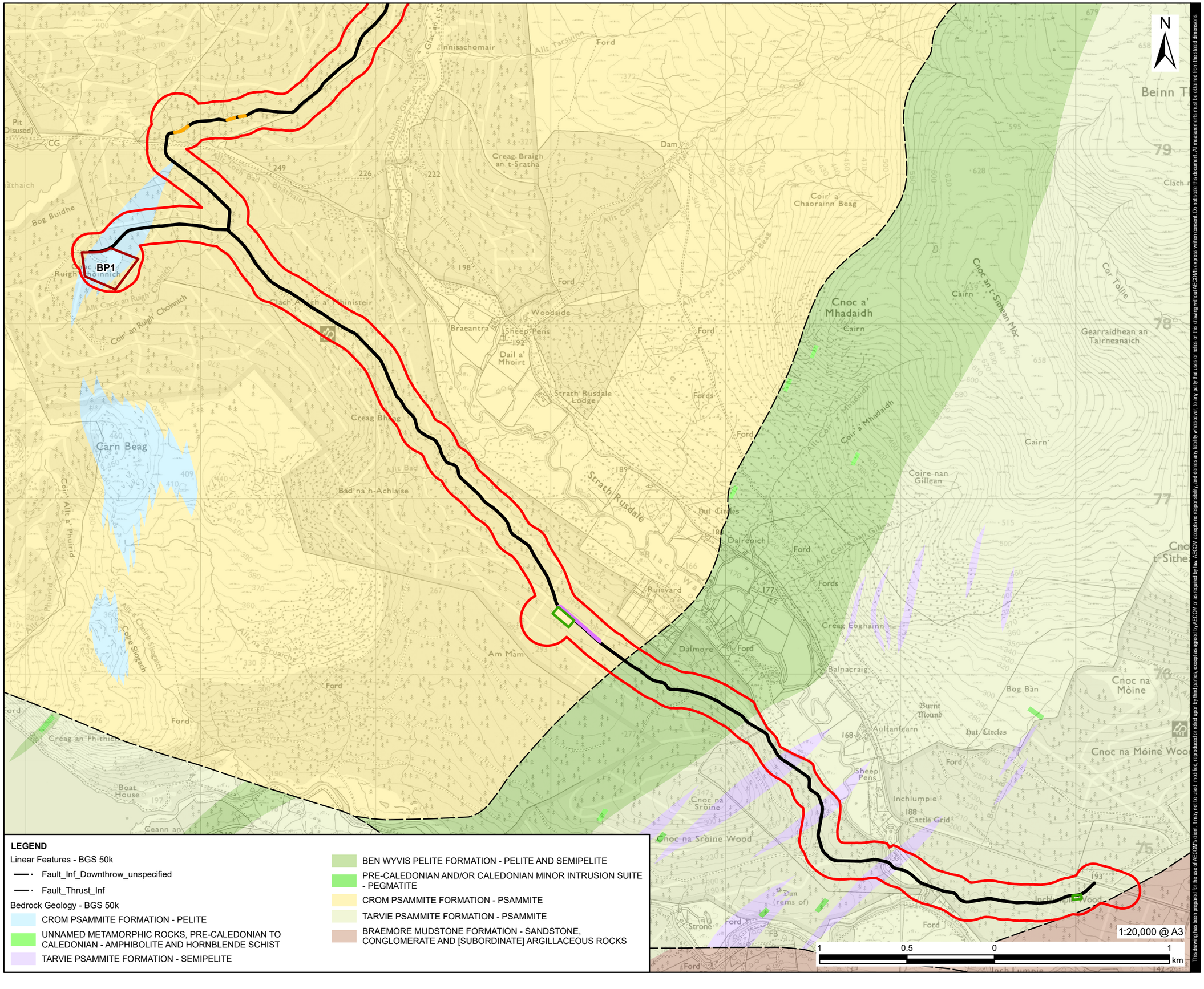
Bedrock Geology

FIGURE NUMBER

Figure 13.2.5 (1 of 2)

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-12-08

Filename: C:\Users\craggs\Downloads_Creachan Wind Farm_Local\02_Maps\EIAR\CWF_EIAR_Appendix_Ch13_Geology.aprx



LEGEND

Linear Features - BGS 50k

- Fault_Inf_Downthrow_unspecified
- Fault_Thrust_Inf

Bedrock Geology - BGS 50k

- CROM PSAMMITE FORMATION - PELITE
- UNNAMED METAMORPHIC ROCKS, PRE-CALEDONIAN TO CALEDONIAN - AMPHIBOLITE AND HORNBLENDE SCHIST
- TARVIE PSAMMITE FORMATION - SEMIPELITE
- BEN WYVIS PELITE FORMATION - PELITE AND SEMIPELITE
- PRE-CALEDONIAN AND/OR CALEDONIAN MINOR INTRUSION SUITE - PEGMATITE
- CROM PSAMMITE FORMATION - PSAMMITE
- TARVIE PSAMMITE FORMATION - PSAMMITE
- BRAEMORE MUDSTONE FORMATION - SANDSTONE, CONGLOMERATE AND [SUBORDINATE] ARGILLACEOUS ROCKS

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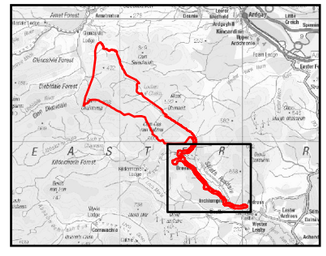
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LEGEND

- Site Boundary
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area



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ISSUE PURPOSE

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PROJECT NUMBER

60728056

FIGURE TITLE

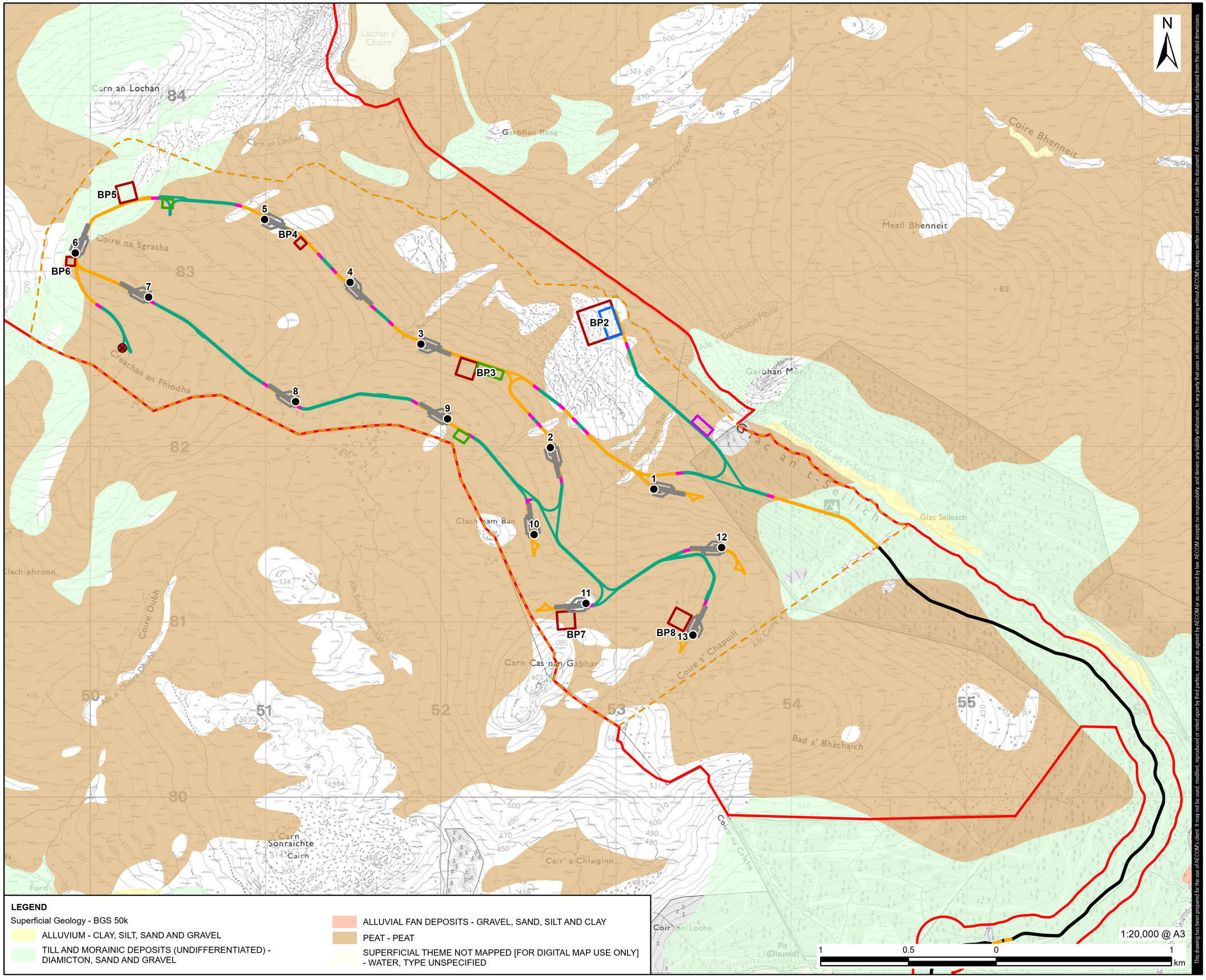
Bedrock Geology

FIGURE NUMBER

Figure 13.2.5 (2 of 2)

Revision: 4 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06

Filename: C:\Users\craggsl\Downloads_Creachan Wind Farm_Local\02_Maps\EIAR\CWF_EIAR_Appendix_Ch13_Geology.aprx



LEGEND

Superficial Geology - BGS 50k

- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- TILL AND MORAINIC DEPOSITS (UNDIFFERENTIATED) - DIAMICTON, SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - GRAVEL, SAND, SILT AND CLAY
- PEAT - PEAT
- SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY] - WATER, TYPE UNSPECIFIED

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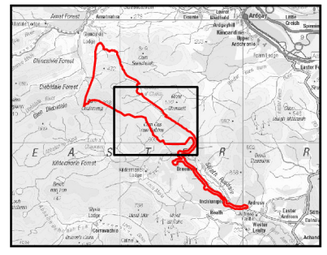
RWE

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LEGEND

- Site Boundary
- Main Development Area
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area



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PROJECT NUMBER

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FIGURE TITLE

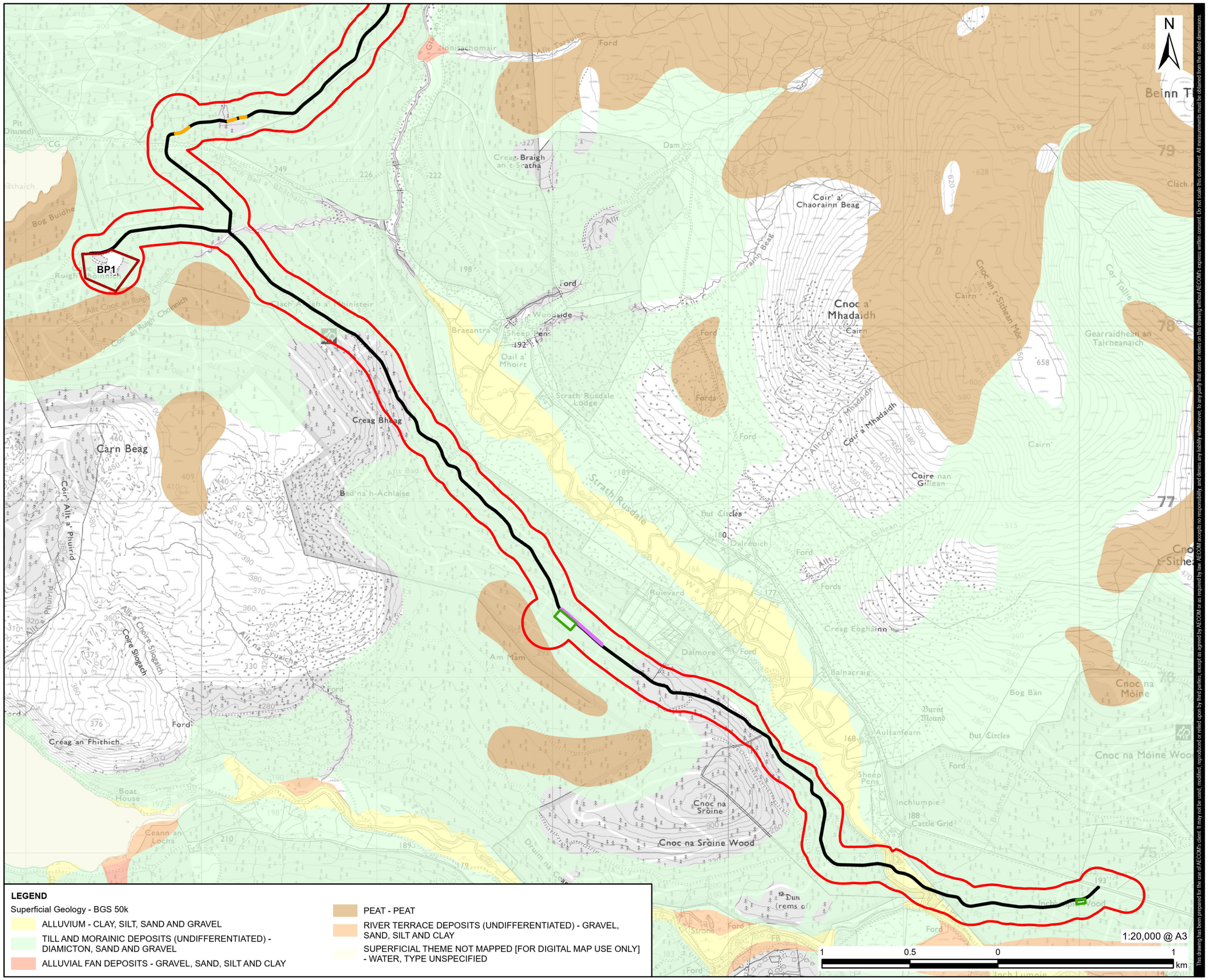
Superficial Geology

FIGURE NUMBER

Figure 13.2.6 (1 of 2)

Revision: 4 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06

Filename: C:\Users\craggs\Downloads_Creachan Wind Farm_Local\02_Maps\EIAR\CWF_EIAR_Appendix_Ch13_Geology.aprx



LEGEND

Superficial Geology - BGS 50k

- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- TILL AND MORAINIC DEPOSITS (UNDIFFERENTIATED) - DIAMICTON, SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - GRAVEL, SAND, SILT AND CLAY
- PEAT - PEAT
- RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - GRAVEL, SAND, SILT AND CLAY
- SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY] - WATER, TYPE UNSPECIFIED

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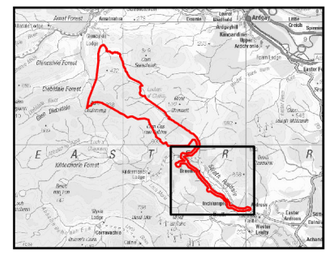
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LEGEND

- Site Boundary
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area



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FIGURE TITLE

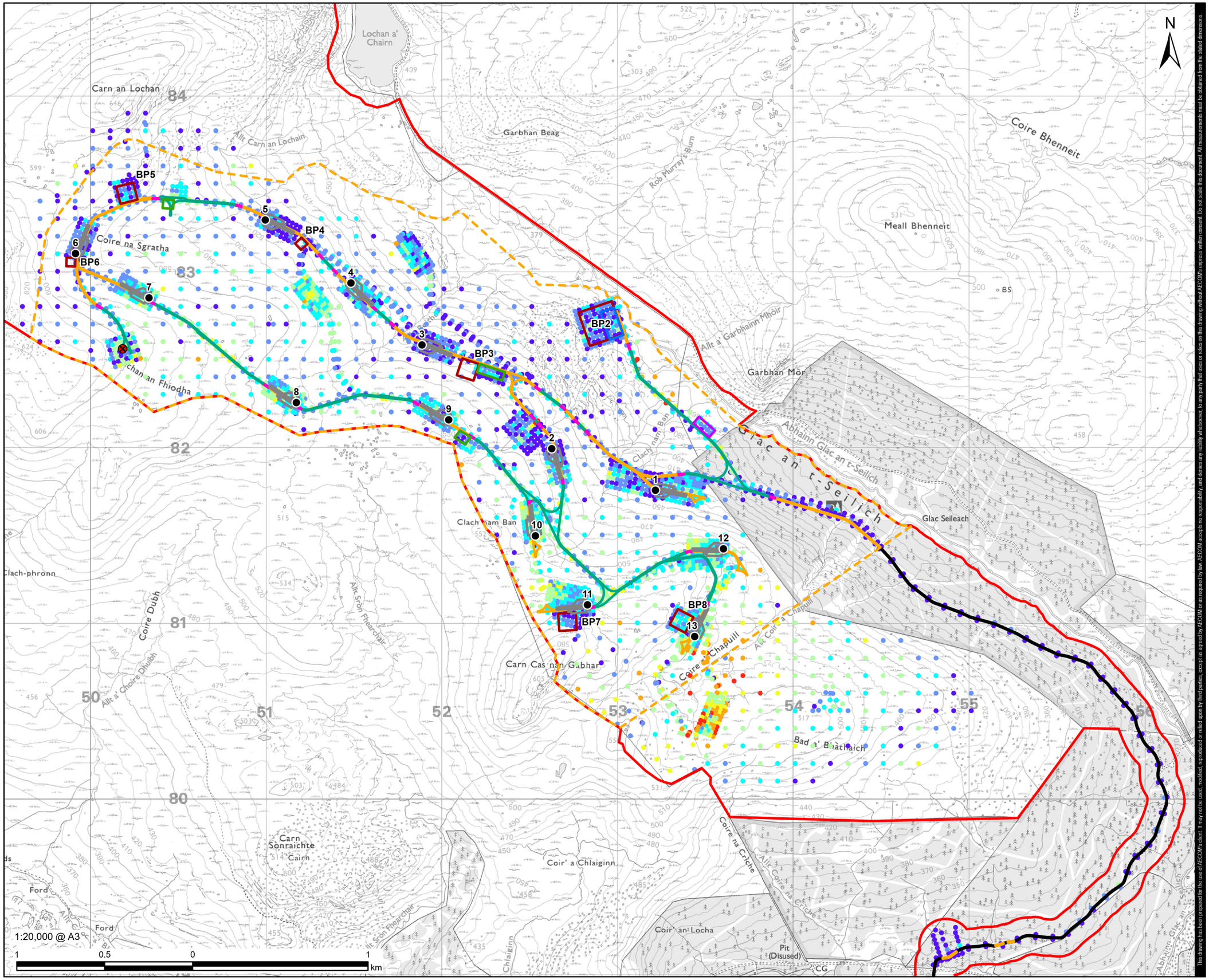
Superficial Geology

FIGURE NUMBER

Figure 13.2.6 (2 of 2)

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06

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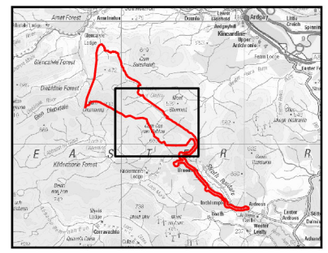
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LEGEND

- Site Boundary
- Main Development Area
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area

Peat Probe Results (Depth m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01+



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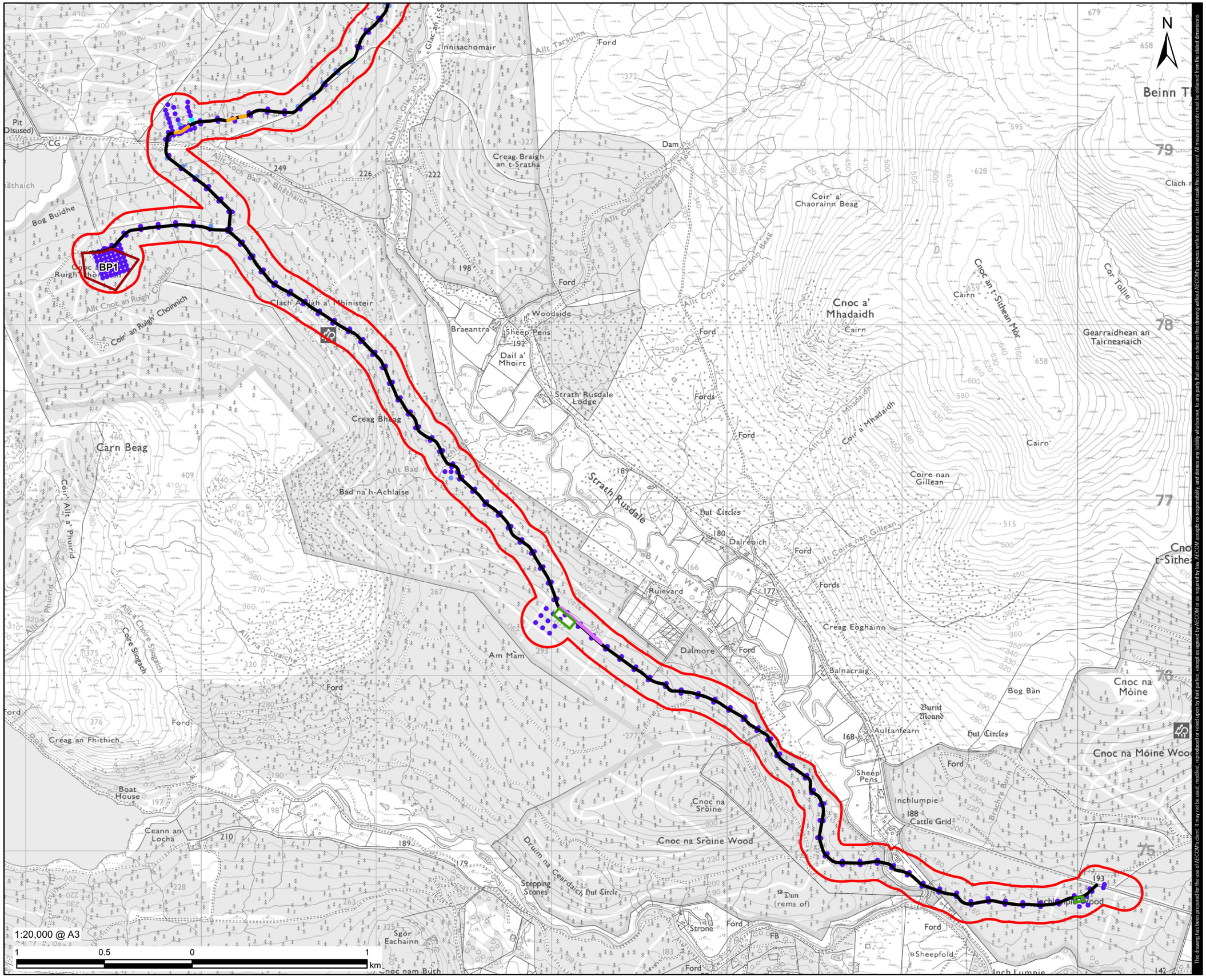
FIGURE TITLE

Peat Probe Locations and Depth

FIGURE NUMBER

Figure 13.2.7 (1 of 2)

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06



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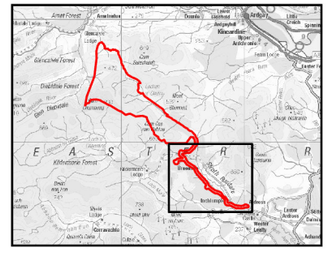
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LEGEND

- Site Boundary
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area

Peat Probe Results (Depth m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00



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ISSUE PURPOSE

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PROJECT NUMBER

60728056

FIGURE TITLE

Peat Probe Locations and Depth

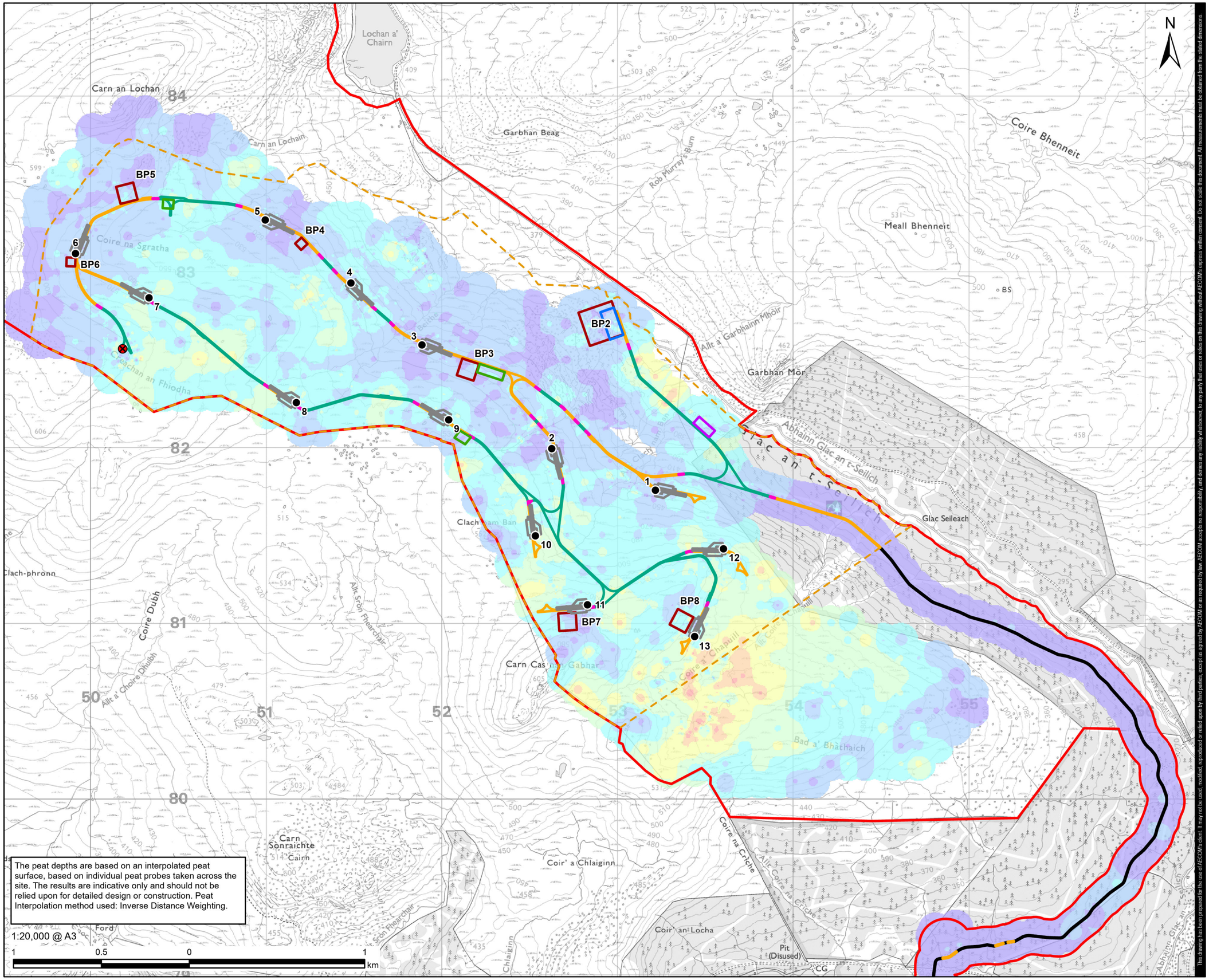
FIGURE NUMBER

Figure 13.2.7 (2 of 2)

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Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06

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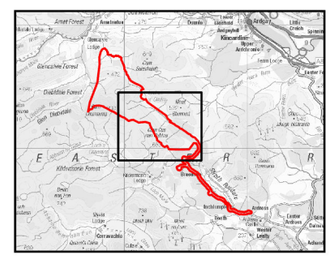
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LEGEND

- Site Boundary
- Main Development Area
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area

Peat Depth Interpolation (m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01+



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FIGURE TITLE

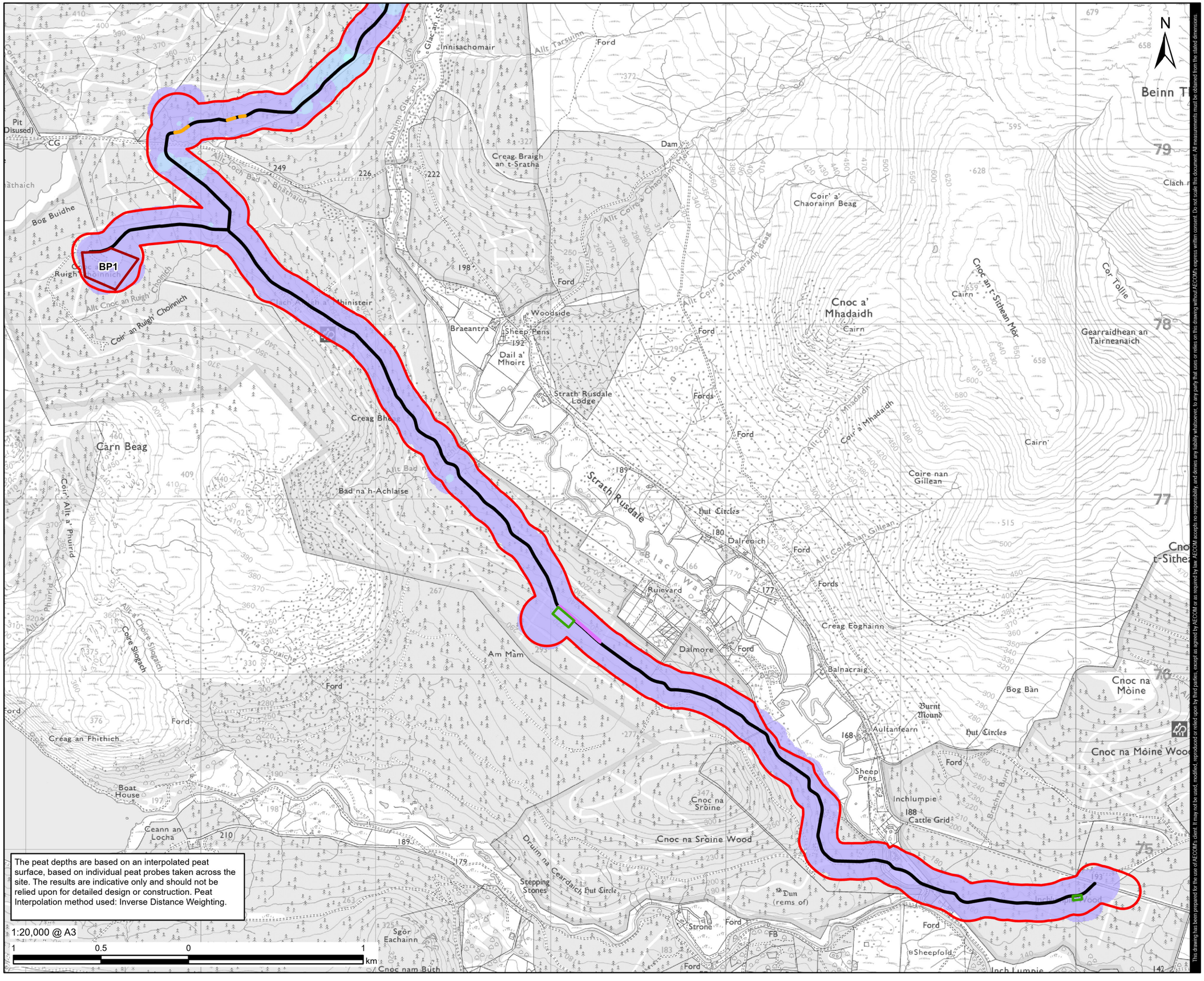
Peat Depth Interpolation

FIGURE NUMBER

Figure 13.2.8 (1 of 2)

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06

Filename: C:\Users\craggs\Downloads_Creachan Wind Farm_Local\02_Maps\EIAR\CWF_EIAR_Appendix_Ch13_Geology.aprx



The peat depths are based on an interpolated peat surface, based on individual peat probes taken across the site. The results are indicative only and should not be relied upon for detailed design or construction. Peat Interpolation method used: Inverse Distance Weighting.

1:20,000 @ A3

1 0.5 0 1 km

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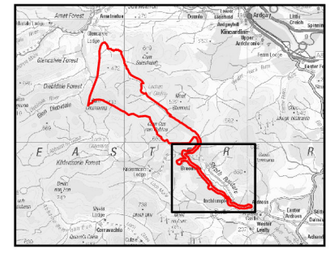
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LEGEND

- Site Boundary
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area

Peat Depth Interpolation (m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00



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FIGURE TITLE

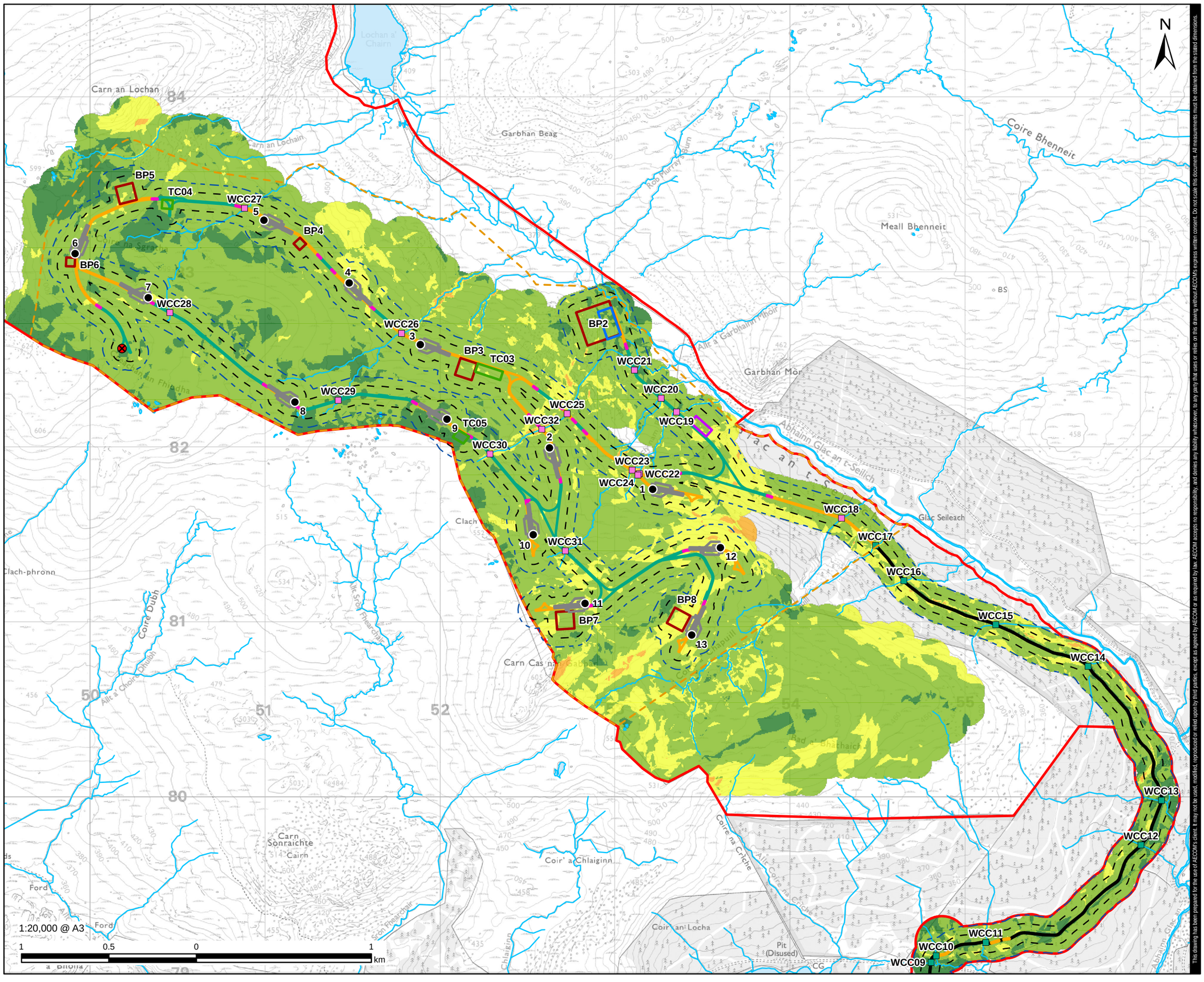
Peat Depth Interpolation

FIGURE NUMBER

Figure 13.2.8 (2 of 2)

Revision: 6 Drawn: MM Checked: LC Approved: SW Date: 2025-10-30

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LEGEND

- Site Boundary
- Main Development Area
- Infrastructure 50m Micrositing
- Infrastructure 100m Impact Zone
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Existing Watercourse Crossing
- Proposed New Watercourse Crossing
- Watercourse
- Waterbody
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area

Peat Slide Assessed Hazard

- 1 - Negligible
- 2 - Unlikely
- 3 - Likely
- 4 - Probable
- 5 - Almost certain

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ISSUE PURPOSE

EIAR

PROJECT NUMBER

60728056

FIGURE TITLE

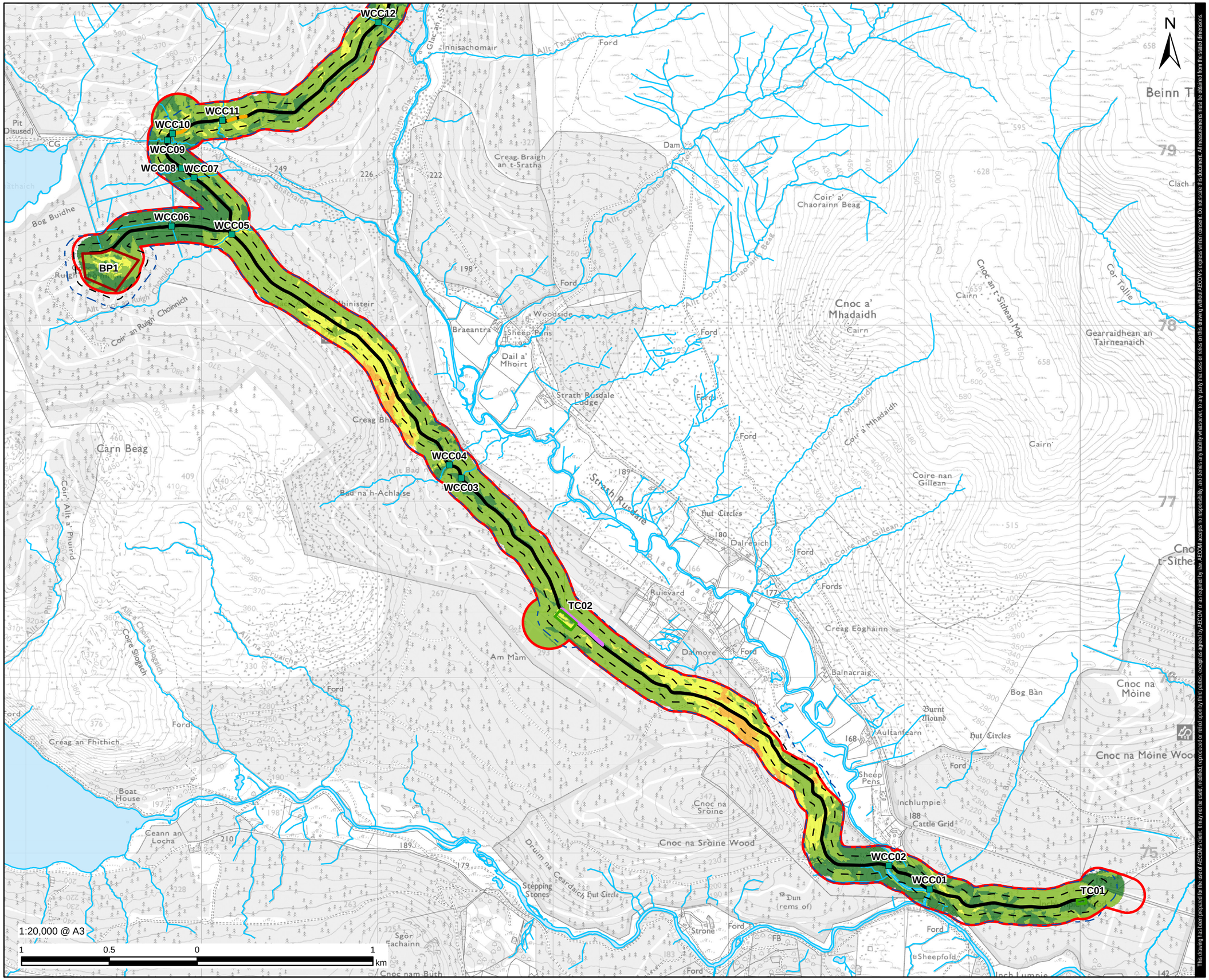
Peat Slide Assessed Hazard

FIGURE NUMBER

Figure 13.2.9 (1 of 2)

Revision: 6 Drawn: MM Checked: LC Approved: SW Date: 2025-10-30

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LEGEND

- Site Boundary
- Infrastructure 50m Micrositing
- Infrastructure 100m Impact Zone
- Existing Watercourse Crossing
- Watercourse
- Waterbody
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area

Peat Slide Assessed Hazard

- 1 - Negligible
- 2 - Unlikely
- 3 - Likely
- 4 - Probable
- 5 - Almost certain

NOTES

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ISSUE PURPOSE

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PROJECT NUMBER

60728056

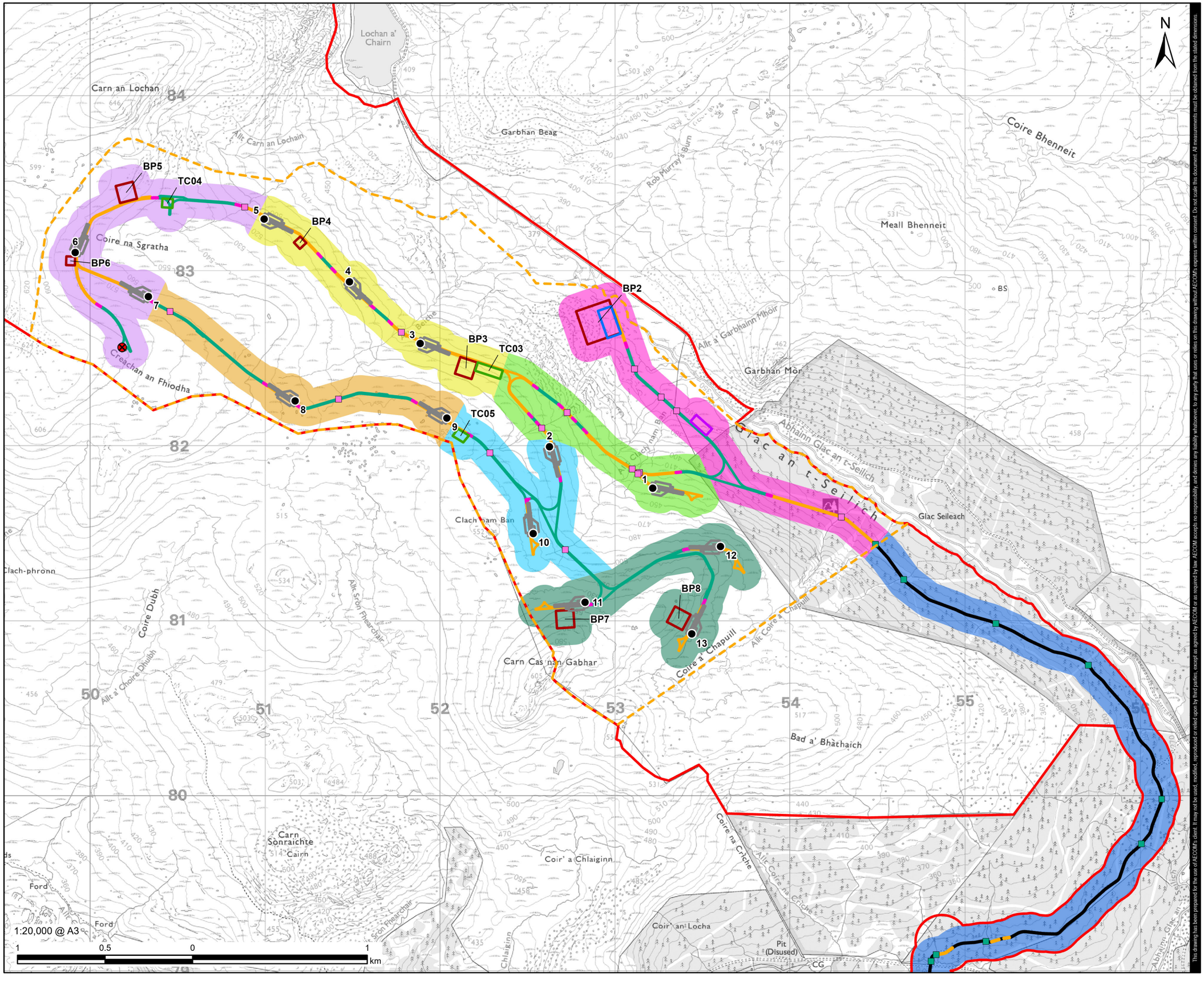
FIGURE TITLE

Peat Slide Assessed Hazard

FIGURE NUMBER

Figure 13.2.9 (2 of 2)

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06



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PROJECT

Creachan Wind Farm

CLIENT

RWE

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LEGEND

- Site Boundary
- Main Development Area
- Proposed Turbine Location
- Proposed Permanent Met Mast Location
- Existing Watercourse Crossing
- Proposed New Watercourse Crossing
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - Floating
- Proposed Access Track - New - Floating Transition
- Proposed Cranepad and Laydown Area
- Proposed Temporary Compound
- Proposed Control Building & Substation
- Proposed BESS Site
- Proposed Borrow Pit Search Area

Access Track Sections

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

NOTES

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ISSUE PURPOSE

EIAR

PROJECT NUMBER

60728056

FIGURE TITLE

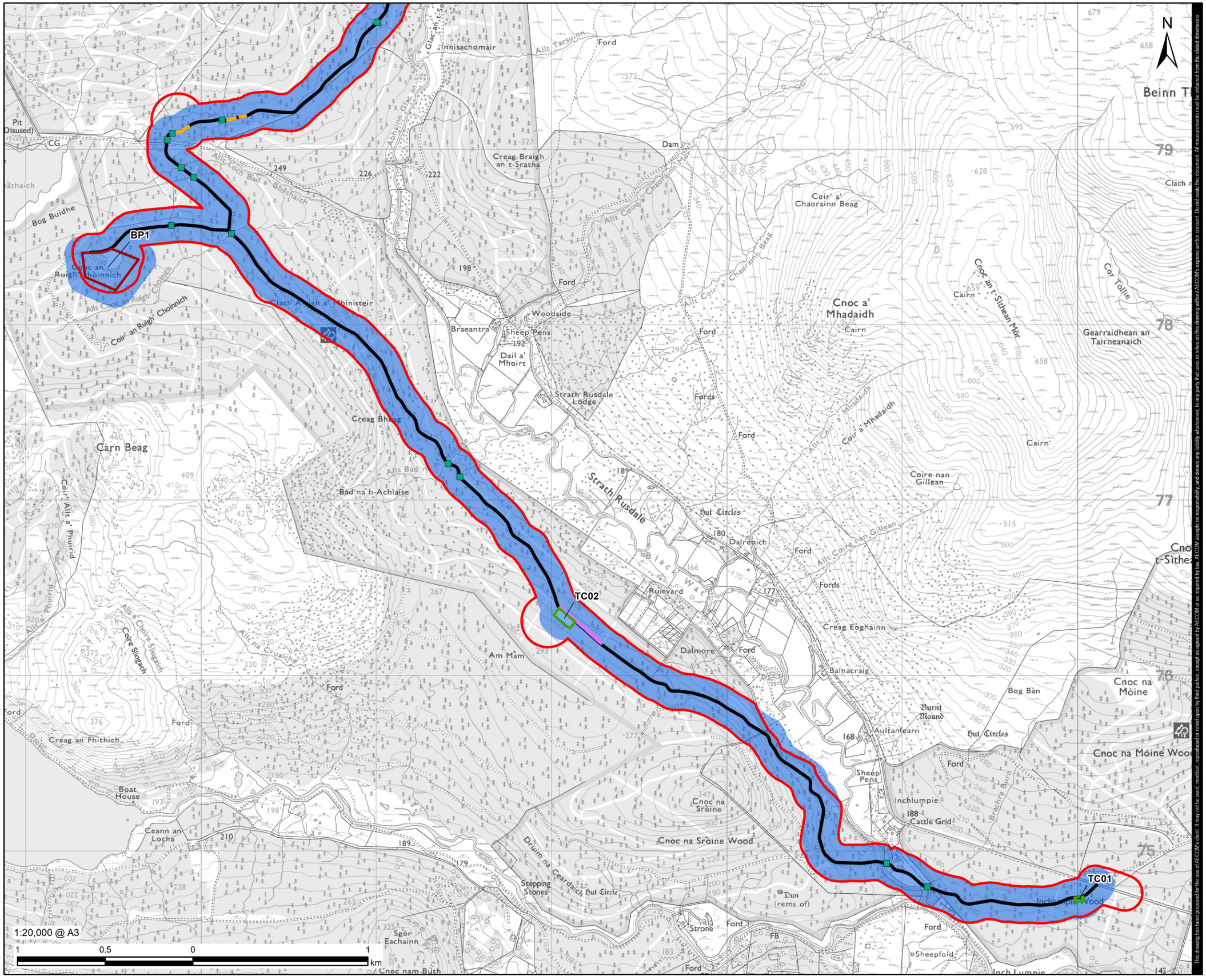
Access Track Groupings and Borrow Pits

FIGURE NUMBER

Figure 13.2.10 (1 of 2)

Filename: C:\Users\craggs\Downloads_Creachan Wind Farm_Local\02_Maps\EIAR\CWF_EIAR_Appendix_Ch13_Geology.aprx

Revision: 5 Drawn: MM Checked: LC Approved: SW Date: 2025-10-06



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LEGEND

- Site Boundary
- Existing Watercourse Crossing
- Proposed Access Track - Existing
- Proposed Access Track - New - Excavated
- Proposed Access Track - New - AIL Overnight Parking
- Proposed Temporary Compound
- Proposed Borrow Pit Search Area

Access Track Sections

- 1

NOTES

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ISSUE PURPOSE

EIAR

PROJECT NUMBER

60728056

FIGURE TITLE

Access Track Groupings and Borrow Pits

FIGURE NUMBER

Figure 13.2.10 (2 of 2)