

APPENDIX 8-1

PEAT STABILITY RISK ASSESSMENT REPORT



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Clonberne Wind Farm Peat Stability Risk Assessment (PSRA)

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Client Document Ref. Project Title Date

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REVISION SUMMARY

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03	09/04/2024	All	Revision to address final MKO comments	





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EXECUTIVE SUMMARY

MKO commissioned Gavin and Doherty Geosolutions (GDG) to undertake a Peat Stability Risk Assessment (PSRA) for the proposed Clonberne Wind Farm (the "Proposed Project). A peat stability assessment is required in accordance with planning guidelines compiled by the Department of the Environment, Heritage and Local Government (DoEHLG), where peat is present on a proposed wind farm development.

The purpose of this report is to outline the potential for peat instability at the Proposed Project and to outline a quantitative peat stability risk assessment rating in line with the Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, Scottish Government, 2017) for the proposed permanent development footprint.

The peat stability risk assessment findings showed that the site has an acceptable margin of safety and low risk of peat failure and is suitable for the proposed renewable energy development.

Consultation with published GSI maps and the observations from site investigations indicate that a large proportion of the site consists of cut-over Raised Peat. Peat is mapped across the site, aside from small areas at the far eastern, southern and western site boundaries. Recorded peat thicknesses range from 0-6.65m across the site. In total, 67% of recorded peat thicknesses were under 1m, and 85% were under 2m. Areas of deep peat of >2m in thickness have been recorded near T07 and T11, and also along access tracks in the northern and central portions of the site.

A desk study, site walkovers, ground investigation campaigns, stability analyses and a risk assessment were carried out to assess the risks posed by peat failures within the Proposed Project site. The risks were assessed following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Executive, 2017).

The stability analysis aims to determine the Factor of Safety (FoS) of the peat slopes. The FoS provides a direct measure of the degree of stability of a peat slope. A FoS of less than 1.0 indicates that a slope is unstable; a target FoS for slopes is 1.3 or greater.

A risk assessment was carried out considering the FoS value calculated in the stability analysis and other factors that could influence peat stability, considering how damaging a peat slide would be to this site's environment.

The wind farm elements (turbines, substation and construction compounds) of the Proposed Project were found to have acceptable safety factors and risk levels against peat instability. One small area, referred to as a safety buffer (see Appendix L), has been highlighted and will have restricted construction activities. Forty-six small areas across the Proposed Project have been identified as peat stockpile restriction areas and should not be used to place peat or spoil. The proposed permanent development footprint avoids these areas, aside from a few areas discussed in greater detail in Section 4.6.3.





1 INTRODUCTION

1.1 BACKGROUND

Gavin and Doherty Geosolutions (GDG) was commissioned in June 2019 by MKO to undertake a Peat Stability Risk Assessment (PSRA) for the proposed Clonberne wind farm site, hereafter referred to as "the Proposed Project". The Proposed Project layout is presented in Appendix A.

1.2 STATEMENT OF AUTHORITY

GDG has been involved in many wind farm developments in both Ireland and the UK at various stages of development, i.e. preliminary feasibility, planning, peat stability assessment, design and construction. In addition to this, the GDG team, made up of engineering geologists, geomorphologists, geotechnical engineers and environmental scientists, has developed expertise in landslide hazard mapping, including leading a recent national landslide hazard mapping pilot study which included extensive landslide runout and hazard mapping and calculation in Irish blanket peat.

GDG brings together state of the art research and direct industry experience and offers a bespoke engineering service, delivering the most progressive, reliable, and efficient designs across a wide variety of projects and technical areas, including providing forensic engineering and expert witness services to the Insurance and Legal sectors. Our clients include large civil engineering contractors, renewable energy developers, semi-state bodies and engineering and environmental consulting firms.

GDG has been involved in many wind farm developments in both Ireland and the UK at various stages of development, i.e. preliminary feasibility, planning, peat stability assessment, design and construction. The GDG team, made up of engineering geologists, geomorphologists, geotechnical engineers and environmental scientists, has developed expertise in the design and construction of developments in areas of peat.

The members of the GDG team involved in this assessment include:

- Paul Quigley Project Director. Paul is a Chartered Engineer with over 26 years of experience in geotechnical engineering and a UK Registered Engineering (RoGEP) Advisor. He has worked on a wide variety of projects for employers, contractors and third parties, gaining a range of experience, including earthworks for major infrastructure schemes in Ireland and overseas, roads, tunnelling projects, flood protection schemes, retaining wall and basement projects, ground investigations and forensic reviews of failures. Paul is adept at designing creative solutions for complex problems and has published numerous peer-reviewed technical papers. He has also acted as an independent expert for several legal disputes centred on ground-related issues. He is a reviewer for the ICE Geotechnical Engineering Journal, a member of the Eurocode 7 review panel at NSAI and a former Chairman of the Geotechnical Society of Ireland.
- John O'Donovan. John leads the onshore renewable sector at GDG. He completed his PhD at Imperial College, investigating the use of DEM to model wave propagation techniques to measure small-strain soil stiffness. After completing the PhD, John spent 2.5 years working with BH's Ground Engineering Group. He has over ten years of experience in engineering and seven years in his current role. At GDG, John manages onshore wind farm projects and solar farm projects. John specialises in dealing with difficult ground conditions and providing robust designs for projects in peatland areas. John also works on the landfall and onshore aspects of offshore windfarms, including cable routing and onshore substation foundation design.





- **Stephen Curtis**. Stephen is a Senior Engineering Geologist on the onshore renewables team. He has over seven years of experience in both site investigation contracting and geotechnical consultancy environments. He is Chartered with the Institute of Geologists of Ireland (IGI) and the European Association of Geographers. Stephen has worked on multiple renewable energy projects, primarily solar and wind farm projects in Ireland and the UK, for over four years. He has been involved in the feasibility study, planning, design and construction stages of wind and solar farm developments, focusing on geotechnical risk management and mitigation for construction in upland peat areas and Irish glacial ground conditions.
- Chris Engleman. Chris is a Geologist with a Master's degree in Geological Sciences from the University of Leeds. He has four years of industry experience within the onshore renewables sector and the field of geological mapping with a particular focus on Quaternary geology, predominantly working on projects for peat stability and management, ground investigation, rock and soil logging, GIS mapping and geotechnical design. Chris has worked on several renewable energy projects, particularly wind and solar, for over two years. Chris supervised site investigation works at the Proposed Project in 2023.
- **Brian McCarthy**. Brian is a Civil Engineer within the infrastructure team in GDG with two years of post-graduate experience. Brian holds a Master's degree in Civil, Structural and Environmental Engineering from University College Cork and is a member of the Institution of Engineers of Ireland. Brian has worked on various renewable energy and infrastructural projects in Ireland and the UK and has carried out peat probing on several projects throughout Ireland. Brian lead peat probing site investigation works at the Proposed Project in 2023.
- Efstathia Chioti. Efstathia is a Geotechnical Engineer within the structures team in GDG with 2 years of industry experience. Since joining GDG, Efstathia has completed geotechnical design work on various projects, including retaining wall design, shallow foundation design and earthworks, and ground movement assessment in Ireland and the UK. She has strong technical skills within geotechnical design. Efstathia lead peat probing site investigation works at the Proposed Project in 2023.
- Daniel Murphy. Daniel is a Graduate Engineer working in both the GDG Infrastructure team and the Structures team. He has a Masters' degree in Civil Structural and Environmental Engineering from University College Cork and has been working with GDG since graduating in 2022. Daniel has worked on a variety of Temporary Works and Permanent Works design projects in Ireland and the UK. Daniel has carried out site inspections, visual assessments of slopes, peat probing and water sampling on a number of projects throughout Ireland. Daniel carried out peat probing at the Proposed Project in 2023.

1.3 PROPOSED PROJECT

The Proposed Project is located approximately 14km northeast of Tuam and approximately 6.5km southeast of Dunmore in Co. Galway. The approximate location of the centre of the site is X554464, Y756549 in Irish Transverse Mercator (ITM). The proposed site covers approximately 353 hectares (Appendix A, Figure A- 1).

The Proposed Project Description is detailed in Chapter 4 of the Environmental Impact Assessment Report (EIAR), which includes the works subject to a proposed planning application for An Bord Pleanála in relation to the Proposed Wind Farm Site.

The Proposed Wind Farm Site will comprise the elements listed below:





- 1. 11 No. wind turbines and associated hardstand areas;
 - a. Tip Height of 180m
 - b. Rotor Diameter of 162m
 - c. Hub Height of 99m
- 2. A 35-year operational life from the date of full commissioning of the wind farm and subsequent decommissioning;
- 3. Upgrade of existing tracks/ roads and provision of new site access roads, junctions, and hardstand areas;
- 4. All works associated with the provision of a new permanent site entrance off the R328 Regional Road in the townland of Killavoher;
- 5. 2 no. Temporary construction compounds;
- 6. 1 no. Borrow pit;
- 7. Peat, Spoil and Overburden Management Areas;
- 1 no. permanent 220kV electrical substation which will be constructed in the townland of Cloonarkan. The proposed electrical substation consists of a two-storey control building with welfare facilities, all associated electrical plant and equipment, battery storage system, security fencing, all associated underground cabling, wastewater holding tank and all ancillary works and equipment;
- 9. Underground electrical (33kV) and communications cabling from the proposed wind turbines to the proposed 220kV substation;
- 10. All works associated with the connection of the Proposed Project to the national electricity grid, via the provision of the underground electrical cabling (220kV) to the existing 220kV overhead line in the townland of Laughil;
- 11. The provision of 2 no. new interface towers to facilitate the connection to the existing overhead line;
- 12. Provision of 1 no. joint bays, communication chambers and earth sheath links along the underground electrical cabling route;
- 13. Reinstatement of the road or track surface above the proposed cabling trench along existing roads and tracks;
- 14. Junction Accommodation works to facilitate turbine delivery;
- 15. Site Drainage;
- 16. Peatland Enhancement
- 17. Tree Felling;
- 18. Operational stage site signage; and
- 19. All associated site development works and apparatus

The Proposed Project has been designed with an operational life of 35 years, at the end of which it can be decommissioned. The Applicant is therefore seeking a ten-year permission and a 35-year operational life from the Proposed Project's commissioning date.

Refer to Chapter 4 of the EIAR for a detailed description of the development.

This report examines the conditions at the Proposed Project Site, located within the EIAR Site Boundary as defined in Chapter 1 of the EIAR, and does not analyse the transport delivery route. The transport delivery route has not been included in this report as no peat stability risk is expected along the route. Works on the transport delivery route are not expected to be carried out in peat





material and will not require excavating or placing significant amounts of material (See Figure G- 2 in Appendix G). The '*Proposed Project*' or '*Site*' in this report refers to the core of the Proposed Project as defined in Chapter 4 of the EIAR. Methodologies for the construction of turbines and infrastructure elements and management of peat are considered in detail in EIAR Appendix 4-2 Peat and Spoil Management Plan. Piled foundations will be used as an alternative to gravity base foundations where the ground conditions require it. Gravity foundations will be utilised at T1-T4 with precast piles the only alternative being considered at these locations.

1.4 OVERVIEW OF PEAT LANDSLIDES

1.4.1 PEAT LANDSLIDE TYPES

The literature typically refers to two general groups of peat landslides: peat slides and bog bursts. Some descriptions of each type are provided in Table 1-1.

Characteristics	Peat slide	Bog burst
	Shallow translational failures	Particularly fluid failures without
		necessarily a clear scar margin. The
Outstanding characteristic		liquefied basal material is expelled
		through surface tears followed by
		settlement of the overlying mass.
	Shear failure along discrete shear	
Mechanism	surfaces, typically at the peat-	Subsurface creep, swelling
	substrate interface	
Peat depth	≤ 2 m	≥ 1.5 m
Slope angle	5 – 15° (moderate)	2 – 10° (gentle), where deeper peat is
Slope aligie	5 – 15 (moderate)	more likely
Spatial distribution	Scotland, England and Wales	Ireland

Table 1-1: Peat landslide types.

The slope angle within the Proposed Project Site ranges from zero to a maximum gradient of 22°, as identified in localised areas along peat cuttings. The majority of the site is largely flat-lying. The site topography is discussed in further detail in Section 2.7. Evidence of large past landslides has not been identified within the proposed wind farm site and the near surroundings on the available Google Earth imagery (available from 2010 onwards), nor during the fieldwork. An area of potential instability has been identified at the margins of a drain in the southeast corner of the area proposed for rewetting as part of the Proposed Peatland Enhancement. This instability is discussed in more detail in Section 2.6. This does not necessarily mean that landslides have never occurred at the wind farm site. Geomorphological features associated with peat landslides (peat slides and bog bursts) are typically softened with time through erosion, drying, and re-vegetation (Feldmeyer-Christe & Küchler, 2002; Mills, 2003). Additionally, human activity (e.g., grassland activity and deforestation) may hamper the identification of possible landslides.

1.4.2 CONTROLS OF PEAT INSTABILITY

The spatial and temporal occurrence of landslides, including peat landslides, is controlled by *conditioning* and *triggering factors*. The conditioning factors explain the spatial distribution of landslides and are related to the inherent properties of the terrain, such as soil type, slope angle, curvature (convex/concave) of the slopes, and drainage.





The triggering factors explain the frequency of landslides. They can be distinguished between fast and slow triggers:

- Fast triggers:
 - Intense rainfall (the most frequent trigger);
 - Snowmelt (very frequent trigger; Warburton, 2022);
 - Rapid ground accelerations (e.g. from blasting rock);
 - o Undercutting of peat by natural processes (e.g. fluvial) or man-made; or
 - Loading the peat.
- Slow triggers:
 - Low intensity but constant rainfall;
 - o Afforestation / Deforestation (wildfires, pollution-induced vegetation change); or
 - Weathering (physical, chemical, biological).

Slow triggers can start landslides by themselves and can also act as *preparatory factors* for fast triggers by lowering their threshold to start landslides.

1.4.3 PRE-FAILURE INDICATORS

The presence of conditioning factors and low-pace triggers before failure is often indicated by ground conditions, features, and morphologies that can be identified remotely or during fieldwork by the geomorphologist or through basic monitoring techniques.

According to the updated guidelines provided by the Scottish Executive (2017), the following critical features are indicative of the susceptibility or proneness to failure in peat environments:

- Presence of historical and recent failure scars and debris;
- Presence of features indicative of tension (e.g. cracks);
- Presence of features indicative of compression (e.g. ridges, thrusts, extrusion features);
- Evidence of peat creep (typically associated with tension and compression features);
- Presence of subsurface drainage networks or water bodies;
- Presence of seeps and springs;
- Presence of artificial drains or cuts down to substrate;
- Presence of drying and cracking features;
- The concentration of surface drainage networks;
- Presence of soft clay with organic staining at the peat and (weathered) bedrock interface; and
- Presence of iron pans or similar hardened layers in the upper part of the mineral substrate.

Other evidence of peat instability unrelated to landslides has been considered, namely quaking peat in horizontal areas with very low bearing capacity.

1.5 PEAT STABILITY RISK ASSESSMENT WORKFLOW

GDG has carried out the PSRA for the Proposed Project Site following the principles set out in the *Proposed electricity generation developments: peat landslide hazard best practice guide* (Scottish





Executive, 2017). This guide has been used in this report as it provides best practice methods to identify, mitigate, and manage peat slide hazards and associated risks concerning consent applications for electricity generation projects.

Figure 1-1 shows a workflow diagram showing the general methodology for the PSRA. The methodology can be summarised into the following steps:

- 1. Completion of the desk study, including:
 - Geology and Quaternary sediments (subsoils);
 - o Soils;
 - o Moisture;
 - Hydrogeology;
 - Multi-temporal aerial / Satellite imagery;
 - Topography;
 - Landslide inventories and landslide susceptibility;
 - Hydrology;
 - Land cover and land use;
- 2. Relevant academic literature and publications. Undertaking a walkover and fieldwork to:
 - Carry out geo-investigations, especially concentrated at the proposed infrastructure areas, including peat probing, hand shear vane testing, and trial pitting;
 - Record geological and geomorphological features, including exposures of the soil profile and evidence of peat instability; and
 - Record hydrologic and vegetation features.
- 3. Risk assessment, including:
 - Interpolation of the peat probe values and generation of the peat depth map;
 - Creation of the Factor of Safety (FoS) maps using a deterministic approach (Bromhead, 1986) for drained and undrained conditions;
 - Qualitative hazard assessment by combining the FoS with observations of the peat condition identified both on aerial imagery and during fieldwork.
 - Qualitative consequences assessment;
 - o Calculation of the peat landslide risk by multiplying hazards and consequences;
 - \circ $\;$ Classification of the risk values into four classes:
 - Negligible;
 - Low;
 - Medium; and
 - Serious.
- 4. Proposal of actions required for each infrastructure element.





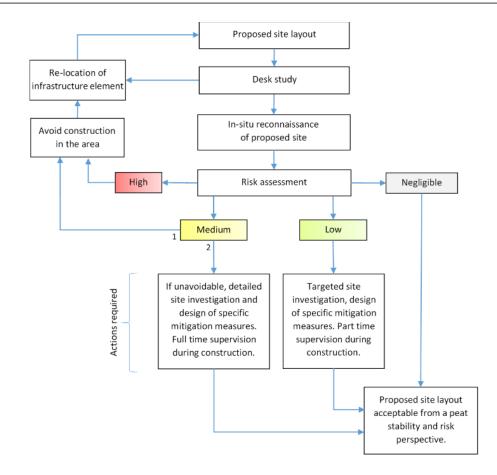


Figure 1-1: Workflow of the PSRA methodology for the acceptability of the proposed site layout (Scottish Executive, 2017).





2 DESK STUDY

For a preliminary site suitability analysis and background knowledge of local peat stability and ground conditions, the following aspects have been considered:

- 1. Geology and Quaternary sediments (subsoils);
- 2. Soils;
- 3. Moisture;
- 4. Hydrogeology;
- 5. Multi-temporal aerial / Satellite imagery;
- 6. Topography;
- 7. Landslide inventories and landslide susceptibility;
- 8. Hydrology;
- 9. Land cover and land use;
- 10. Relevant academic literature and publications.

2.1 BEDROCK GEOLOGY

According to the GSI bedrock geological map of Ireland at 1:100,000 scale (GSI, 2020a) (Figure B- 1), the bedrock under the wind farm site is limestone of the Burren Formation. Pale grey packstones and wackestones typify this formation but also contain intervals of dark cherty limestones, often associated with oolitic grainstones. No GSI borehole data is available for the Proposed Project.

As limestones dominate the underlying geology of the site, karstic features may be present and present additional risks. According to GSI mapping, a spring is located at the west end of the wind farm area, north of T7. Other karst features, namely enclosed depressions and turloughs, are situated beyond the limits of the development area, at about 2km West of the site boundary.

2.2 QUATERNARY SEDIMENTS

The map of Quaternary sediments at 1:50,000 scale shown in Figure B- 2 in Appendix B (GSI, 2021) shows that the wind farm site is located primarily on cut-over raised peat. Cut-over raised peat consists of discreet, raised, dome-shaped masses of peat that have had part of their peat volume removed by anthropogenic peat harvesting methods. Parts of the site area consist of uncut raised peat bog, surrounded by cut-over peat. These raised bog areas are located between T1 and T3, to the east of T7, and in the area proposed for peatland enhancement between T10 and T11.

Alluvium deposits are not mapped within the site boundary; however, some form of alluvium is expected to be present adjacent to most of the minor watercourses that cross the site.

Pockets of Till derived from limestones are mapped throughout Proposed Project, largely corresponding with small ridge features mapped by the GSI as drumlins. Glacial till consists of typically over consolidated sediments directly deposited by glacial action and can vary between cohesive clays and sands and gravels. A small patch of gravels derived from limestones is mapped near T04. The proposed borrow pit is also mapped as underlain by gravels derived from limestones.

2.3 SOIL COMPOSITION

The Irish soil map at a 1:250,000 scale is shown in Figure C-1 in Appendix C (EPA, Teagasc, & Cranfield University, 2018). The Proposed Project Site is covered mainly by:

• Peat (soil association 1xx)





- Coarse loamy drift with limestone (soil association 1100q)
- Coarse loamy over calcareous gravels (Soil Association 1150a).

It is noted that the presence or absence of peat cover in the regional scale maps (Figure B- 2 and Figure C- 1) must not be taken as exact. The depth and extent of peat deposits may vary over short distances as a function of local underlying geology, past and ongoing geomorphological activity, and management history. Therefore, these maps have been complemented by peat probes and field observations described in Section 3.

2.4 MOISTURE

Water reaching a slope can produce the following processes:

- <u>Lubrication</u>. It reduces friction along rock or soil discontinuities (joints or stratification) (Wu, 2003). In clay soils, lubrication is due to water that produces a repulsion or separation between the clay particles.
- <u>Softening</u>. It mainly affects the physical properties of filler materials in fractures and fault planes in rocks.
- <u>Pore pressure</u>. Water in soil pores exerts pressure on soil particles, changing the effective pressure and the shear strength. The negative impact of pore pressure changes is particularly evident in partially saturated or unsaturated soils, where the increase in moisture content causes the development of a wetting front that converts beneficial negative suction stresses within the capillary structure of the soil to a fully saturated positive pore pressure. When soil is saturated, capillary stresses and adhesion between particles diminish, and, as a result, soil shear strength decreases.
- <u>Confined water pressures</u>. The confined underground water acts as an uplifting pressure on the impermeable layers, decreasing the shear strength and producing hydrostatic pressures on the layers where permeability changes. These lifting stresses can cause material deformation or failure, and pore pressure decreases soil resistance.
- <u>Fatigue failure due to fluctuations in the water table</u>. Some landslides occur in episodes of rain with lower intensity than previous ones. This phenomenon is explained by Santos et al. (1997) as a case of soil fatigue due to cyclical pore pressures. In temperate climates, seasonal temperature variations can lead to slight variations in the water table. These changes are much more significant in tropical climates (Xue & Gavin, 2008).
- <u>Washing away of cement material</u>. The groundwater flow can remove the soluble cement (e.g. calcium carbonate) from the soil and, thus, decreases the cohesion and the friction angle. This process is usually progressive.
- <u>Density increase</u>. The presence of water in soil pores increases the bulk density and weight of the materials in the slope. Therefore, shear stress increases, and the slope safety factor decreases.
- <u>Internal hydraulic forces</u>. The movement of groundwater currents creates hydrodynamic pressure on the ground in the direction of flow. This force acts as a destabilizing element on the groundmass and can appreciably decrease the safety factor of the slope. The hydrodynamic or seepage/flow force can also cause the movement of the particles and the destruction of the soil mass (piping).





- <u>Collapse</u>. Collapsible soils (alluvial soils deposited very rapidly and wind soils or loess) are very sensitive to changes in humidity. When water content increases, their volume decreases, and the microstructure collapses.
- <u>Desiccation cracks</u>. Changes in humidity can cause cracking, and these cracks can determine the extension and location of the surface of failure and have a significant effect on the safety factor or possibility of sliding.
- <u>Piping in clays</u>. Some clayey soils disperse and lose their cohesion when saturated. The result can be the total collapse of the soil structure and the activation of landslides.
- <u>Chemical weathering</u>: Processes of ion exchange, dissolution, hydration, hydrolysis, corrosion, oxidation, reduction, and precipitation (Wu, 2003).
- <u>Erosion</u>. The detachment, dragging, and deposition of soil particles by water flows modifies the relief and the stresses on slopes and can produce the activation of a landslide, especially when erosion undercuts slopes.

The Normalized Difference Moisture Index Colorized GIS service or the United States Geological Survey (USGS) has been used to estimate levels of moisture in the soil across the Proposed Project site. This service is based on the analysis of multispectral Landsat 8¹ OLI images. Using data processing, the raw digital number (DN) values for each Landsat band are transformed to scaled (0 - 10000) apparent reflectance values, and then, the Normalised Difference Moisture Index is obtained using Equation 2.4-1 (Gao, 1996):

NDMI = (Band 5^2 – Band 6^3) / (Band 5 + Band 6) Equation 2.4-1

Figure D- 1 in Appendix D illustrates the levels of estimated soil moisture across the Proposed Project Site as calculated by the above method. Wetlands and other vegetated areas with high levels of moisture appear as dark blue. Regions of lower moisture values are represented as light blue and green. The map indicates that the Proposed Project site as a whole displays a high moisture content.

2.5 HYDROGEOLOGY

According to the GSI Bedrock Aquifer map (2018), shown inFigure E- 1 in Appendix E, the entirety of the Proposed Project is underlain by a Regionally Important Aquifer – Karstified (conduit). This aquifer is classed as capable of supporting large public water supplies sufficient to support a large town.

The GSI Subsoil Permeability map (2018), shown in Figure E- 2 in Appendix E, indicates that almost the entirety of the site is of low permeability. A small area close to T03 is currently unmapped, and the proposed borrow pit ranges from medium to high permeability.

2.6 MULTITEMPORAL AERIAL/SATELLITE IMAGERY

The aerial / satellite imagery used for this report is the ESRI orthophoto (OTF) and the Google Earth multitemporal imagery (2009 onwards). This imagery has been used to:

¹ Landsat 8 includes 8-band multispectral scenes at 30-meter resolution which are typically used for mapping and change detection of agriculture, soils, moisture, vegetation health, water-land features and boundary studies.

² Near Infrared (NIR)

³ Short Wave Infrared 1 (SWIR1)





- Identify the presence of existing failure scars and the extent of debris runout;
- Identify pre-conditioning factors for failure (where visible at the resolution of the imagery);
- Identify evidence of other pre-development ground conditions of relevance to ground works but not exclusively associated with landslides, including vegetation cover, drainage regime and dominant drainage pathways; and
- Identify evidence for land management practices that can influence ground conditions (e.g., burning, artificial drainage, peat cutting, forestry). Figure 2-1 and Figure 2-2illustrate examples of peat cutting and the evolution of the peat extent from 2009 to 2023 due to peat harvesting in the sector of T7 and T10-T11, respectively (2009 shown in green, 2016 shown in blue, 2018 shown in yellow, and 2023 shown in red). In particular, it must be noted that peat harvesting in proximity to T07 has moved areas of deep peat away from the T07 turbine location since the date of the topo capture used in the peat stability calculations (2017).







2023

<u>2009</u>

<u>2016</u>

<u>2020</u>





Figure 2-1: Peat cuts and harvesting at T07, showing the retreat of peat cuts from the turbine location (Google Earth, 2009-2023).

Note: Google Earth imagery from 2009 to 2023. Green line: 2009. Blue line: 2016. Yellow line: 2020. Red line: 2023.

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<u>2016</u>



Figure 2-2: Peat cuts and harvesting in the T10-T11 zone (Google Earth, 2009-2023).

Note: Google Earth imagery from 2009 to 2023. Green line: 2009. Blue line: 2016. Purple line: 2023.

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It is noted that the time-lapse of the available imagery is too short to identify old peat instability evidence that may have been eroded or re-vegetated with time or changes in land management.

A potential existing failure has been identified at the southeast corner of the area proposed for peatland enhancement, as seen in Figure 2-3. Minor tension cracks suggesting a potential partial failure of the peat cut margin are identified in this location. The aerial imagery analysis suggests that these features are associated with desiccation and drying out of the peat in this location.

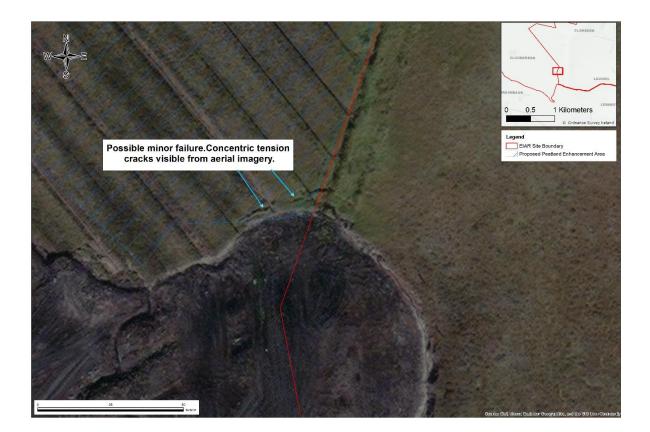


Figure 2-3: Possible minor failure at the southern edge of the area proposed for peatland enhancement as part of the Proposed Peatland Enhancement Area (ESRI World Imagery, 2020).

2.7 TOPOGRAPHY

A Digital Terrain Model derived from Bluesky (2017) orthophoto data was used for the topographical analysis and is shown in Figure 2-4 and Figure F-1 in Appendix F.

The topography of the site is largely low-lying and flat, with low NW-SE oriented ridges mapped by the GSI as drumlins running across the site. The peat bogs on site occupy generally flat depressions between the drumlins, with raised peat bog areas forming topographic highs relative to areas of cutover peat. The topography of the site can be described as flat to undulating raised bog plain. The elevation varies between 63 mOD to 87 mOD (meters above ordnance datum). Slope angles across the site range from 0-22° (Figure F- 2 in Appendix F), however the vast majority of the site has a slope angle of <1°. Higher slope angles >5° are found only in isolated areas alongside drainage ditches, peat cuts, and alongside the margins of low ridge features, identified as drumlins, 100m SE of T3 and 70m South of T9. No peat is identified at the drumlin locations close to T3 or T9.





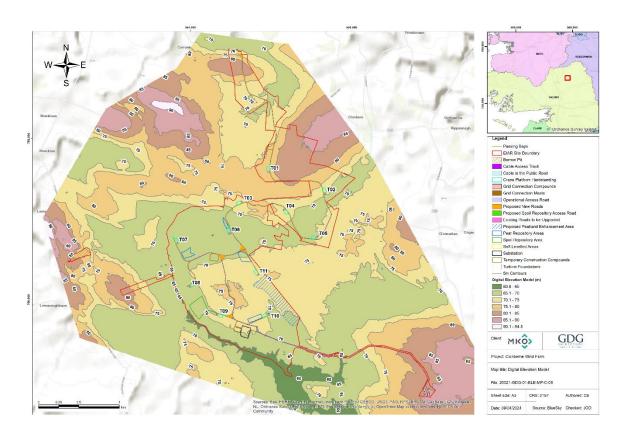


Figure 2-4: Digital Elevation Model for the Proposed Project, (Bluesky, 2017).

2.8 SLOPE INSTABILITY MAPPING

The GSI landslide inventory (GSI, 2022a), the multi-temporal aerial / satellite imagery, the DEM, the landslide susceptibility map (GSI, 2016), and the rainfall information of Met Éireann data 1981-2010 have been used for this part of the desk study.

Figure G-2 in Appendix G depicts the spatial relationship between records of previous landslide events (GSI, 2022a, 2022b) and rainfall across Ireland from the Met Éireann (2018) average annual rainfall dataset. The study area is in a region of moderately high rainfall and relatively flat topography. According to the GSI landslide inventory (GSI, 2022), the closest landslide is located around 5.3 km northeast of the closest turbine (T01) and around 3.9km from the site boundary. The area of the peat slide was not recorded, but it is recorded to have occurred in 1873 and "moved quickly first and continued slowly for 11 days" (Praeger, 1893). This landslide resulted in the peat "burying three farmhouses and covering about 300 acres of pasture and arable land, 6 feet deep". Little other information is available, but this location appears to be a relatively flat, deep raised peat bog, and therefore, the failure mechanism was likely a margin rupture (Warburton et al. 2004) triggered bog burst event caused by the extraction of peat from the raised bog due to steep cuttings (7-9m high), removing toe support for the high raised bog. Figure 2-5 shows the location and visible evidence of this bog burst event. Much of the outflow area has been modified and cut away subsequent to the event. However, the source area is still visible on the aerial imagery. A series of crescentic failure scarps are visible, though eroded and revegetated (a common occurrence on old peat failure features – i.e. Feldmeyer-Christe & Küchler, 2002; Mills, 2003).





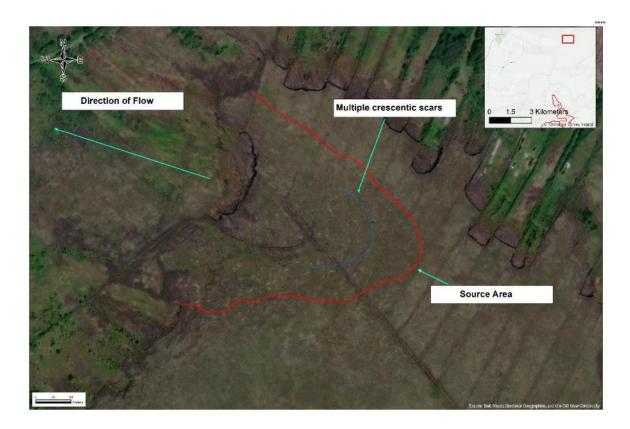


Figure 2-5: Evidence for the bog burst recorded by the GSI at Dunmore, 3km from the EIAR boundary (ESRI World Imagery, 2023).

Figure G- 1 in Appendix G illustrates the landslide susceptibility (GSI, 2016) across the Proposed Project Site. This map was obtained by using an empirical probabilistic method at a regional scale and should provide input into site-specific scale engineering studies. Most of the site is mapped as having low susceptibility due to the low slope angles encountered. Small zones of moderately low susceptibility are mapped at the site's west, east, and north ends, where no developments are proposed. The field visits of the geotechnical team support that most of the site is stable.

2.9 HYDROLOGY

According to the Ordnance Survey Ireland (OSi) shapefiles of rivers, lakes, and catchments/basins (Figure H- 1), the site is located within the watershed of two catchments (*Sinking 020* and *Levally Stream 010*). The erosive potential of the fluvial network at this location is likely to be low. T2 and T6 are located quite close (at 50 m or less) to a minor watercourse labelled as *Timadooaun*. The rest of the projected elements (e.g., turbines, borrow pits, etc.) are located more than 50m from any water course.

2.10 LAND COVER AND LAND USE

According to the Corine Land cover map shown in Figure I- 1 in Appendix I, the surrounding landscape of the proposed site comprises mixed forest, peat bog, pastures and mixed agriculture. Land use within the site is mixed, with peat cutting and agricultural land dominating.





3 SITE RECONNAISSANCE AND GROUND INVESTIGATION

GDG conducted a site reconnaissance as part of the assessment, comprising four walk-over inspections (February 2020, March 2020, May 2023, and September 2023) to record geomorphological features concerning the Proposed Project, peat depths, and peat strength. An indication of the site conditions (harvested peat, peat bogs, wetlands, and forestry) with flat topography is shown in Figure 3-1 and Figure 3-2. Access was limited to some areas, in particular, the area proposed for peatland enhancement in between T10 and T11, limiting the number of peat probes taken in this area.



Figure 3-1: Harvested peat close to T11.







Figure 3-2: Peat cuts 100m east of T10.

Seven ground investigations (GI) were carried out on the site:

- 1) MKO (May 2019): 21 peat probes
- 2) GDG (February 2020): 47 peat probes and 7 hand shear vanes.
- 3) GDG (February 2020): 15 trial pits.
- 4) GDG (March 2020): 47 peat probes.
- 5) MKO (May-June 2021): 5 open hole boreholes.
- 6) GDG (May 2023): 40 peat probes and 3 shear vanes.
- 7) GDG (September 2023): 39 peat probes and 4 shear vanes.

In summary, intrusive ground investigations were carried out at a total of 229 locations. The site investigation locations (Figure J- 1 to Figure J- 3 in Appendix J) considered the following criteria:

- Spatial distribution of the proposed infrastructure;
- Distance between probe points to avoid interpolation of peat depths across large distances;
- Changes in slope angle, as peat depths are likely to be shallower on steeper slopes;
- Changes in vegetation, which can reflect changes in peat condition;
- Changes in hydrological conditions; and
- Changes in land use.





No evidence of any previous landslides or peat instability indicators, as described in Section 1.4.3, were identified during the walkovers.

A raster map was created in GIS software presenting the interpolated peat depth across a site from the peat probe points using the Inverse Distance Weighted (IDW) method. This interpolated raster of peat depth is represented in Figure J- 4 to Figure J- 6 in Appendix J.

Table J- 1 to Table J- 15 in Appendix J presents the observations made at the proposed infrastructure. The trial pit logs can be seen in Appendix J.

3.1 GROUND INVESTIGATION SUMMARY AND PEAT CONDITIONS

The ground investigations indicate that the ground conditions at the site comprise predominantly areas of cut-over raised peat of up to 6.65m in depth, with patches of glacial till in the north, centre, and south of the site. Trial pit locations (Appendix J-1) suggest that the peat is typically underlain by granular or cohesive glacial material, with trial pits encountering stiff gravelly clays, gravelly sands, and sandy gravels beneath the peat, or beneath topsoil in several locations. Petersen Drilling Services Ltd. additionally carried out five boreholes for the purpose of the hydrological assessment (Chapter 9 of the EIAR). These boreholes encountered a similar mix of cohesive and granular glacial tills, and all encountered bedrock between 6m bgl and 16m bgl.

The peat thickness encountered by intrusive investigations across the site varies from 0m to a maximum of 6.65m, with an average of 1.68m recorded. Most of the site contains little to no peat, with T1-T4 and T9 being located in areas of no peat, underlain by cohesive or granular glacial tills. Much of the remaining proposed infrastructure, including T5-T7, T10-T11, and the construction compounds, are located in areas of cut-over peat, where turbary peat harvesting has removed significant quantities of peat, reducing peat thicknesses. T08 is located in an area of forestry, planted over peat of up to 2.16m thickness.

The frequency of different peat thicknesses is shown in Figure 3-3. In total, 69.9% of recorded peat thicknesses were under 1m, and 85.6% were under 2m.

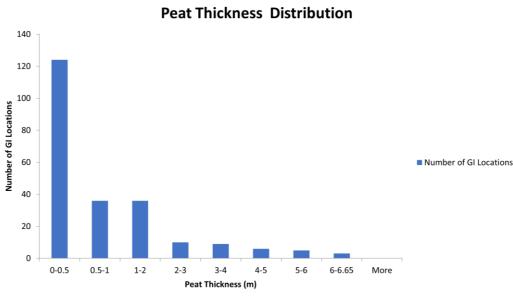


Figure 3-3: Histogram of peat thickness results across the site.

Laterally extensive regions of >2m in depth were encountered in high raised bog settings, particularly to the east of T07, south of T11, northeast of T10, west of T6, and between T01 and T3. These areas of deep peat are restricted to discrete raised bogs, which have been avoided by all





major infrastructure locations. The depths encountered are considered moderate to deep in places, with probes identifying peat thicknesses of up to 6.65m.

The walkover indicated that the peat was being cut in several areas and had drained significantly, with the observed peat classified as the catotelm. The surface condition of the peat is varied, with some areas having bare peat at the surface where cutting is active, as shown in Figure 3-1 and Figure 3-2, and some areas of un-cut peat capped by heather, with visible acrotelm. A large variation in the level of decomposition and humification was observed throughout the peat body. However, this generally appeared to increase with depth. Most of the peat material identified at the site is logged as fibrous and pseudo-fibrous, indicating that it is of a higher strength material and will be suitable for landscaping and reinstatement adjacent to proposed infrastructure locations. Hand shear vanes were carried out in 14 locations across the site, ranging from 18-70kPa.





4 PEAT STABILITY ASSESSMENT

The peat stability assessment is one of the inputs required for the peat hazard assessment and risk calculation. This section presents:

- A review of the general approaches to assess peat stability;
- The concept of Factor of Safety (FoS);
- The methodology adopted for this report and the parameters required; and
- The resulting FoS delineates safety buffers and peat stockpile restricted areas.

4.1 MAIN APPROACHES TO ASSESS PEAT STABILITY

The main approaches for assessing peat stability for wind farm developments include the following:

- 1) Qualitative geomorphological judgement; and
- 2) Quantitative assessment:
 - i) Empirical probabilistic approach.
 - ii) Physically based deterministic approach (Factor of Safety FoS).

Approach 1 is subjective and thus not adopted for this study. Approach 2a is objective and quantitative but is more appropriate for land planning and decision-making studies at a regional scale. Additionally, the method does not provide an engineering indication of physical stability as Approach 2b does. In this report, the peat stability assessment is carried out by using Approach 2b: deterministic (FoS) approach (Bromhead, 1986).

4.2 THE FACTOR OF SAFETY (FOS) CONCEPT

The factor of safety is a measure of the stability of a slope. For any slope, the degree of stability depends on the balance between the landslide driving forces (weight of the slope) and its inherent shear strength, illustrated in Figure 4-1.

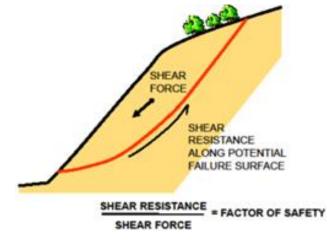


Figure 4-1: Balance of forces in a slope (Scottish Executive, 2017).

Therefore, the factor of safety provides a direct measure of the degree of stability of a slope by the ratio of the shear resistance along a potential surface of failure and the landslide driving forces





acting on such surface. Multiple potential surfaces of failure are possible, but the FoS assigned to a slope is that of the surface of failure with the lowest value of FoS.

- FoS < 1 indicates a slope is unstable and prone to failure.
- FoS = 1 indicates a slope is theoretically stable but not safe.
- FoS ≥ 1.3 indicates the acceptable safety threshold. The previous code of practice for earthworks BS 6031:1981 (BSI, 1981) provided advice on the design of earthworks slopes. It stated that for a first-time failure with a good standard of site investigation, the design FoS should be greater than 1.3. This way, the slope is stable and safe.

As a general guide, the FoS limits for peat slopes assumed in this report are summarised in Table 4-1.

Factor of Safety limits	Slope stability
FoS < 1	Unstable
1 ≤ FoS <1.3	Stable but not safe
FoS ≥ 1.3	Stable and safe

Table 4-1: Factor of Safety limits assumed in this report.

Eurocode 7 (EC7) (IS EN 1997-1:2005) is now the reference document and basis for design geotechnical engineering works. The design philosophy used in EC7 applies partial factors to soil parameters, actions and resistances. Unlike the traditional FoS approach, EC7 does not provide a direct measure of stability, as global factors of safety are not used.

Therefore, to provide a direct measure of the peat stability across the site, the previous FoS method has been used for this assessment rather than EC7 partial factors.

4.3 METHODOLOGY ADOPTED AND PARAMETERS

The stability of a peat slope depends on several factors working in combination, namely the slope angle, the peat's shear strength, the peat, the depth of the peat, the pore water pressure and the loading conditions. An adverse combination of these factors could potentially result in peat failure. An adverse value of one of the factors mentioned above alone is unlikely to result in peat failure. The infinite slope model (Skempton and DeLory, 1957) combines these factors to determine a safety factor for peat sliding in the study area. This model is based on a translational slide, which is a reasonable representation of the dominant mode of movement for peat failures.

To determine the stability of the peat slopes in the study area, undrained (short-term stability during construction) and drained (long-term stability during operation) analyses have been carried out.

4.3.1 UNDRAINED CONDITIONS

The undrained loading condition applies in the short term during construction and until construction-induced pore water pressures dissipate.

Undrained shear strength values (c_u) for peat are used for the total stress analysis. Based on the findings of the Derrybrien failure, undrained loading during construction was found to be the critical failure mechanism.

Among the shear strength values obtained by GDG by using the hand shear vane tests in the proposed site, the lowest registered value was 18 kPa. However, based on GDG's experience in the





assessment of similar blanket peats and values reviewed in the literature, a more conservative value of 5 kPa has been adopted for the undrained shear strength (C_u). The Shear Vane testing was carried out in the summer and is not considered to be representative of undrained winter conditions. This has been considered when selecting the design c_u value. The formula used to determine the factor of safety for the undrained condition in the peat (Bromhead, 1986) is as follows:

$$F = \frac{c_u}{\gamma z sin\alpha cos\alpha}$$

Equation 4.3-1

Where,

F = Factor of Safety;

c_u = Undrained strength (5 kPa in the study area);

 γ = Bulk unit weight of the material (assumed 10 kN/m³);

z = Depth to failure plane assumed as the depth of peat (this is the interpolated raster of peat depth); and

 α = Slope angle (in each pixel of 1 m. This is obtained from the 1-m DEM provided by the Client).

4.3.2 DRAINED CONDITIONS

The drained loading condition applies in the long term. The condition examines the effect of the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes.

A drained analysis requires effective cohesion (c') and effective friction angle (ϕ ') values for the calculations. These values can be difficult to obtain because of the disturbance experienced when sampling peat and the difficulties in interpreting test results due to the excessive strain induced within the peat. A review of published information on peat was undertaken to determine suitable drained strength values. Table 4-2 shows a summary of the drained parameters used in published literature. Based on GDG's experience in the assessment of similar raised peats and the values reviewed in the literature, it was considered appropriately conservative to use design values below the averages, namely c' = 4 kPa and ϕ ' = 25°.

The formula used to determine the factor of safety for the drained condition in the peat (Bromhead, 1986) is as follows:

$$F = \frac{c' + (\gamma z - \gamma_w h_w) \cos^2 \alpha \tan \phi'}{\gamma z \sin \alpha \cos \alpha}$$

Equation 4.3-2

Where,

F = Factor of Safety;

c' = Effective cohesion (4 kPa);

 γ = Bulk unit weight of the material (10 kN/m³);

z = Depth to failure plane assumed as the depth of peat (this is the interpolated peat depth);

 γ_w = Unit weight of water (9.81 kN/m³);

 h_w = Height of the water table above the failure plane (= *z*, i.e. surface level);

 α = Slope angle (in each pixel. This is obtained from the 1-m contour lines provided by the Client);

 ϕ' = Effective friction angle (25°).



Reference	Cohesion, c' (kPa)	Friction Angle, ø'
Hanrahan et al. (1967)	5 to 7	36 to 43
Rowe and Mylleville (1996)	2.5	28
Landva (1980)	2 to 4	27.1 to 32.5
Landva (1980)	5 to 6	-
Carling (1986)	6.5	0
Farrell and Hebib (1998)	0	38
Farrell and Hebib (1998)	0.61	31
Rowe, Maclean and Soderman (1984)	3	27
McGreever and Farrel (1988)	6	38
McGreever and Farrel (1988)	6	31
Hungr and Evans (1985)	3.3	-
Madison et al. (1996)	10	23
Dykes and Kirk (2006)	3.2	30.4
Dykes and Kirk (2006)	4	28.8
Warburton et al (2003)	5	23.9
Warburton et al (2003)	8.74	21
Entec (2008)	3.8	36.8
Komatsu et al (2011)	8	34
Zhang and O'Kelly (2014)	0	28.9 to 30.3

Table 4-2: Effective cohesion and friction angle values from the literature

Several general assumptions were made as part of the analysis:

- 1. Peat depths are based on the maximum peat depths recorded in each probe from the walkover surveys.
- 2. The slope angles derived from the DEM (BlueSky, 2017), as outlined in Section 2.7, accurately represent slope angles on site.
- 3. The surface of failure is assumed to be parallel to the ground surface.
- 4. The peat stability is calculated in pixels of 5m across the fringe containing information on peat depth and the proposed infrastructure.

Two surcharging conditions are considered for the stability analysis:

- No surcharging load; and
- Surcharging load of 10 kPa, equivalent to 1 m of stockpiled or side-cast peat.

4.4 FOS RESULTS

The factors of safety obtained for the two different conditions (undrained and drained) and for the two surcharge scenarios (no surcharge and 1 m of peat surcharge (10kPa)) are presented in both table format and map format.





Table K- 1 and Table K- 2 in Appendix K show the FoS calculation process in the proposed turbine sites for undrained and drained conditions, respectively. The FoS calculation for the rest of the sites, i.e. the proposed substation, temporary construction compounds, and existing and upgraded access roads (more than 5000 pixels of 5 m), has been carried out semi-automatically in GIS by implementing Equation 4.3-1 and Equation 4.3-2 in the GIS raster calculator.

4.4.1 FoS FOR UNDRAINED CONDITIONS

The spatial distribution of the FoS values calculated for undrained conditions (no surcharge) is shown in Figure K- 1 to Figure K- 3 in Appendix K. Almost all of the pixels are shown to be stable and safe (FoS > 1.3, green), but there are some small areas beside the cable access track and the T7 hardstand which show FoS values between 1 and 1.3 (yellow: stable but not safe). A small number of pixels within and beside T7 show FoS values <1 (red: not stable).

These risk areas are caused by localised factors, which have been examined in more detail in Section 4.5. Where required, additional mitigation, including exclusion zones and peat storage restriction areas, have been scheduled which the designer and contractor must adhere to at the construction stage.

4.4.2 FoS FOR UNDRAINED CONDITION AND SURCHARGE OF 10 KPA

Figure K- 4 to Figure K- 6 in Appendix K depict the spatial distribution of the FoS values calculated for undrained conditions and with a 10 kPa surcharge. The 10kPa simulated the placement of 1m of peat material on the ground surface. In terms of the factor of safety results, the undrained condition with the 10kPa surcharge is considered to be the critical stability scenario. Almost all of the pixels are shown to be stable and safe (FoS > 1.3, green), but there are some small areas beside the cable access track and the T7 hardstand which show FoS values between 1 and 1.3 (yellow: stable but not safe). A small number of pixels within and beside T7 and PRA 3 show FoS values <1 (red: not stable).

These risk areas are caused by localised factors which have been examined in more detail in Section 4.5. Where required additional mitigation, including exclusion zones and peat storage restriction areas have been scheduled which the designer and contractor must adhere to at the construction stage.

4.4.3 **FOS FOR DRAINED CONDITIONS**

The spatial distribution of the FoS values calculated for undrained conditions (no surcharge) is shown in Figure K- 7 to Figure K- 9 in Appendix K. Almost all of the pixels are shown to be stable and safe (FoS > 1.3, green), but there are some small areas beside the cable access track and the T7 hardstand which show FoS values between 1 and 1.3 (yellow: stable but not safe). A small number of pixels within and beside T7 show FoS values <1 (red: not stable).

These risk areas are caused by localised factors which have been examined in more detail in Section 4.5. Where required additional mitigation, including exclusion zones and peat storage restriction areas have been scheduled which the designer and contractor must adhere to at the construction stage.

4.4.4 FoS FOR DRAINED CONDITION AND SURCHARGE OF 10 KPA

The spatial distribution of the FoS values calculated for undrained conditions (no surcharge) is shown in Figure K- 10 to Figure K- 12 in Appendix K. Almost all of the pixels are shown to be stable and safe (FoS > 1.3, green), but there are some small areas beside the cable access track and the T7 hardstand which show FoS values between 1 and 1.3 (yellow: stable but not safe).





These risk areas are caused by localised factors which have been examined in more detail in Section 4.5. Where required additional mitigation, including exclusion zones and peat storage restriction areas have been scheduled which the designer and contractor must adhere to at the construction stage.

4.5 ASSESSMENT AND INTERPRETATION OF FOS RESULTS

The interpretation of the factor of safety analysis and accurate assessment of the peat stability conditions is a semi-automated approach that combines the developed polygon areas of the FoS results, areas of risk identified during the site walkovers, and potential risk areas identified from the examination of peat depths and site topography. It is noted that the results from all FoS analyses (drained/undrained, with and without surcharge) are used, highlighting any areas indicative as having a FoS of less than 1.3 in the worst-case surcharged condition with 10kPa. These areas were then cross-examined with the observations from the site visits and topographic models.

This analysis was used throughout the development process to aid in the siting and design of the Proposed Project layout including turbines, hardstands, and other key infrastructure locations. The undrained scenario with a 1m peat surcharge has been considered as the critical scenario. However, the FoS of all elements of the site was examined in both the drained and undrained conditions.

The foundation and hardstand at T7 overlap with an area of FoS <1 in the undrained and drained scenarios without surcharge. This area of low FoS is linear, running N-S and then W-E along a peatcutting face. This low FoS is driven by locally thick peat (up to 5m thick) and locally steep slope angles calculated at peat cuttings. Analysis of the aerial imagery (Section 2.6) suggests that the present peat-cutting face is, in reality, 30m further east than the locally steep slope angles derived from the topo data. This suggests that peat cutting in the area has progressed since the topo was captured and that the peat-cutting face no longer crosses the T7 foundation or hardstand, reducing the risk at this location. This is confirmed by site observations, which show that the peat cut face no longer interacts with the turbine location, as seen in Figure 4-2.

As the low FoS in this location is driven by a high slope angle calculated at the peat-cut face, this significantly reduces the potential risk. The proposed piled foundation at this turbine and excavation of the locally shallower peat (~1.5m) at the hardstand will eliminate the peat hazard in this location, with careful peat management and peat cutting slope angle reinstatement subject to the local stability modelling as part of the contractor's detail design.

Much of the Proposed Project Site contains flat-lying, deep peat with active peat cutting. Steep peat cuttings of <1m generate low factors of safety but are considered to be generally of low landslide risk. Raised bog environments like this site may be susceptible to bog burst type failures, which can occur at very low slope angles and may not be fully quantified by the FoS calculation, as they are driven by hydrological factors rather than slope-driven. For this reason, the locations need to be assessed on-site and 'ground-truthed' to identify true hazards. GDG site walkovers identified no evidence of significant bog burst features; however, as described in Section 2.6, a small area of possible past failure at the peat margin was identified.







Figure 4-2: View looking east across the proposed T7 location showing the high peat cut face in the background.

The lack of evidence for historical bog bursts does not preclude the possibility that these may occur. Further inspection will be required during the detailed design and construction stage to inspect for peat instabilities, including bog burst features. This will be carried out by the detail Designer and Contractors team. The design team shall develop their own inspection and testing criteria to satisfy and de-risk the possibility of peat landslides at these locations. A new topographic survey will be required to capture recent changes to the peat body generated by cutting activities since the capture of the DEM used in this study (2017), and a construction stage PSRA will be required to capture this.

4.5.1 ASSESSMENT OF PEAT STABILITY AT THE GRID CONNECTION ROUTE

Peat stability at the grid connection route is considered separately as part of the peat stability risk assessment calculation outlined in Section 6, with results outlined in Table M- 16. In general, no global peat stability risk has been identified at this location. A small section of FoS <1.3 has been identified close to the grid connection route. However, it has been determined that it is generated by localised drainage and peat bank factors described in further detail in section 4.6.3.

4.6 SAFETY BUFFER ZONES AND PEAT STOCKPILE RESTRICTION AREAS

From the site reconnaissance and the calculations of the FoS for the peat slopes, a series of safety buffer zones and peat stockpile restriction (PSR) areas are proposed and presented in Figure L- 1 to Figure L- 3 in Appendix L.





4.6.1 SAFETY BUFFER ZONES

From the site reconnaissance and the calculations of the FoS for the peat slopes, a series of safety buffer zones and peat stockpile restriction (PSR) areas are proposed and presented Figure L- 1 to Figure L- 3 in Appendix L.

Safety Buffer zones are areas identified during the development phase of the wind farm layout that are highlighted as possessing a potential instability risk. The development of the safety buffer zones is a semi-automated approach that combines the developed polygon areas of the FoS results, areas of risk identified during the site walkovers, and potential risk areas identified from the examination of peat depths and site topography. It is noted that the results from all FoS analyses (drained/undrained, with and without surcharge) are used, highlighting areas indicative as having a FoS < 1.3 in the worst-case surcharged condition with 10kPa. This analysis was used throughout the development process to aid in the siting and design of the Proposed Project layout and ensure that turbines, hardstands, and other key infrastructure locations are only developed in stable and safe locations. One safety buffer zone was identified, located to the east of T07.

Where the Proposed Project layout and the safety buffer zone have overlapped or are in close proximity, further assessment of the localised risk has been assessed as outlined in Section 4.6.3, and where required, further mitigation measures have been scheduled, such as peat storage restriction areas.

Outside of the Proposed Project layout, where construction is not required as part of the Proposed Project, the safety buffer areas should be treated as peat storage and plant restriction areas and construction activities should not be carried out in these areas without further assessment.

Safety buffer areas are outlined in Appendix L, Figure L- 1 to Figure L- 3.

4.6.2 PEAT STOCKPILE RESTRICTION AREAS

Although the peat stability results and safety buffers have been considered in the design of the wind farm infrastructure, there are some locations where construction is required within a safety buffer zone. The stability assessment results at these locations suggest FoS values <1.3 in the surcharged scenario only and have FoS results >1.0 in the analysis without the surcharge. This suggests that the areas are of a low instability risk in their natural state but are unsuitable for the storage of peat or other materials.

Peat and over burden Storage Restriction (PSR) areas are identified at some access roads and in areas at or adjacent to some turbine hardstands, along with the margins of areas proposed for peatland enhancement.

The risk at these locations can be examined by looking at the geometry of the local slope and the proposed construction methodology, and the hazards can be mitigated with restricted peat placement and the limiting of plant operations within the area.

PSR areas are outlined in Appendix L, Figure L- 1 to Figure L- 3. Certain mitigations must be adhered to within the PSR areas in future stages of the Proposed Project:

- No peat or other materials shall be temporarily or permanently placed in the areas within the PSR zones,
- Any peat excavated in the area shall be immediately removed and placed/ stored in an appropriate storage location as outlined in Appendix 4-2: Peat and Spoil Management Plan,
- Plant used within these areas shall be low ground bearing and only the necessary plant shall be used here. No excessive quantity or size of plant will be stored in these areas.





Safety buffer zones are outlined in Appendix LFigure L- 1 to Figure L- 3.

4.6.3 SAFETY BUFFER ZONES AND PEAT STOCKPILE RESTRICTION ZONES

The safety buffer zones and peat stockpile restriction areas are shown in Figure L- 1 to Figure L- 3 in Appendix L. Areas included in the safety buffer zone include:

Areas where key infrastructure encounter safety buffer zones are outlined in Table 4-3:

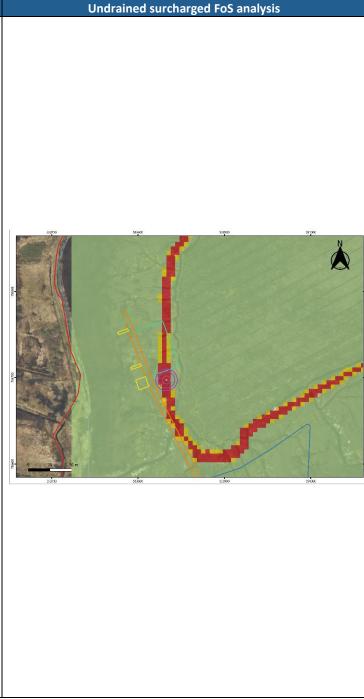




Table 4-3: Safety buffer zones at key locations.

Risk and mitigation

The area at the hardstand and foundation for T7 suggests a FoS of <1 with the application of a 10kPa surcharge. Based on site observations and a study of aerial imagery it is determined that this region of low FoS is caused by locally deep peat and a steep slope calculated at an existing peat cut face. A study of temporal aerial imagery (Section 2.6) indicates that the peat cut face has migrated east due to continued cutting activities since the capturing of both the topo data and the deepest peat probes at this location. This would indicate that both the locally steep slope and deep peat have migrated eastwards as well. Due to this information, the safety buffer zone in this location has been manually shifted to the east to follow the newly interpreted edge of the peat mass. It is therefore interpreted that the low FoS is not representative of current on-site conditions and does not represent a true hazard at this location. It is also noted that this foundation is proposed to be piled, which will further limit any possible risk at this location. Further mitigation measures include the stabilising of the cutting with excavated material and reinstatement to a natural gradient. Ensuring adequate Drainage and avoidance of drying out the peat, will also improve stability at this location.







Risk and mitigation

A small section of road interacts with an area of FoS <1.3 in the undrained scenario with 10kPa surcharge. This low factor of safety is assessed to arise from locally deep peat and high slope angles calculated at relict existing peat banks. It is determined that these do not present a global risk of peat failure, **but that the ground should be levelled and stabilised locally prior to construction, and that peat should not be placed in this area.**

A small section of access road and the cable route with an area of FoS <1.3 in the undrained scenario with 10kPa surcharge. This low factor of safety is assessed to arise from locally deep peat and high slope angles calculated at relict existing peat banks. It is determined that these do not present a global landslide risk. The ground should be levelled and stabilised locally prior to construction, and peat should not be placed adjacent to the road in this area.







5 ASSESSMENT OF AREAS PROPOSED FOR PEATLAND ENHANCEMENT

The proposed project includes an area of currently drained raised bog, used previously for turbary cutting, which is proposed to be enhanced by rewetting. The purpose of this process is to establish a hydrological regime, which will allow for the regeneration of an area of raised bog. The purpose of this measure is to raise the water table in the drain, and in adjacent areas in order to reduce run-off rates and carbon losses.

The location of the proposed peatland enhancement can be seen in Figure A-1 in Appendix A. The proposed area consists of a section of raised bog (maximum peat thickness from probes recorded at 3.88m), with parallel drains running NW to SE, roughly every 10-15m across the peat surface. The depth of the existing drains is estimated based on limited site walkovers to be between 0.5-1m. The current condition of the drained peat can be seen in Figure 5-1.







Figure 5-1: Parallel drainage ditches at the north end of the proposed area of peatland enhancement.

5.1 BACKGROUND TO PEATLAND ENHANCEMENT

Peatland enhancement by rewetting has been practiced in both Ireland and the UK over a long period, typically aiming to restore hydrological function, vegetation cover, and active peat-forming vegetation (Alderson, 2019). Peat enhancement on a large scale has been implemented in Ireland since the 1990s, with over 7,200Ha enhanced to date (Bord na Móna, 2023), and Scotland since 2012, under the publicly funded Peatland ACTION programme (Mills and Rushton, 2023), with over 19,000Ha of peatland enhanced since this date. Studies by Kelly and Schouten (2002) and Fernandez et al. (2014) indicate that peatland enhancement by rewetting can be very successful, provided that water levels are maintained within 10cm of the surface. The process is becoming more common in large-scale construction projects similar to the Proposed Project. The main techniques used for the enhancement of peatland areas are:

• Ditch blocking.





- Ditch reprofiling.
- Gully blocking.
- Felling and/or ground smoothing.
- Surface bunding.

Many of these techniques apply only to high elevation blanket bogs with higher slope angles. The techniques best suited to low elevation raised bog settings as found at the Proposed Project are:

- Ditch blocking. This consists of constructing dams either of peat or artificially imported materials to block existing drainage ditches. Best practice, as established by the National Parks & Wildlife Service (NPWS) (Mackin et al., 2017; McDonagh, 1996), is for a minimum of 3 dams or a maximum of 10 dams per 100m of drain. Bord na Móna has used three dams per 100m on raised bog enhancement projects, including Carrickhill, Derryvilla and Templetuohy (Bord na Móna, 2022).
- Surface bunding. This consists of trenches being dug around the edges of the bog, with these being backfilled with peat material to reduce water flow from the margins of the bog. Surface bunds are constructed on the cutover areas surrounding the high raised bog, and serve to attenuate flow from the high bog to the surrounding areas. This has been successfully implemented in flat-lying bogs such as Killyconny Bog (Mackin et al., 2017)

5.2 PEAT STABILITY IN ENHANCED AREAS

In a 2023 study, Mills and Rushton examined 100 enhanced Scottish peatland areas, of which 41 were lowland raised bogs. In this study, three failures were recorded as having occurred after peat enhancement, with the following two of these occurring on raised bogs:

- Margin failure of a enhanced lowland raised bog at Moss Band (Lanarkshire).
- Margin failure of a enhanced lowland raised bog at Greenhead Moss (Lanarkshire).

In both previous instances, failure was associated with dome-shaped raised bogs, with gently dipping contacts between the peat and the mineral substrate of 1-2°. In both examples, while slopes were very gentle, drains were cut obliquely to the slope and were organised so as to concentrate flow at the lowest elevation areas of the bog. It is also generally considered that raising the water table across the peat mass will lead to an increase in pore water pressures, which is anticipated to slightly reduce stability across rewetted areas (Mills and Rushton, 2023). No known examples of peat failure triggered by peatland enhancement measures on lowland raised bogs have been identified in Ireland to date.

5.3 PEAT STABILITY AT THE PROPOSED PROJECT

In this instance, it is proposed that the peat will be rewetted by blocking the drains with peat dams being installed at the end of the drains, and at 20m intervals along the drains, in line with the best practice outlined by Mackin et al. (2017) and McDonagh (1996). This will reduce drainage from the area and allow the water table to rise, allowing for peat accumulation. It is considered that rewetting by this method is unlikely to trigger failure at this location, as the slope angle of the peat surface and of the basal contact between the peat and the mineral substrate is interpreted to be <0.5°, based on the data available. The parallel drains within the area are not convergent and are unlikely to concentrate flow in specific regions, leading to a significant weakening of the peat mass. It is considered that the process of rewetting is likely to lead to an increase in pore water pressure, which may slightly reduce peat stability at the rewetted area (Mills and Rushton, 2023). To account





for this, an additional item has been added to the hazard assessment section of the PSRA calculation outlined in Section 6.3.





6 PEAT STABILITY RISK ASSESSMENT (PSRA)

A peat stability risk assessment (PSRA) has been carried out at each of the proposed structures, considering the landslide hazard probability and potential consequences at each location. The peat stability factor of safety is the most significant factor in generating a risk rating. The production of a PSRA risk rating for the site access tracks is not possible as they are linear structures that cover significant distances, but the same considerations were used in the design and assessment of the stability of the access road alignment.

6.1 **RISK DEFINITION**

Risk is the potential or probability of adverse consequences, including economic losses, environmental or social harm, or detriment. Risk is expressed as the product of a hazard (e.g. peat landslide) and its adverse consequences (Lee & Jones, 2004; Corominas et al., 2014) (Equation 6.1-1). Some use approximate synonyms and refer to risk as the product of the likelihood and the impact or the product of susceptibility and the exposure.

Risk = (Hazard) x (Adverse Consequences)

Equation 6.1-1

6.2 GENERAL METHODS FOR RISK ASSESSMENT

There are various levels of risk assessment, ranging between:

- Detailed quantitative risk assessments (QRA) where the objective is to generate more precise measures of the risks (e.g. expressing risk as a specific probability of loss). These require a large amount of quantitative input and time, and
- High-level qualitative assessments where the objective is to develop an approximate estimate of the risks, particularly in relative terms (e.g. low, medium, and high levels of risk).

Qualitative risk assessments are typically used for PSRA reports, given the availability of information and the time frame. To apply Equation 6.1-1, the quantitative information (e.g. FoS) and the qualitative information (e.g. geomorphic observations relevant to peat stability) that determine the hazard and the consequences need to be transformed into subjective ratings. The following sections address the calculation of the two risk components: hazard and consequence.

6.3 HAZARD ASSESSMENT

Landslide hazard is the likelihood or probability of landslide occurrence in each location and a given period. The likelihood or hazard of peat landslides has been determined according to the guidelines for geotechnical risk management given by Clayton (2001), taking into account the approach of MacCulloch (2005) and using the available data from the desk study, site reconnaissance, and site investigations.

The hazard is calculated from a variety of weighted factors, including the FoS and thirteen secondary factors related to geomorphic observations, topography, hydrology, vegetation, peat workings, existing loads, and slide history (Appendix M). These secondary factors are difficult to quantify in a stability calculation but may contribute to peat instability.

In accordance with the Scottish Guidance (2017), each hazard factor has been reclassified into one of four classes with rating values ranging from 0 to 3 (Appendix M). A rating of 0 indicates that the





hazard factor is not relevant; ratings 1, 2, and 3 indicate low, moderate, and high correlation to peat slide hazard, respectively.

These factors have been assigned weighting values to reflect their relative importance in peat stability. Both the rating and the weighting values have been assigned according to the expert criteria of the project team and are presented in Appendix M. The hazard score of each factor is the multiplication of its rating value and weight value. These factors and their corresponding weightings are presented in Table 6-1.

The hazard values for a given wind farm element are the sum of the scores of all the hazard factors divided by the maximum hazard value possible to obtain a normalised hazard value ranging from 0 to 1 (see tables in Appendix M). Hazard is grouped into four categories: Negligible, low, medium, and high.

Hazard factors		ctors	Role in peat stability	Weight
Factor of Safety		afety	This is the most critical factor, including the slope angle, the peat depth, the peat density, the peat cohesion in the drained and undrained conditions, and the effective friction angle. This is the complete factor. See Section 4 for further details.	10
		Curvature Plan (across the slope)	This represents the curvature across the slope and the funnelling/dispersion of the runoff.	
	Topography	Curvature Profile (downslope)	This represents the curvature down-slope and, therefore, the capacity of water retention and infiltration. Convex slopes are typically more prone to landslides.	
	Hydrology -	Distance from watercourse (m)	This tends to affect the likelihood of landslides, especially in sectors where this distance is short.	1
ctors		Moisture index (NDMI)	This Landsat-derived factor indicates the water content or moisture of the vegetation, which can be considered as a proxy of the terrain moisture.	
Secondary factors		Evidence of piping	The presence of piping is clear evidence of potential peat instability.	
Secon		The direction of existing drainage ditches	Drainage ditches that are aligned cross slope can affect the overall stability of a slope face.	
		Bush	This is an indicator of the type of peat at the site and the hydrological nature of the site.	
	Vegetation	Forestry	The vigour of forestry is another indicator of peat stability, with stunted trees more frequent in unstable sectors.	
	Peat cuts		This factor evaluates the effect of various peat workings	
	Peat	presence	on the stability of the peat.	
	workings	Peat cuts vs contour lines	Where the peat cuts parallel the contour lines, the potential instability increases.	

Table 6-1: Factors affecting peat stability and hazard.





	Hazard factors		Role in peat stability	Weight
	ixisting loads	Roads	Side-cast of solid roads and floating roads pose a load to the peat blanket.	
Slid	le history	Distance to previous slides (km) Evidence of peat movement (e.g. tension cracks, compression features).	This suggests that landslides at the site are likely if a peat slide has occurred at the site or within a 10-kilometre radius. The weight assigned is doubled the weights for the other secondary factors This factor evaluates the effect of any existing peat movement indicators on-site, such as tension cracks. The weight assigned is doubled the weights for the other secondary factors	2

For the area highlighted for potential peatland enhancement, a further secondary category has been added:

Table 6-2: Additional factors affecting peat stability and hazard in areas proposed for peatland enhancement.

Hazard factors	Role in peat stability	Weight
Peat Rewetting	This factor evaluates the effects of different peat rewetting methodologies on-site, such as drain-blocking techniques and bunding. Rewetting causes water tables to rise, increasing pore pressures.	1

6.4 ADVERSE CONSEQUENCES ASSESSMENT

The impacts of peat landslides on the wind farm elements, surrounding environment, and existing assets may typically generate a variety of adverse consequences. This report qualitatively assessed these consequences following the Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish-Executive, 2017).

Table 6-3 summarises the consequences considered for the PSRA of the development.

Table 6-3: Consequences considered for the PSRA.

Consequence factors	Description	Weight
The volume of potential peat flow (function of distance from the nearest watercourse and peat depth in the area)	This is the second most heavily weighted factor. It is estimated based on the distance from the nearest defined watercourse and the depth of peat in the area. The longer the distance and the deepest the peat depth, the larger the landslide.	3
Downslope features	This factor accounts for the type/shape of downslope features that may hamper or favour the propagation downhill of the peat flow.	1





Consequence factors	Description	Weight
Proximity from the defined valley (m)	This is the distance from the site to the nearest defined river valley. Rivers close to potential landslide sectors are more vulnerable to a landslide event.	
Downhill slope angle	This factor accounts for the runout distance as a matter of slope angle.	
Downstream aquatic environment	Reflects the severity of a peat slide event's impact on the receiving aquatic environment.	
Public roads in the potential peat flow path	Rates the impact of a peat slide striking a public road.	
Overhead lines in the potential peat flow path	Rates the impact of a peat slide striking a service line.	
Buildings in the potential peat flow path	Rates the impact of a peat slide striking a habitable structure.	
Capability to respond (access and resources)	Rates the capability of the site staff to respond to a peat instability event.	

The nine consequence factors considered have been reclassified in the same fashion the hazard factors were reclassified (Appendix M). A rating of 0 indicates that the consequence factor is not relevant and a rating of 3 indicates high consequences.

'Volume of potential landslide' has been assigned a weight of 3 to reflect its relative importance in the potential consequences. The rest of the factors have been assigned a weight of 1. Both the rating and the weighting values have been assigned according to the expert criteria of the project team. The score of each consequence factor is the multiplication of its rating value and its weight value (Appendix M).

The consequences value for a given wind farm element is the sum of the nine consequences scores. This total value is then divided by the maximum consequence value possible to obtain a normalised consequence value ranging from 0 to 1 (see tables in Appendix M). Consequences are grouped into four categories: Negligible, low, medium, and high.

6.5 **RISK CALCULATION**

Risk in each wind farm infrastructure element is calculated with Equation 6.1-1, i.e., multiplying the hazard scores and the consequences scores. The risk rating ranges between 0 and 1 and the following levels of risk rating have been distinguished (Table 6-1 and Table 6-3):

- <u>High (0.6 to 1)</u>: Avoid project development at these locations. Mitigation is generally not feasible.
- <u>Medium (0.4 to 0.6)</u>: The project should not proceed unless risk can be avoided or mitigated at these locations without significant environmental impact to reduce risk ranking to low or negligible.
- <u>Low (0.2 to 0.4)</u>: Project may proceed pending further investigation to refine assessment and mitigate hazard through relocation or re-design at these locations.
- <u>Negligible (0 to 0.2)</u>: The project should proceed with monitoring and mitigating peat landslide hazards at these locations as appropriate.





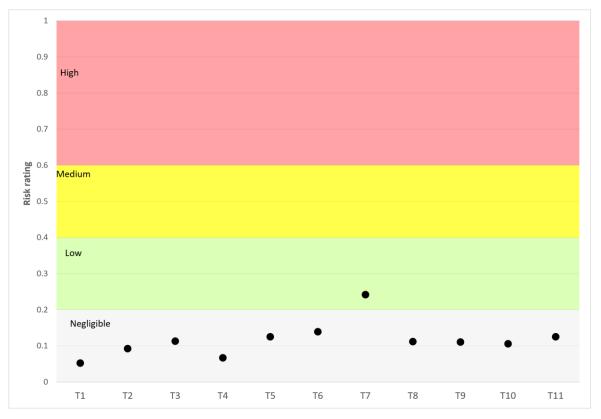


Figure 6-1: Risk ratings at the proposed turbine locations.



Figure 6-2: Risk ratings at the proposed infrastructure element sites.

Appendix M gathers the risk calculation process at each turbine considering the four scenarios of hazard: Undrained; undrained with a surcharge of 1 m; drained; and drained with a surcharge of 1 m (Table M- 1 to Table M- 21). Figure 6-1 and Figure 6-2 summarise the risk rating obtained at the turbines and compound locations. All the turbines and infrastructure elements are located in sectors of negligible to low risk.





It is stressed that the resulting risk rating does not indicate a probability of a landslide occurring; it simply expresses a rating of the potential risk.





7 GEOTECHNICAL RISK REGISTER

This register lists significant potential peat geotechnical hazards and associated risks concerning the construction and operation of the Proposed Project, and recommended mitigations.

Ref.	Risk	Contributing factor	Mitigation			
						The soil parameters are based on the hand shear vane test carried out by GDG at each turbine location. Shear vane testing was carried out at 0.5m intervals through the peat to assess variation within the peat body. The interpreted undrained shear strength values take into account a conservative reduction factor for the influence of the fibres within the peat. Extensive sampling ground investigation at infrastructure location including trial pitting to assess
			the composition and strength of the peat and collect samples for testing.			
	The collapse of the dried peat berm/ peat slippage Overestimation of soil strength parameters					The derived values were compared with a literature review of the most common general drained and undrained parameters for each type of soil and on the descriptions.
1		-	The GI completed to date is considered to be thorough and robust for the purposes of the EIAR, however, it is expected that further testing and assessment of the peat during further ground investigation campaigns will be required before construction. This will allow for a robust understanding of the ground conditions and the detailed design of access roads and structures.			
						An extensive testing protocol shall be developed by the Construction stage contractor and the design team. These tests shall be observed by a suitably qualified engineer and reported to the owner's engineer.
			It would be expected that an observational approach will be required when constructing on peat due to the limitations associated with testing and verifying its strength and the contractor is required to frequently inspect the peat material and provide proof of inspection.			
2	The collapse of	Underestimation of peat depth	Extensive ground investigation including trial pitting and peat probing has been carried out across the site. GI locations have been carried out at locations where			

Table 7-1: Geotechnical risk register





Ref.	Risk	Contributing factor	Mitigation
	berms/peat slippage		access was possible. Access was limited to some areas of the site with restrictions relating to forestry and terrain limiting coverage. Access in particular was limited to the area of raised bog proposed for peatland enhancement. Further GI will be required at these locations during the detail and construction stage to assess peat depths. This will be carried out by the detail designer and Contractors team. The design team shall develop their own testing criteria to satisfy and de-risk the possibility of larger peat depth occurring at these locations.
	Failure of		Assessment of satellite imagery and topographical data for evidence of past landslide events was carried out as part of the desk study, finding no evidence of past instabilities or landslide events within the site area. The Geological Survey of Ireland (GSI) landslide database was examined, identifying two landslide events in the local region within 5km of the site, the closest approx. 3km from the site boundary. During the site walkovers, the site GDG engineers examined the landscape and the areas surrounding the proposed infrastructure for evidence of instability or past landslide events. No past landslide or instability events were identified.
3	peat slope due to loading or agitation of existing instability	Failure to identify existing instability/ peat deformation at the site	Although there is no evidence of landslides within the Proposed Project Site, this does not necessarily mean that landslides have never occurred at the proposed site location. It is noted that the geomorphological features associated with peat landslides (peat slides and bog bursts) are softened with time through erosion, drying, and re-vegetation, particularly given the forestry and peat harvesting activities that have taken place at this site.
			Access was limited to some areas of the site with restrictions relating to raised peat bogs traversed by large drainage ditches. Further inspection will be required during the detailed design and construction stage to inspect for peat instabilities. This will be carried out by the detail designer and Contractors team. The design team shall develop their own inspection and testing criteria to satisfy and de-risk the possibility of larger peat depth occurring at these locations.





Ref.	Risk	Contributing factor	Mitigation
4	The collapse of peat	Failure due to excessive loading	The peat stability analysis factor of safety exercise examines the peat in the drained and undrained condition both without and with the addition of a surcharge equating to 1m of peat loading. Areas indicative of a low or moderate FoS result with the 1m peat surcharge within or adjacent to the proposed site infrastructure have been designated as safety buffer zones, as outlined in Section 4.6.
	berm/peat slippage	of peat	Requirements for the safe and sustainable storage of peat and spoil material are outlined in the associated Peat and Spoil Management Plan (PSMP) document (GDG, 2023).
			The requirements and restrictions for peat and spoil management outlined in this document must be adhered to during the constriction stage.
5	Failure of peat slopes	Over/underestim ation of exiting slope angles.	The peat stability analysis factor of safety exercise examines the peat slope angle using data drawn from a 2018 Bluesky LiDAR survey. It is noted that peat cutting has progressed significantly in specific areas across the site since this date, particularly in the vicinity of T7. It is assessed that the slope angle is likely to have decreased in this location, as the peat cut bank has migrated east, away from the turbine location. This will likely lead to a reduction in risk at this location, and an underestimation of the likely FoS, however uncertainty remains. An updated and more detailed topographic survey will be required prior to commencing the detailed design stage.
			The groundwater conditions were examined during the walkovers and within the trial pit locations. Areas of saturated surface peat were identified during the walkovers as outlined in Section 3 and these have been considered in the risk assessment and findings of the report.
6	Instability of peat slippage	Variations in the groundwater conditions at the site	Water strikes, peat water content, and groundwater conditions are noted in the trial pit locations (GDG, 2020). The groundwater conditions and peat moisture content way vary seasonally and/or more frequently with the immediate weather conditions. Long-term groundwater level monitoring across the site should be considered in further design stage ground investigations and further lab testing of the peat in its in-situ condition will need to be assessed for the construction design. Hydrology of the area





Ref.	Risk	Contributing factor	Mitigation
			shall be maintained as far as possible by implementing and maintaining an appropriate drainage system.
7	Instability due to unmapped subsurface karst features	Voids and subsidence due to karstic weathering of the underlying limestone bedrock.	The existing geological mapping and GI indicate the Proposed Project sits on limestone bedrock, which may be susceptible to karstic weathering. One karstic feature (an enclosed depression) is mapped 2km from the site boundary. Additional karstic features may occur within the site boundary but are obscured by overlying quaternary sediments. Confirmatory ground investigations to investigate the presence and extent of any karstic features in proximity to the infrastructure locations will be required to be undertaken at the design stage.
8	Instability due to rewetting of raised bog	Increases in pore water pressure due to blocking of drains with peat dams.	Limited access to the area proposed for peatland enhancement limits the available data to assess peat stability at the proposed area for peatland enhancement. Assessment of the available data and literature suggests that failure is unlikely to be triggered by the construction of peat dams, however further confirmatory ground investigation to confirm peat depths and characteristics across the area will be required to be undertaken at the design stage.





8 CONCLUSIONS AND RECOMMENDATIONS

Following the guidance of the Scottish Executive, a review of the published thematic geographic information (e.g. geology, soils, protected areas) and relevant background literature was undertaken for the Proposed Project. Site reconnaissance and site investigations were carried out to validate and enhance the desk study information. Based on the available data, the fieldwork, and GDG's professional judgement, it is concluded that significant peat slides are unlikely on the site with diligent peat management and careful consideration of the peat conditions at the site at the design and construction stage.

A deterministic Factor of Safety was calculated across the proposed element locations, and from this, a robust peat stability risk assessment (PSRA) was performed. The findings of the peat assessment showed that the site has an acceptable margin of safety and is suitable for the Proposed Project, provided appropriate mitigation measures, as outlined below, are implemented:

- All earthworks shall be designed by a competent geotechnical designer, informed by detailed ground investigation to confirm peat, mineral soil, and bedrock condition and properties.
- A detailed site investigation will be conducted by experienced geotechnical staff.
- The area's hydrology will be maintained as far as possible by implementing and maintaining an appropriate drainage system.
- Use of experienced contractors and trained operators to carry out the work.

The peat stability risk for the proposed infrastructure is negligible. However, the results of the factor of safety deterministic calculation and the site walkover allowed for the identification of safety buffer areas outlined in Section 4.6 and shown in Appendix L. These must be adhered to in future stages of the Proposed Project.

To minimise the risk of construction activity causing potential peat instability the Construction Method Statements (CMSs) for the project will implement in full, but not be limited to, the recommendations above.

Construction works shall follow the recommendations of the peat and spoil management plan: Peat and spoil management plan (GDG 20021-R02-PMP-00). During construction, it is strongly recommended to carry out frequent monitoring works, especially after heavy rainfall events or prolonged rainfall.

8.1 CONTINGENCY MEASURES

Due to the high factors of safety and negligible risk of peat landslides identified on site, it is not anticipated that peat failure will occur on site. However, in the event of peat failure (e.g. tension cracking, surface rippling, sliding), the following measures should be implemented:

- 1. All activities within the affected area shall cease immediately.
- 2. Where possible action shall be taken to prevent a potential peat slide from reaching any watercourse. In this instance, priority should be given to the one watercourse that crosses the site to the south of T06 and T07). This will usually take the form of the construction of check barrages on land if this is possible after considering the speed of the failure and accessibility of the terrain.
- 3. All relevant authorities should be notified if a peat slide event occurs on site.





- 4. Localised peat slides that do not present a risk to watercourses shall be stabilised where possible by rock infill and granular material. The area shall then be assessed by competent engineers, and further stabilisation measures will be implemented where necessary.
- 5. In the event of a peat slide that presents a risk to watercourses, a check barrage shall be installed within the watercourse, downstream of the likely point of entry. This shall consist of the placement of granular fill across the watercourse to prevent the passage of peat debris while allowing water flow.
- 6. The contractor will be responsible for providing suitable contingencies outlined within the construction stage CEMP. The contractor will additionally need to carry out a construction stage PSRA.

Further mitigations and contingency measures are outlined in the Peat and Spoil Management Plan (Appendix 4-2, GDG 20021-R-02-PMP-02).





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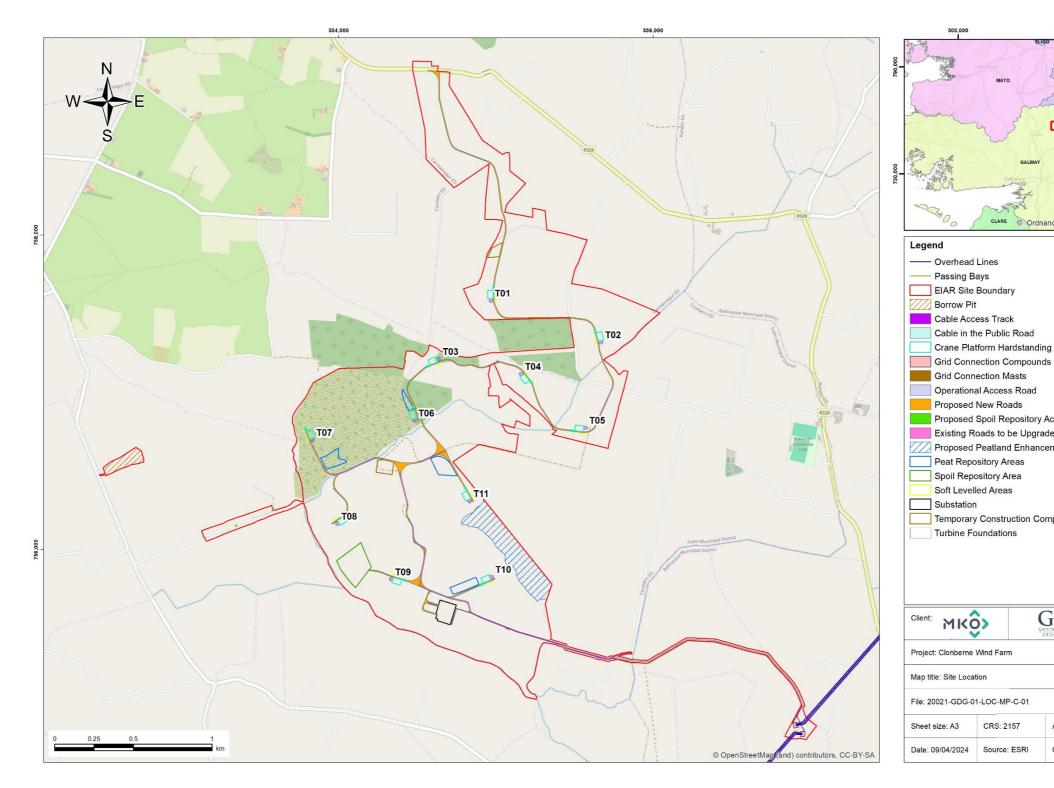


Figure A-1: Proposed Project Location.







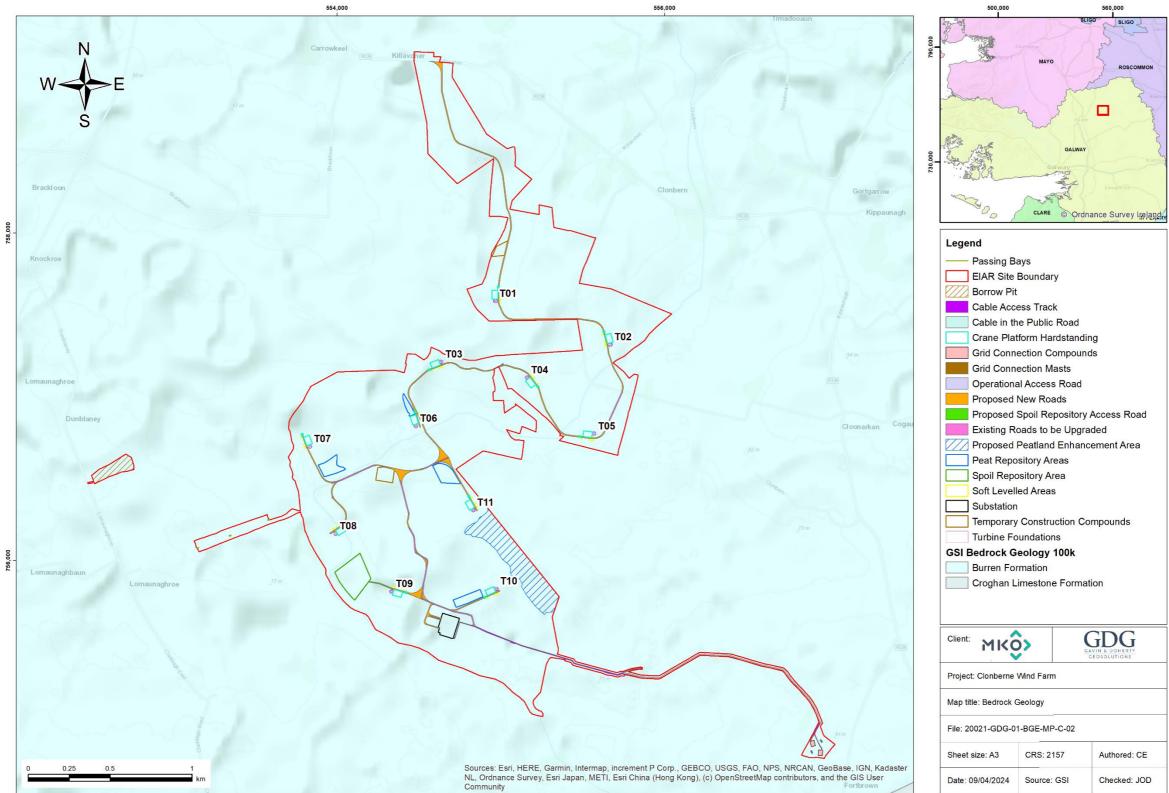


Figure B- 1: Bedrock Geology (GSI).



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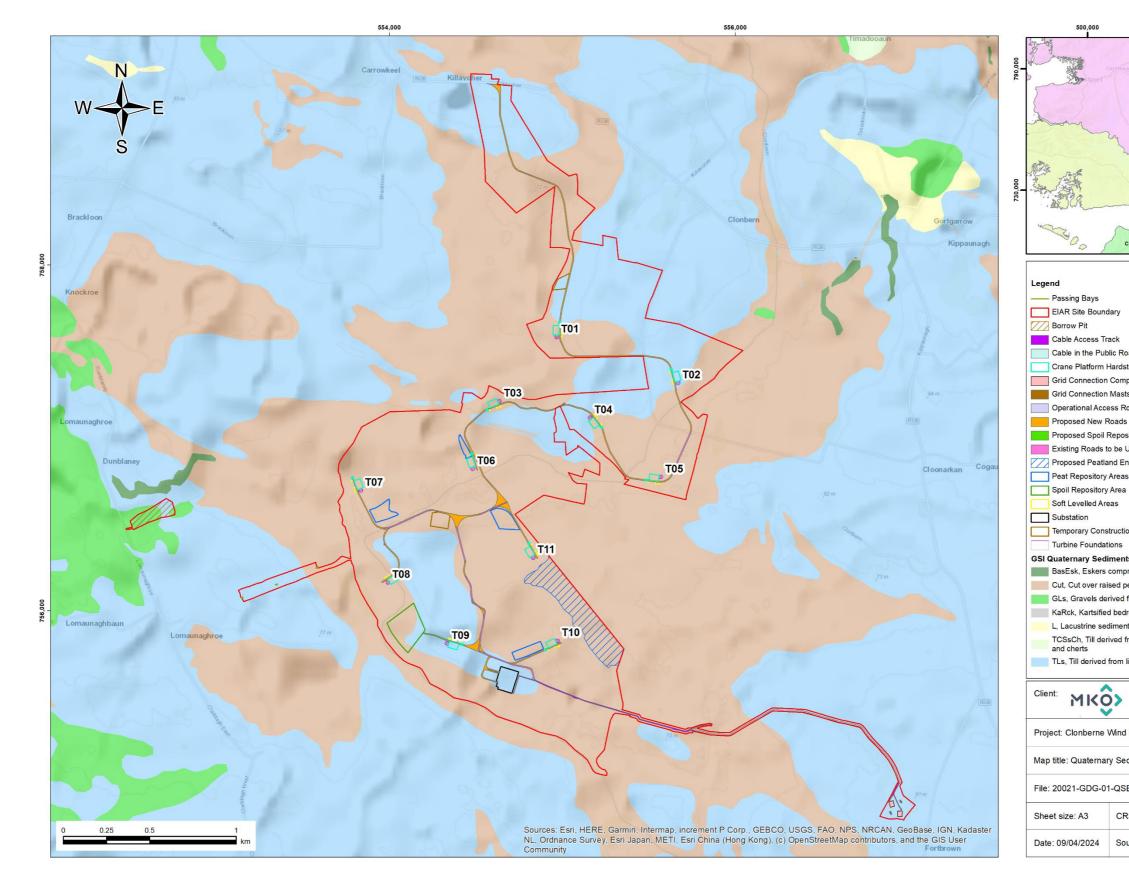


Figure B- 2: Quaternary Sediments (GSI).





- Passing Bays
- EIAR Site Boundary
- Cable in the Public Road
- Crane Platform Hardstanding
- Grid Connection Compounds
- Grid Connection Masts
- Operational Access Road
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations
- **GSI** Quaternary Sediments
- BasEsk, Eskers comprised of gravels of basic reaction
- Cut, Cut over raised peat
- GLs, Gravels derived from Limestones
- KaRck, Kartsified bedrock outcrop or subcrop
- L, Lacustrine sediments
- TCSsCh, Till derived from Carboniferous sandstones
- TLs, Till derived from limestones





- Project: Clonberne Wind Farm
- Map title: Quaternary Sediments
- File: 20021-GDG-01-QSE-MP-C-03

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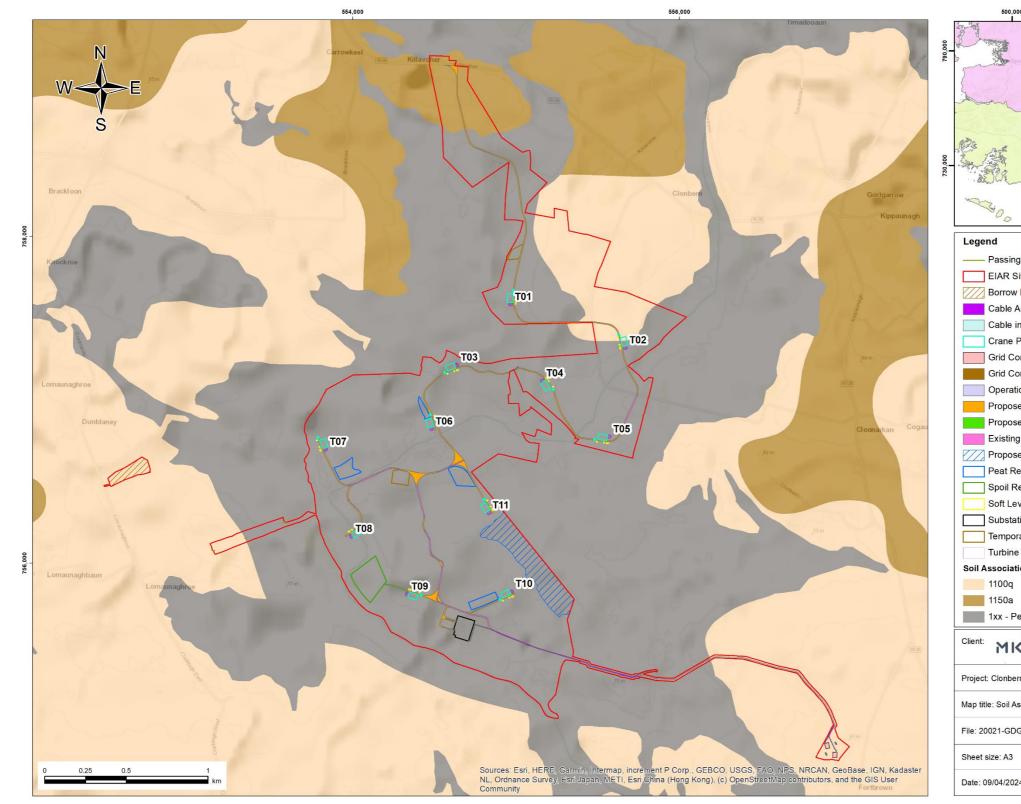


Figure C-1: Soil Associations (EPA/Teagasc).





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Site Boundary			
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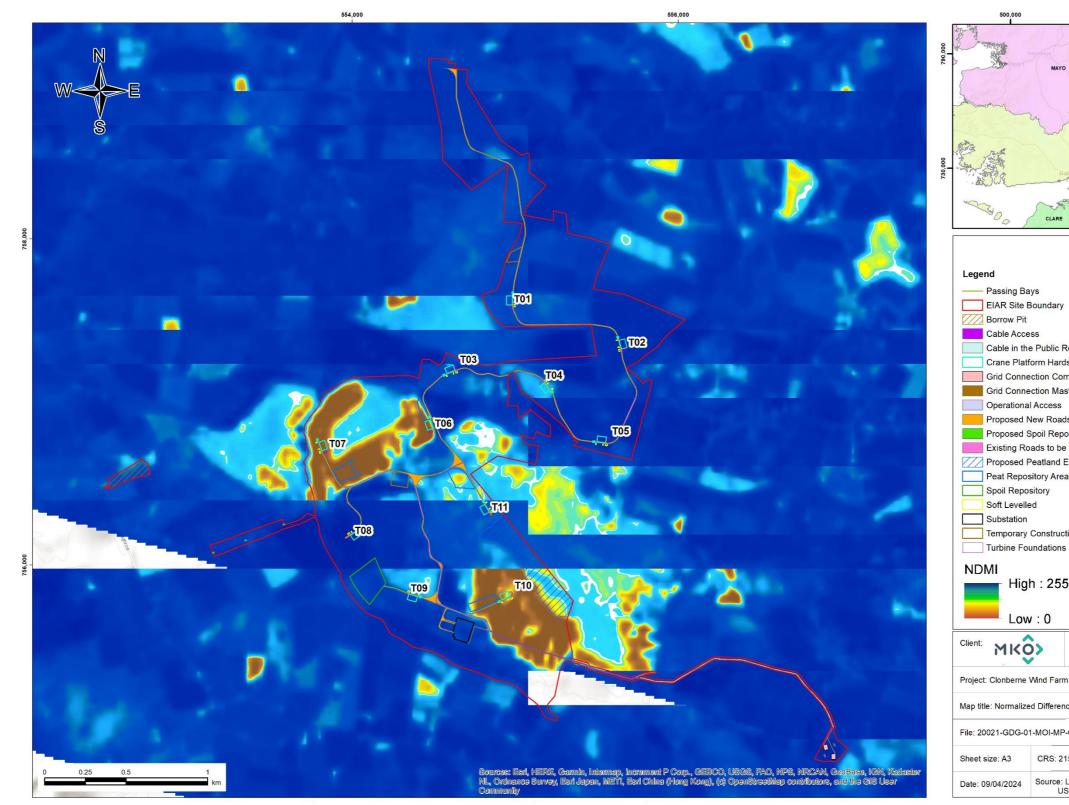


Figure D-1: Normalised Difference Moisture Index (Landsat 8/USGS).





- Cable in the Public Road Crane Platform Hardstanding Grid Connection Compounds Grid Connection Masts Proposed New Roads Proposed Spoil Repository Access Existing Roads to be Upgraded Proposed Peatland Enhancement Peat Repository Areas
- Temporary Construction Compounds

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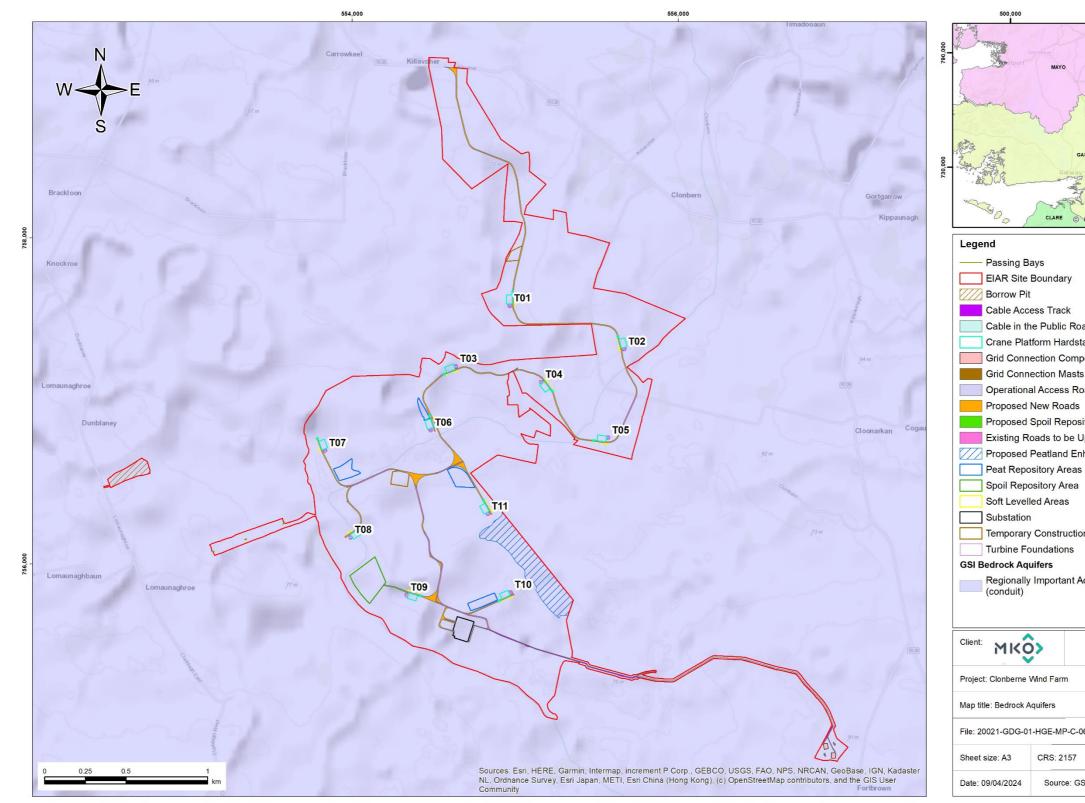


Figure E-1: Bedrock Aquifers (GSI).





- Cable Access Track
- Cable in the Public Road
- Crane Platform Hardstanding
- Grid Connection Compounds
- Grid Connection Masts
- Operational Access Road
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area

 - Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations

Regionally Important Aquifer - Karstified (conduit)



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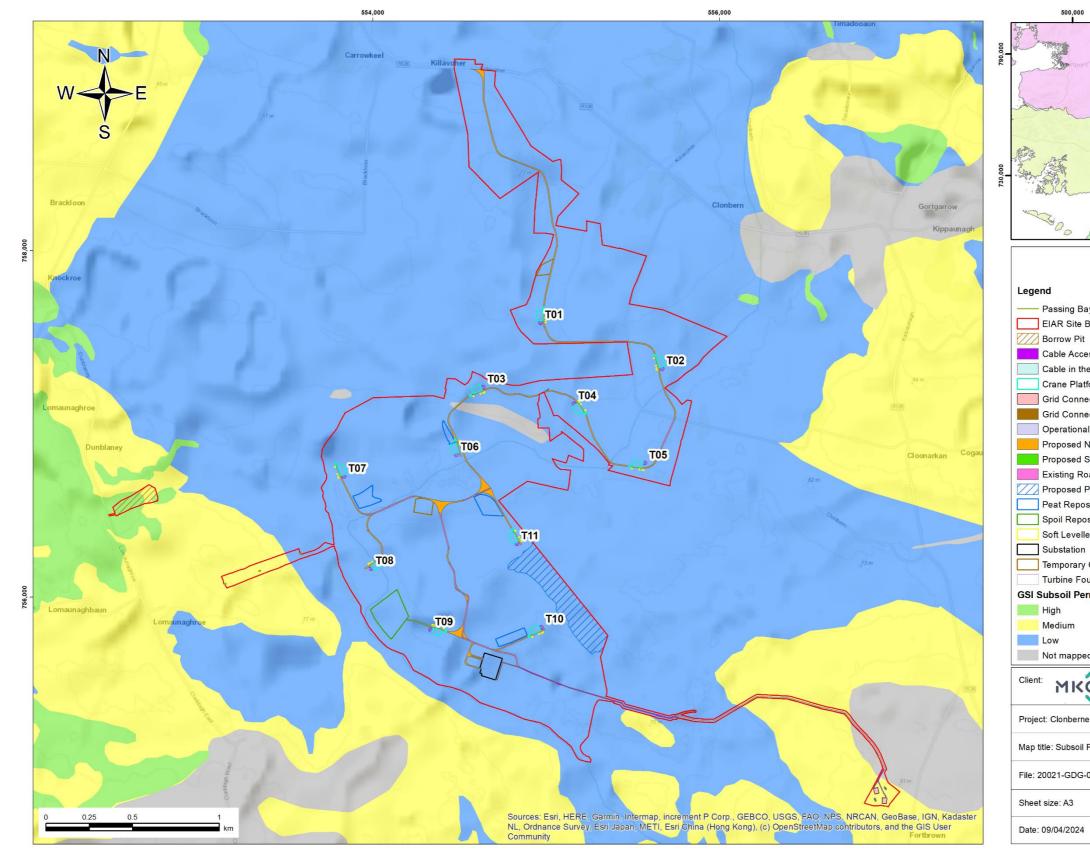


Figure E- 2: Subsoil Permeability (GSI).





Passing Bays EIAR Site Boundary Borrow Pit Cable Access Track Cable in the Public Road Crane Platform Hardstanding Grid Connection Compounds Grid Connection Masts Operational Access Road Proposed New Roads Proposed Spoil Repository Access Road Existing Roads to be Upgraded Proposed Peatland Enhancement Area Peat Repository Areas Spoil Repository Area Soft Levelled Areas Temporary Construction Compounds Turbine Foundations **GSI Subsoil Permeability** Medium Not mapped мко́ **GDG** Project: Clonberne Wind Farm Map title: Subsoil Permeability File: 20021-GDG-01-PER-MP-C-07

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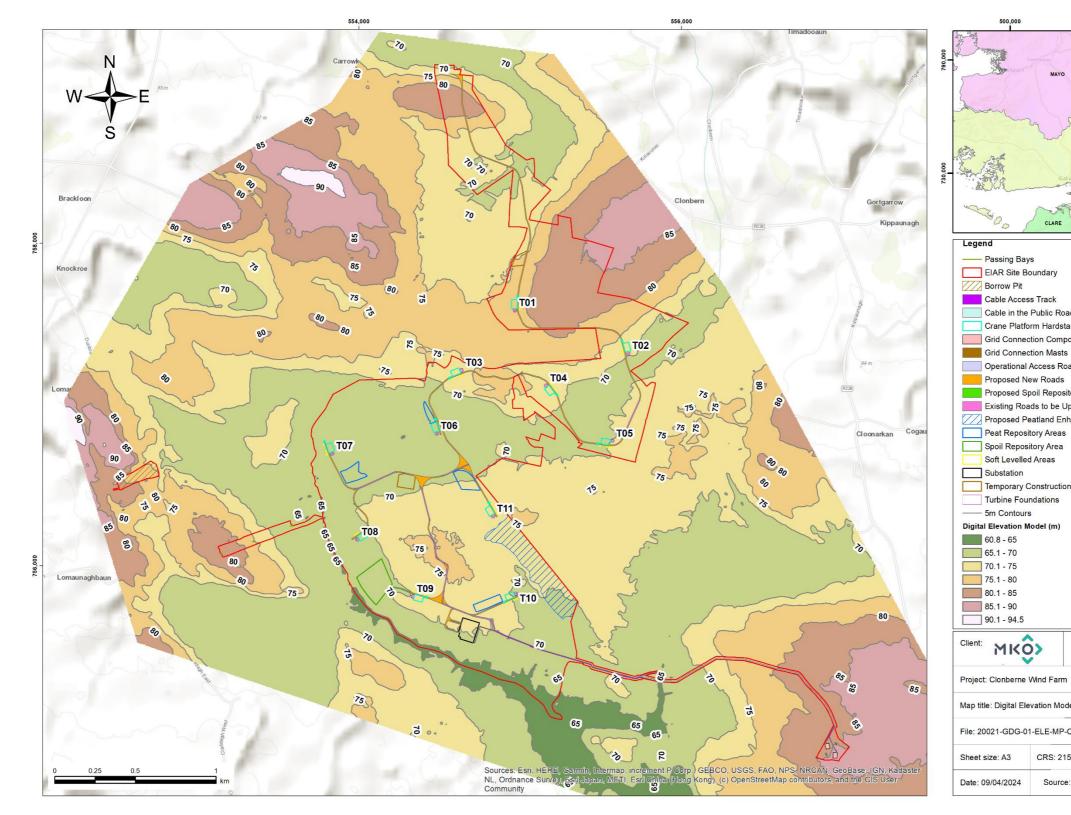


Figure F- 1: Digital Elevation Model (BlueSky, 2017).







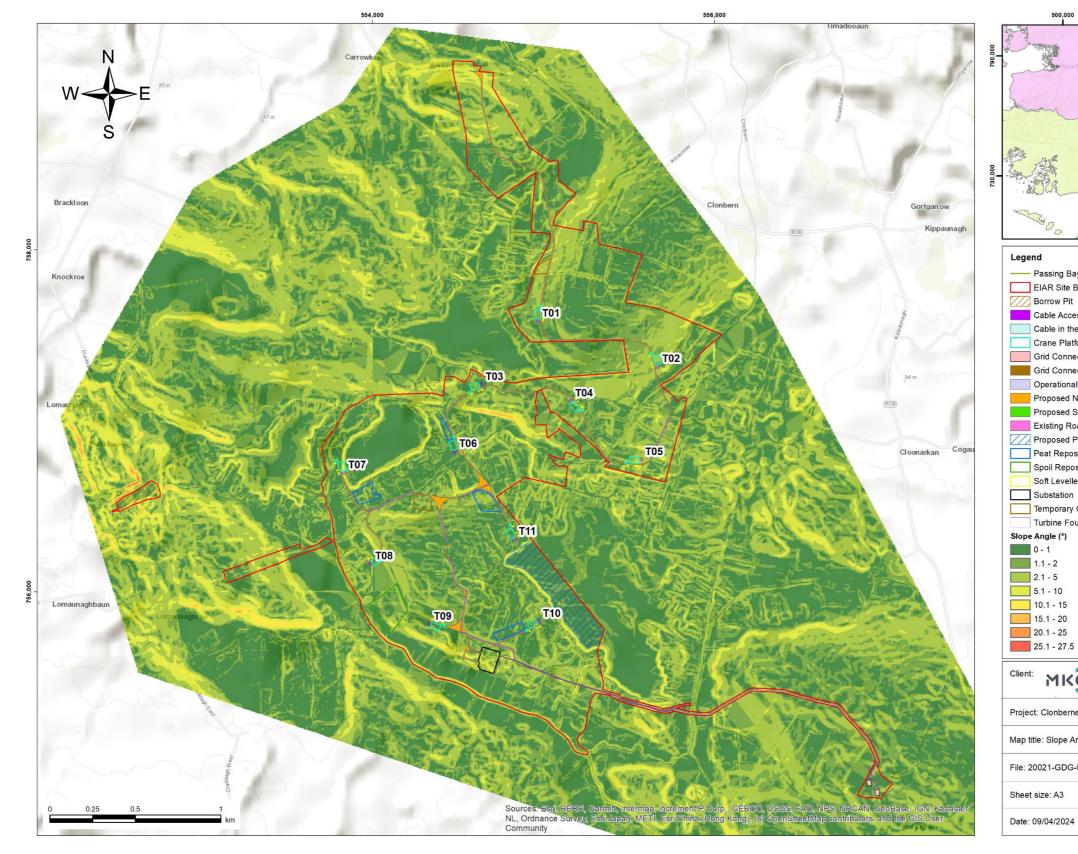


Figure F- 2: Slope Angles (Derived from BlueSky, 2017)







Appendix G SLOPE INSTABILITY MAPPING

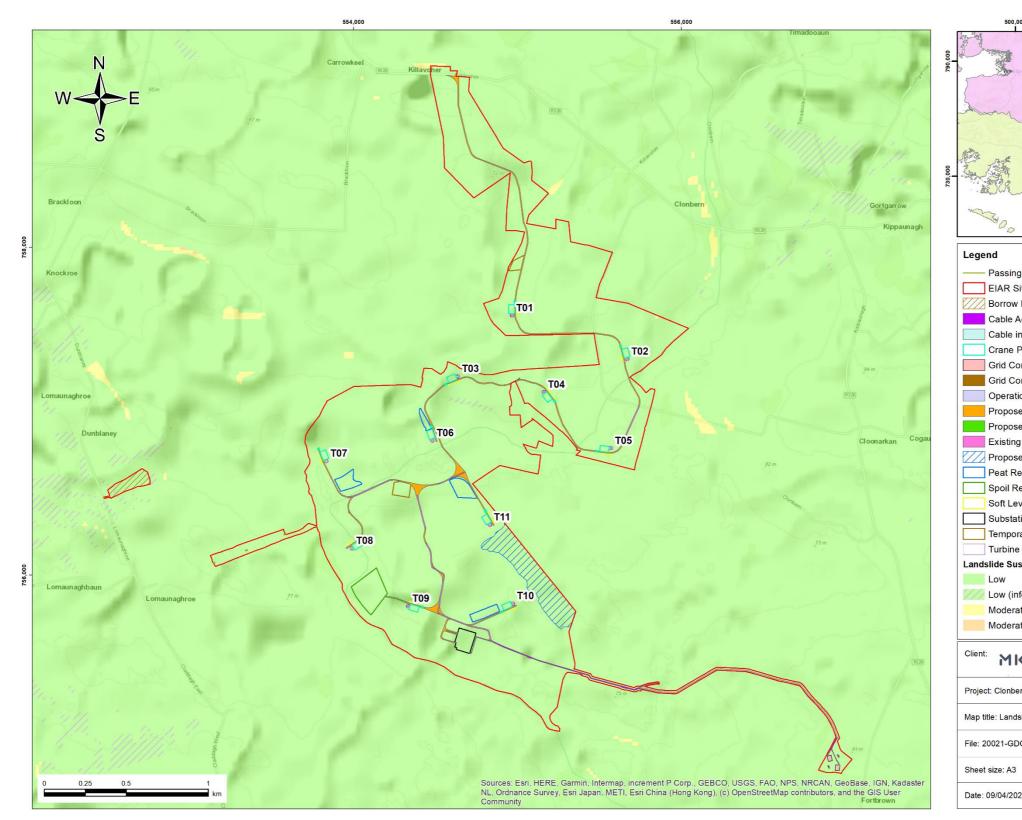


Figure G-1: Landslide Susceptibility (GSI).





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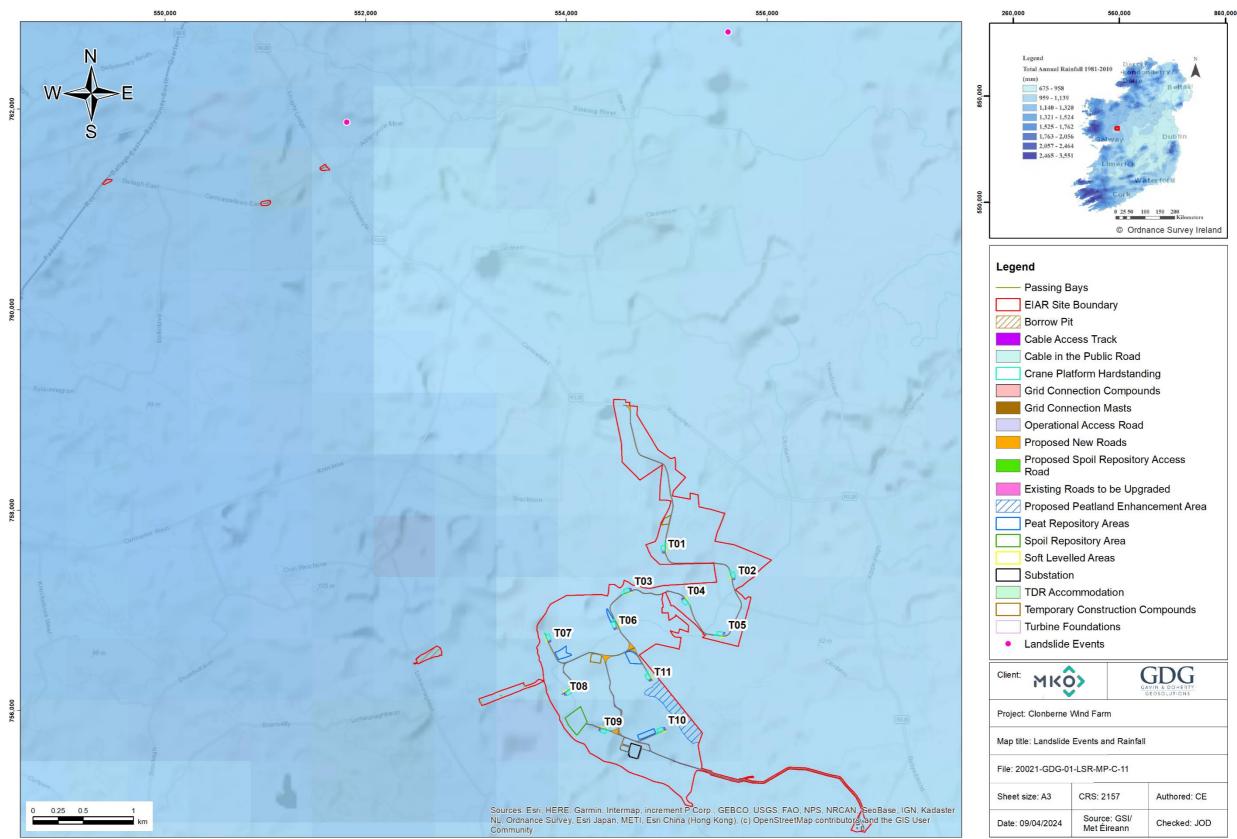


Figure G- 2: Landslide Events and Rainfall (GSI/Met Eireann).



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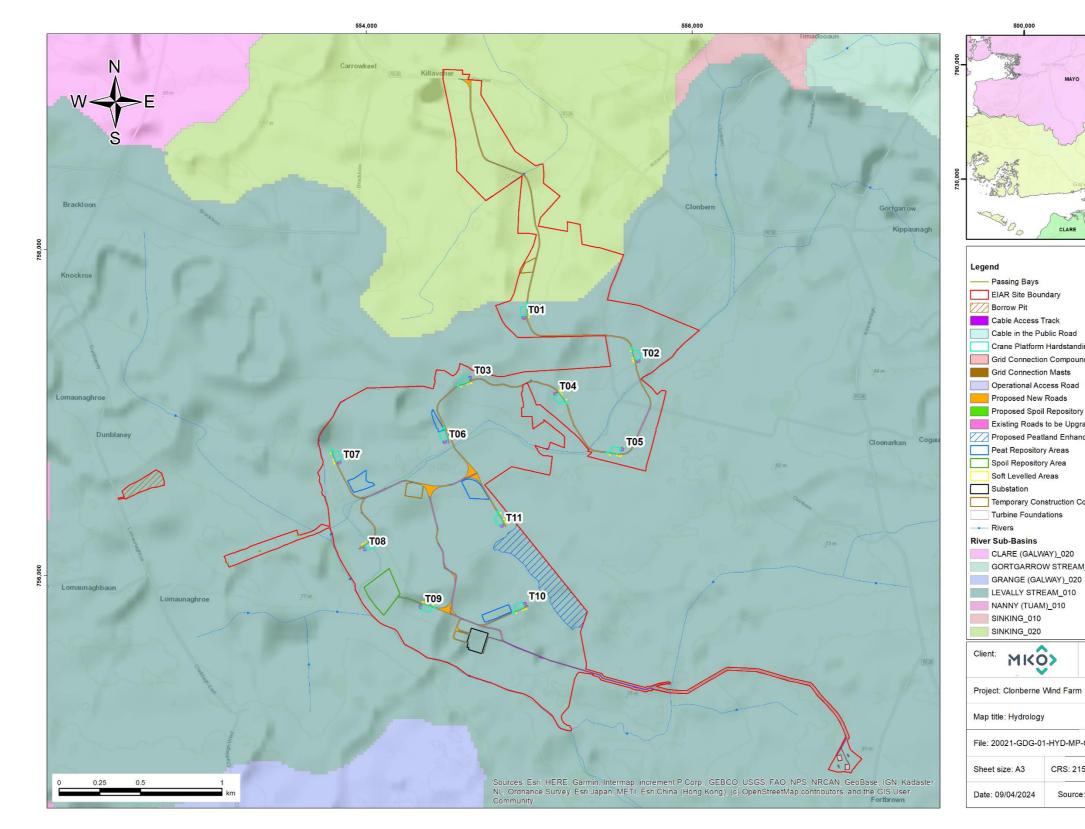


Figure H- 1: Hydrology (EPA).







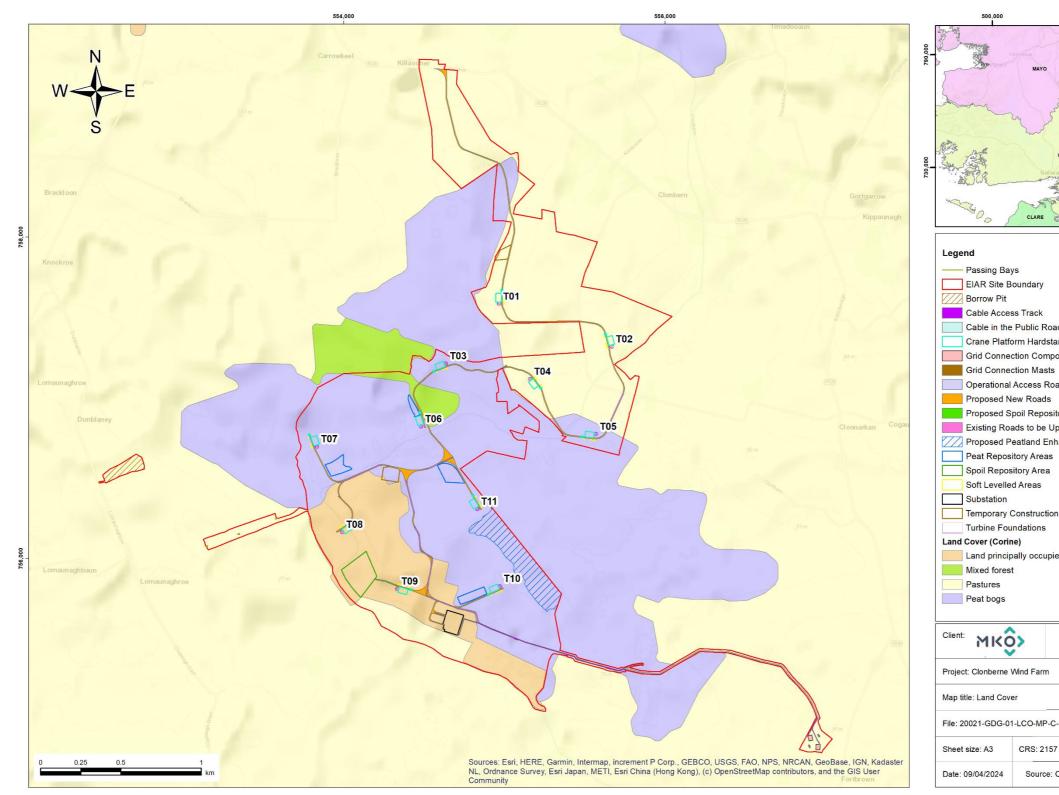


Figure I- 1: Landcover (Corine, 2018).





Cable in the Public Road Crane Platform Hardstanding Grid Connection Compounds Operational Access Road Proposed Spoil Repository Access Road Existing Roads to be Upgraded Proposed Peatland Enhancement Area Temporary Construction Compounds Land principally occupied by agriculture



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Appendix J GROUND INVESTIGATION



Figure J- 1: Ground Investigation Locations (1 of 3).

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- Crane Platform Hardstanding
- Soft Levelled Areas
- Temporary Construction Compounds
- Turbine Foundations

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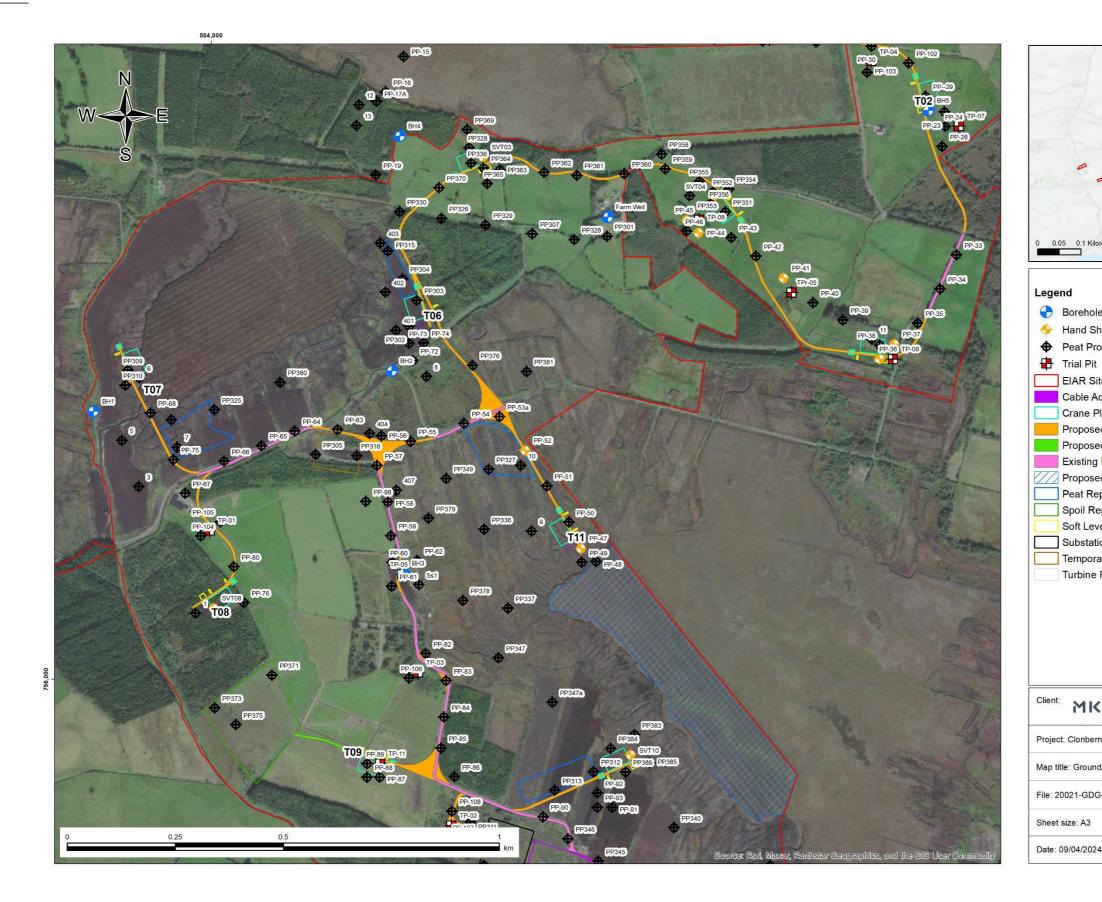
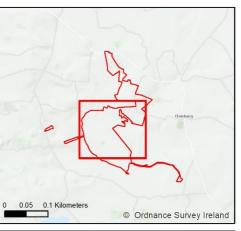


Figure J- 2: Ground Investigation Locations (2 of 3).





- Borehole
- 🔶 Hand Shear Vane
- Peat Probe
- EIAR Site Boundary
- Cable Access Track
- Crane Platform Hardstanding
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
- Soft Levelled Areas
- Substation
- Temporary Construction Compounds
- **Turbine Foundations**



Project: Clonberne Wind Farm

Map title: Ground Investigation Locations (2 of 3)

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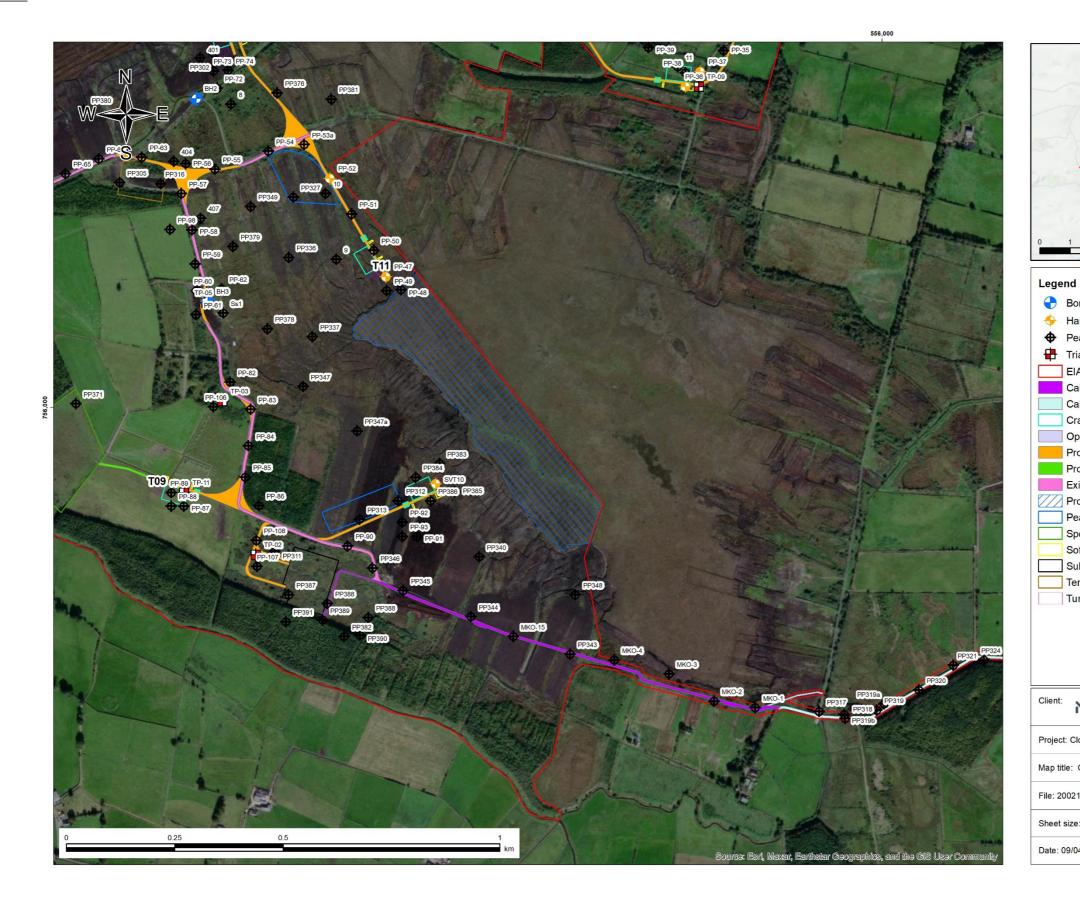
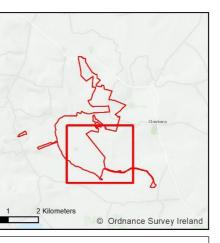


Figure J- 3: Ground Investigation Locations (3 of 3).





- Borehole
- 🔶 Hand Shear Vane
- Peat Probe
- Trial Pit
- EIAR Site Boundary
- Cable Access Track
- Cable in the Public Road
- Crane Platform Hardstanding
- Operational Access Road
 - Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**



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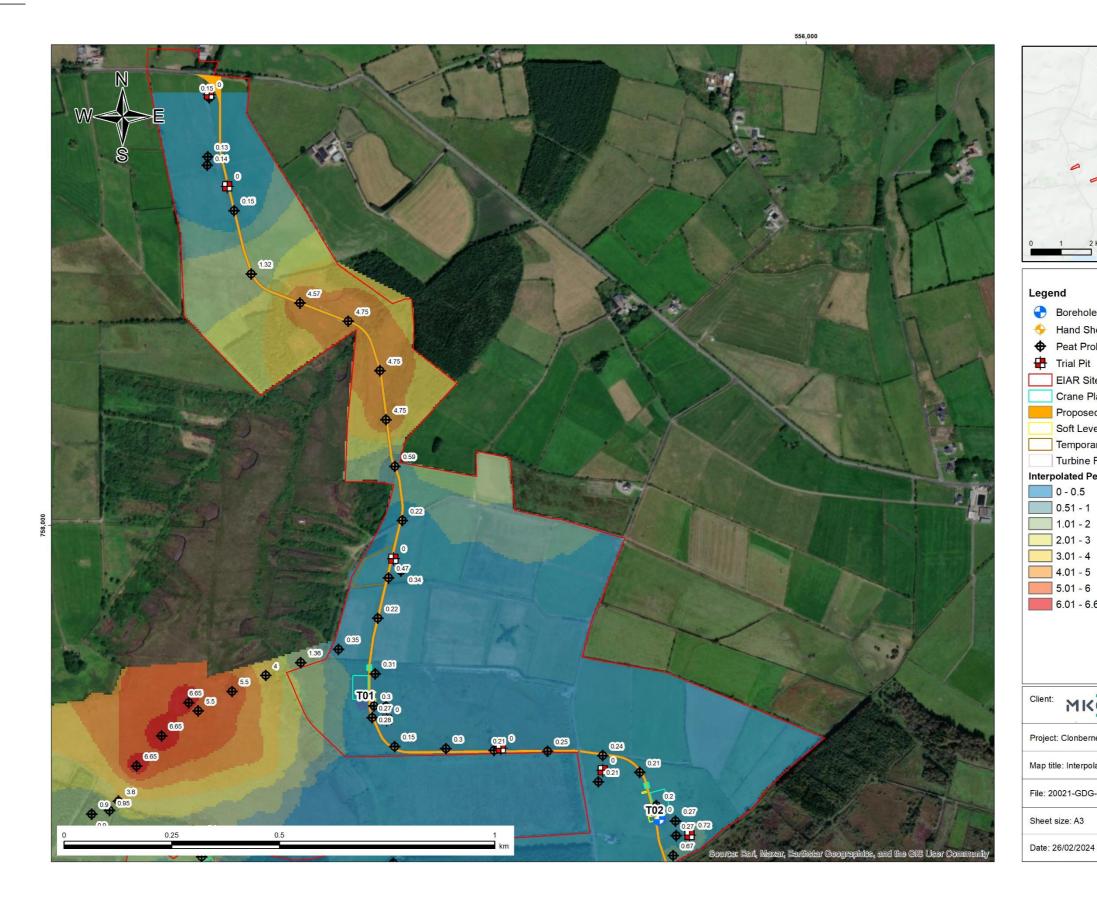
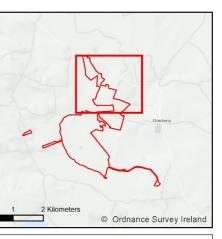


Figure J- 4: Interpolated Peat Thickness (1 of 3).





- Borehole
- 🔶 Hand Shear Vane
- Peat Probe
- Trial Pit
- EIAR Site Boundary
 - Crane Platform Hardstanding
 - Proposed New Roads
 - Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations
- Interpolated Peat Thickness (m)
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M	кô	

Project: Clonberne Wind Farm

Map title: Interpolated Peat Thickness (m) (1 of 3)

File: 20021-GDG-02-IPT-MP-C-17

ze: A3	CRS: 2157	Authored: CE
/02/2024	Source: GDG	Checked: JOD

GDG



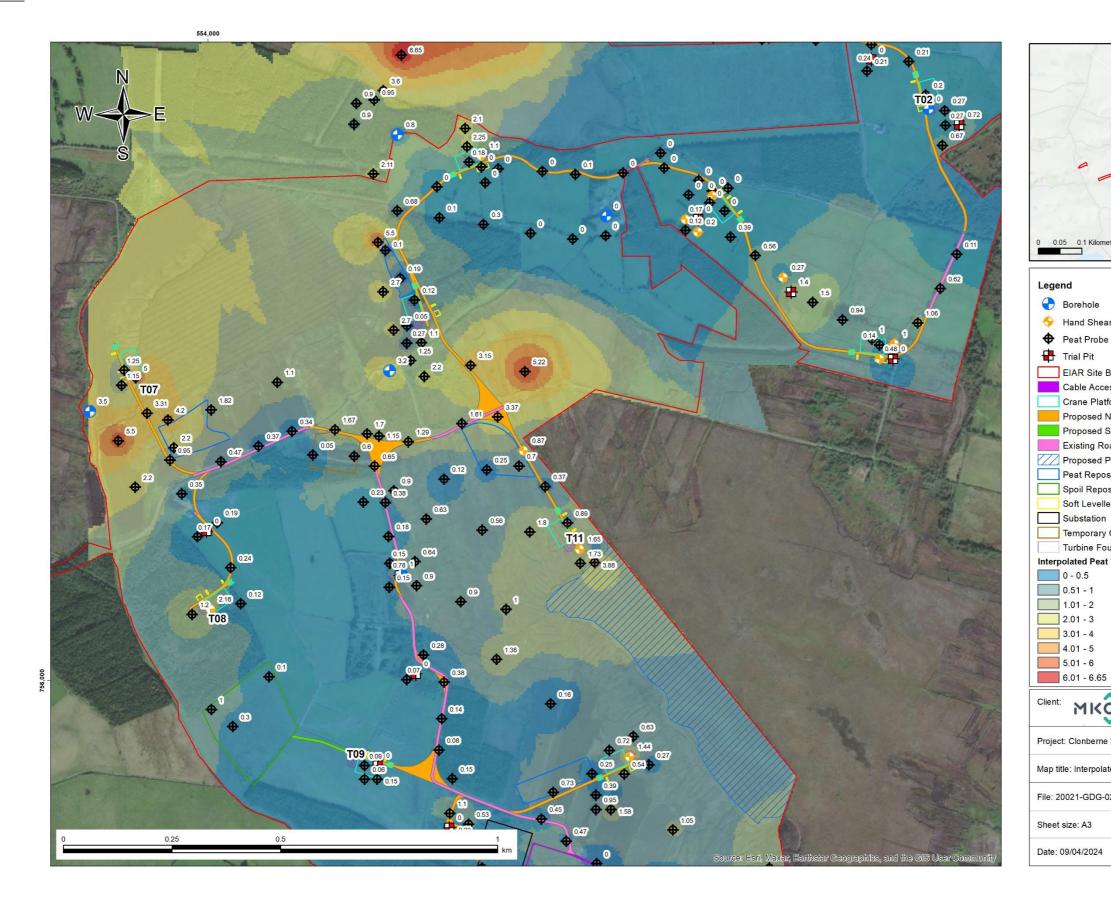
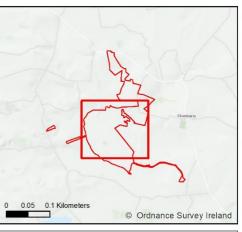


Figure J- 5: Interpolated Peat Thickness (2 of 3).





- 🔶 Hand Shear Vane
- EIAR Site Boundary
- Cable Access Track
- Crane Platform Hardstanding
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations

Interpolated Peat Thickness (m)

мко́



Project: Clonberne Wind Farm

:	Interpolated	Peat	Thickness	(m)	(2	of 3)	
:	Interpolated	Peat	Inickness	(m)	(2	ot 3)	

File: 20021-GDG-02-IPT-MP-C-18

ize: A3	CRS: 2157	Authored: CE
9/04/2024	Source: GDG	Checked: JOD



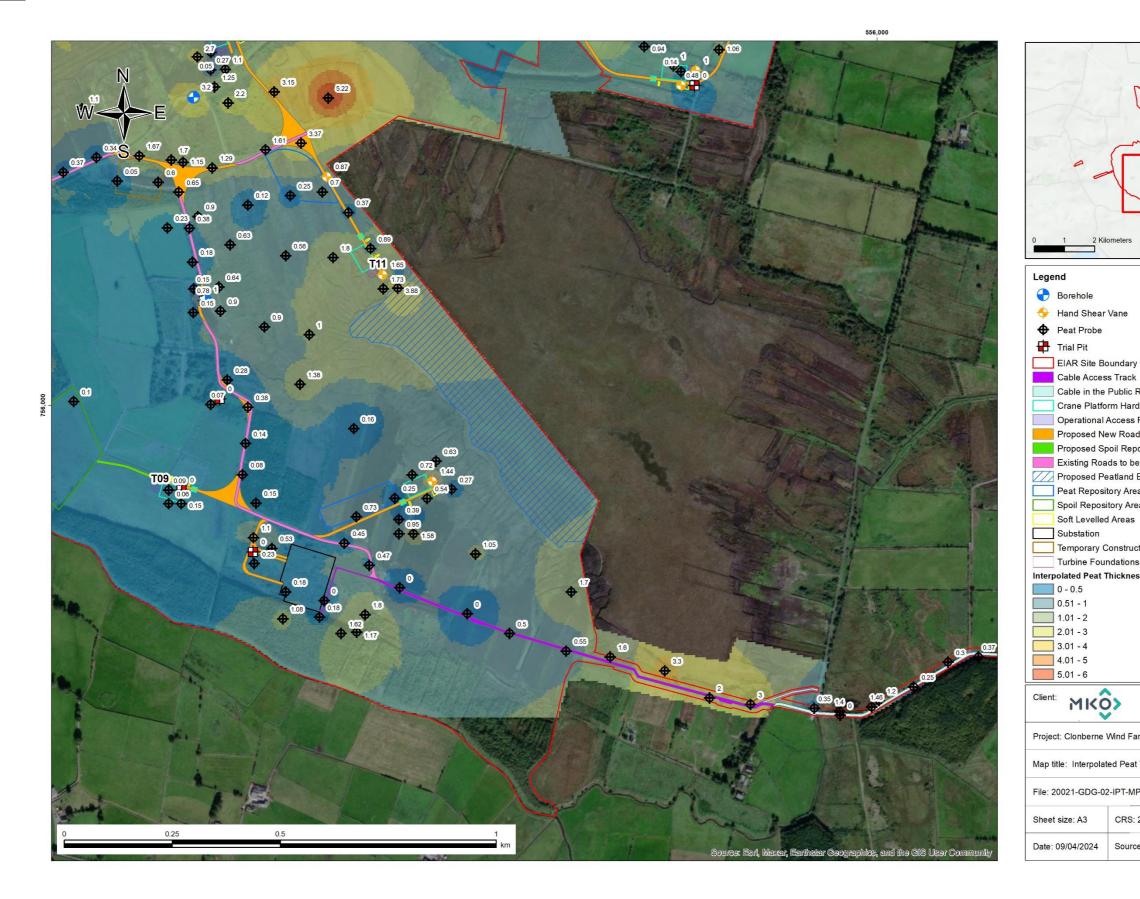
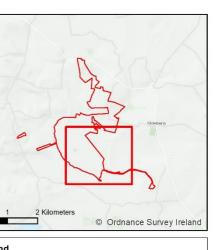


Figure J- 6: Interpolated Peat Thickness (3 of 3).





Borehole

- 🔶 Hand Shear Vane
- Peat Probe
- Cable Access Track
- Cable in the Public Road
- Crane Platform Hardstanding
- Operational Access Road
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation Temporary Construction Compounds
 - Turbine Foundations
- Interpolated Peat Thickness (m)



Project: Clonberne Wind Farm

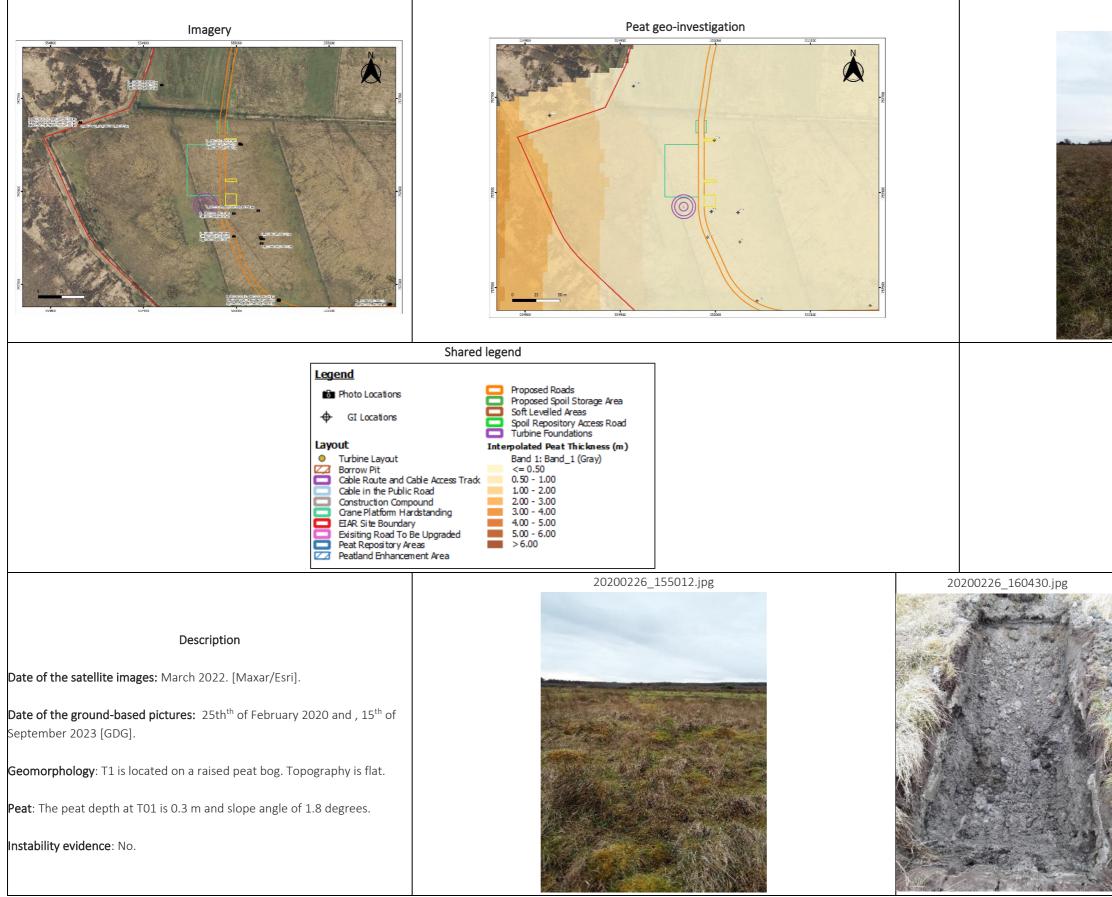
•	Interpolated	Peat	Thickness	(m)	(3 of 3)	
	merpolateu	1 Cut	1110111033	(111)	(0010)	

File: 20021-GDG-02-IPT-MP-C-19

	_	2
ze: A3	CRS: 2157	Authored: CE
/04/2024	Source: GDG	Checked: JOD



Table J-1: Site reconnaissance of the Turbine 1 site.





20200226_154338.jpg 20200226_155508.jpg



Peat geo-investigation Imagery -4 Shared legend Legend Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Spoil Repository Access Road Turbine Foundations Photo Locations - GI Locations Turbine Foundations Interpolated Peat Thickness (m) Band 1: Band_1 (Gray) <= 0.50</td> 0.50 - 1.00 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 Layout Layout Turbine Layout Berrow Pit Cable Route and Cable Access Track Cable in the Public Road Construction Compound Cane Platform Hardstanding EXR Site Boundary EXR Site Boundary EXR Site Road to Be Upgraded Peat Repository Areas Peatland Enhancement Area 4.00 - 5.00 5.00 - 6.00 > 6.00 2020-02-26_20200226_093709.jpg Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 25thth of February 2020 and , 15th of September 2023 [GDG]. **Geomorphology**: The topography is flat. **Peat**: The peat depth at T02 is 0.9m with a slope angle of 2.1 degrees Instability evidence: No.

Table J- 2: Site reconnaissance of the Turbine 2 site.







Table J- 3: Site reconnaissance of the Turbine 3 site.

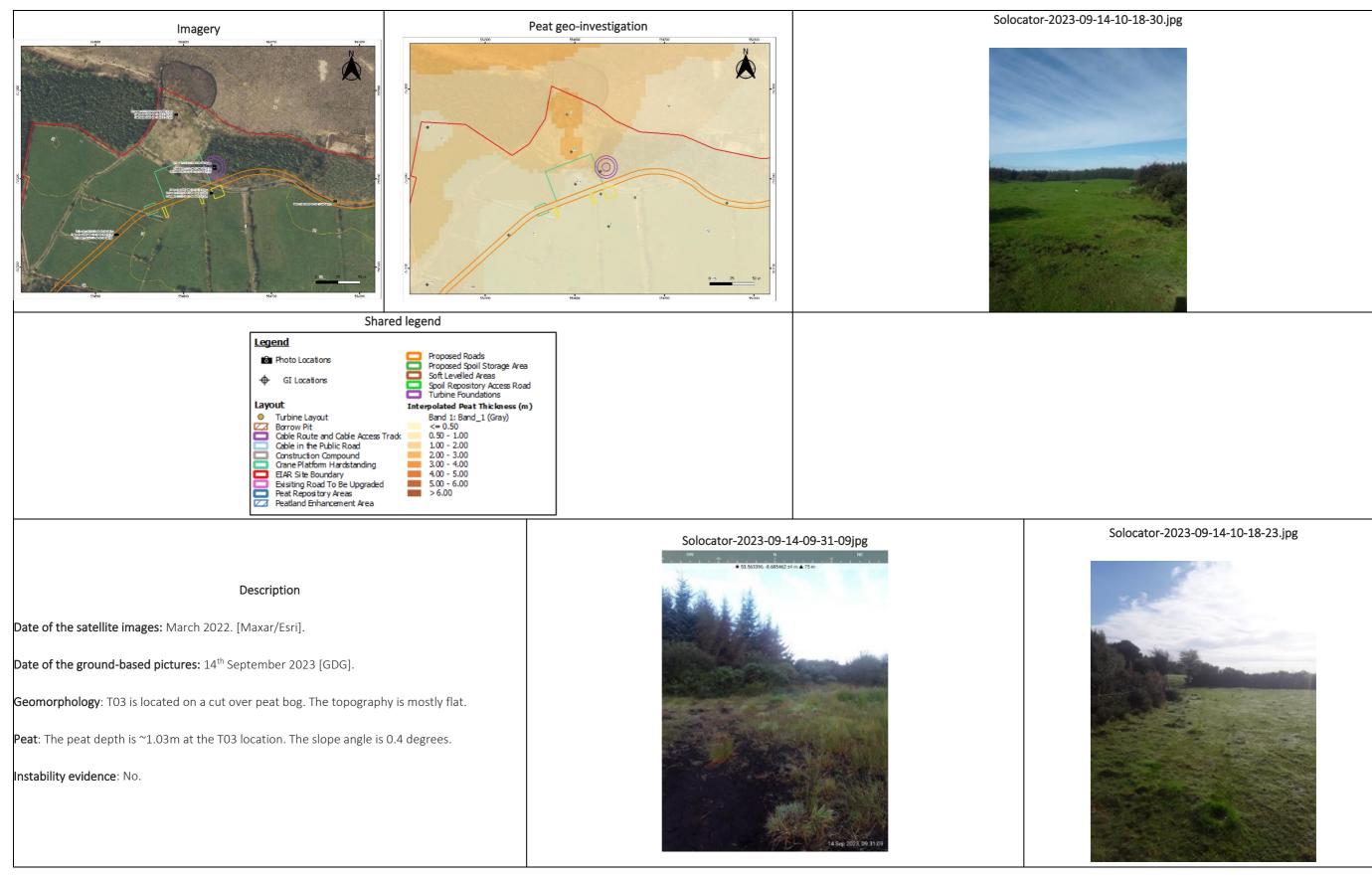
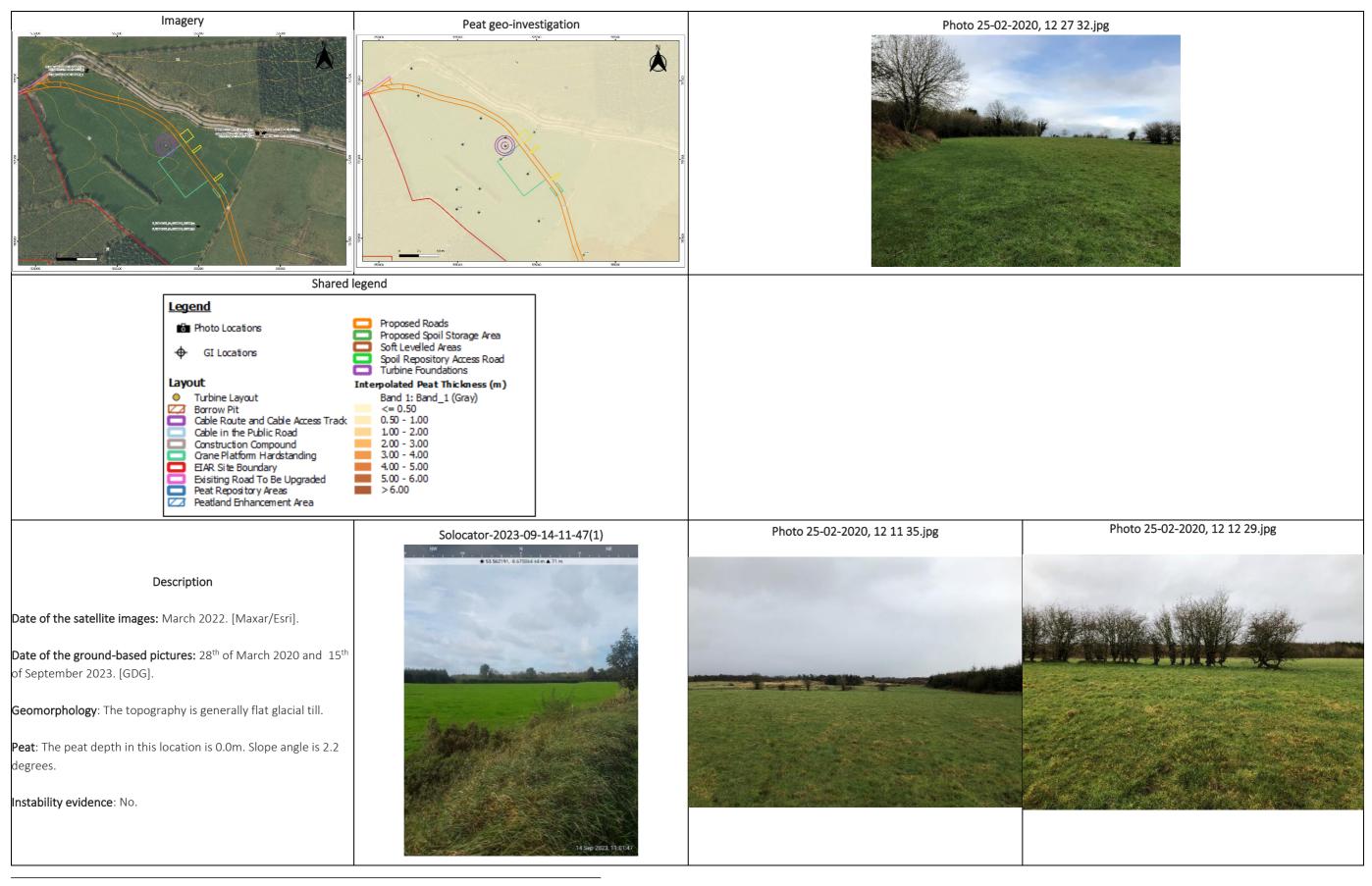






Table J- 4: Site reconnaissance of the Turbine 4 site.



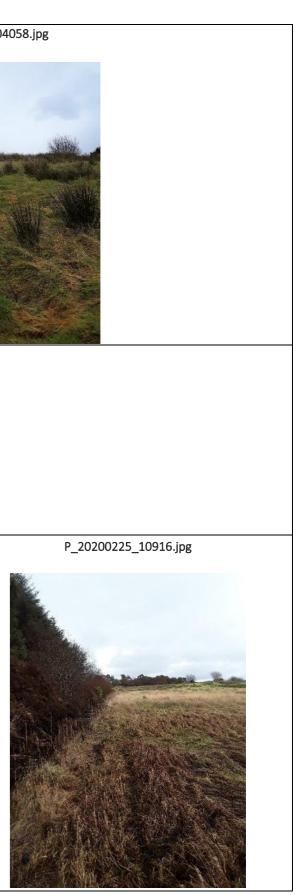




P_20200225_104058.jpg Imagery Peat geo-investigation Shared legend <u>Legend</u> Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Spoil Repository Access Road Turbine Foundations Photo Locations - GI Locations Spon... Turbine Foundation erpolated Peat Thickness / Band 1: Band_1 (Gray) < = 0.50 0.50 - 1.00 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 4.00 - 5.00 5.00 - 6.00 > 6.00 Interpolated Peat Thickness (m) Layout Layout I Turbine Layout Borrow Pit Cable Route and Cable Access Track Cable in the Public Road Construction Compound Crane Platform Hardstanding EAR Site Boundary Existing Road To Be Upgraded Peat Repository Areas Peatand Enhancement Area P_20200225_113449.jpg P_20200225_10916.jpg Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 28th of March 2020 and 15th of September 2023. [GDG]. Geomorphology: Flat cut over peat bog. Peat: Depths of 0.68 m at the turbine location. Slope angle is 4.6 degrees. Instability evidence: No.

Table J- 5: Site reconnaissance of the Turbine 5 site.







Peat geo-investigation Imagery Shared legend <u>Legend</u> Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Spoil Repository Access Road Turbine Foundations Interpolated Peat Thickness (m) Band 1: Band_1 (Gray) <= 0.50</td> (x) 0.50 - 1.00 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 4.00 - 5.00 5.00 - 6.00 > 6.00 Photo Locations + GI Locations Layout Solocator-2023-09-14-11-30-44(1).jpg Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 25th of February 2020 and 15th of September 2023. [GDG]. Geomorphology: Topography is flat cut over peat. Peat is underlain by glacial till.. **Peat**: Peat depth at T06 is 0.64m, with a slope angle of 0.58 degrees. Instability evidence: No.

Table J- 6: Site reconnaissance of the Turbine 6 site.







Photo 25-02-2020, 16 01 02.jpg





Peat geo-investigation Imagery Shared legend <u>Legend</u> Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Spoil Repository Access Road Turbine Foundations Photo Locations - GI Locations Turbine Foundations Interpolated Peat Thickness (m) Band 1: Band_1 (Gray) <= 0.50</td> 0.50 - 1.00 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 4.00 - 5.00 5.00 - 6.00 > 6.00 Layout Turbine Layout Turbine Layout Gable Route and Cable Access Track Cable in the Public Road Cable in the Public Road Cable in the Public Road Cane Platform Hardstanding EIAR Site Boundary Existing Road To Be Upgraded Peat Repository Areas Peatland Enhancement Area Solocator-2013-09-14-11-47-49(1).jpg 53.558093.-8.69188 ±4 m ▲ 60 m Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 14th of September 2023 Geomorphology: Topography is mostly flat but there is a large drain <50m from the turbine site **Peat**: Peat depth at T7 is 4.4m, with a slope angle of 6.3 degrees. Instability evidence: No.

Table J- 7: Site reconnaissance of the Turbine 7 site.

14 Sep 2023, 11:47:49

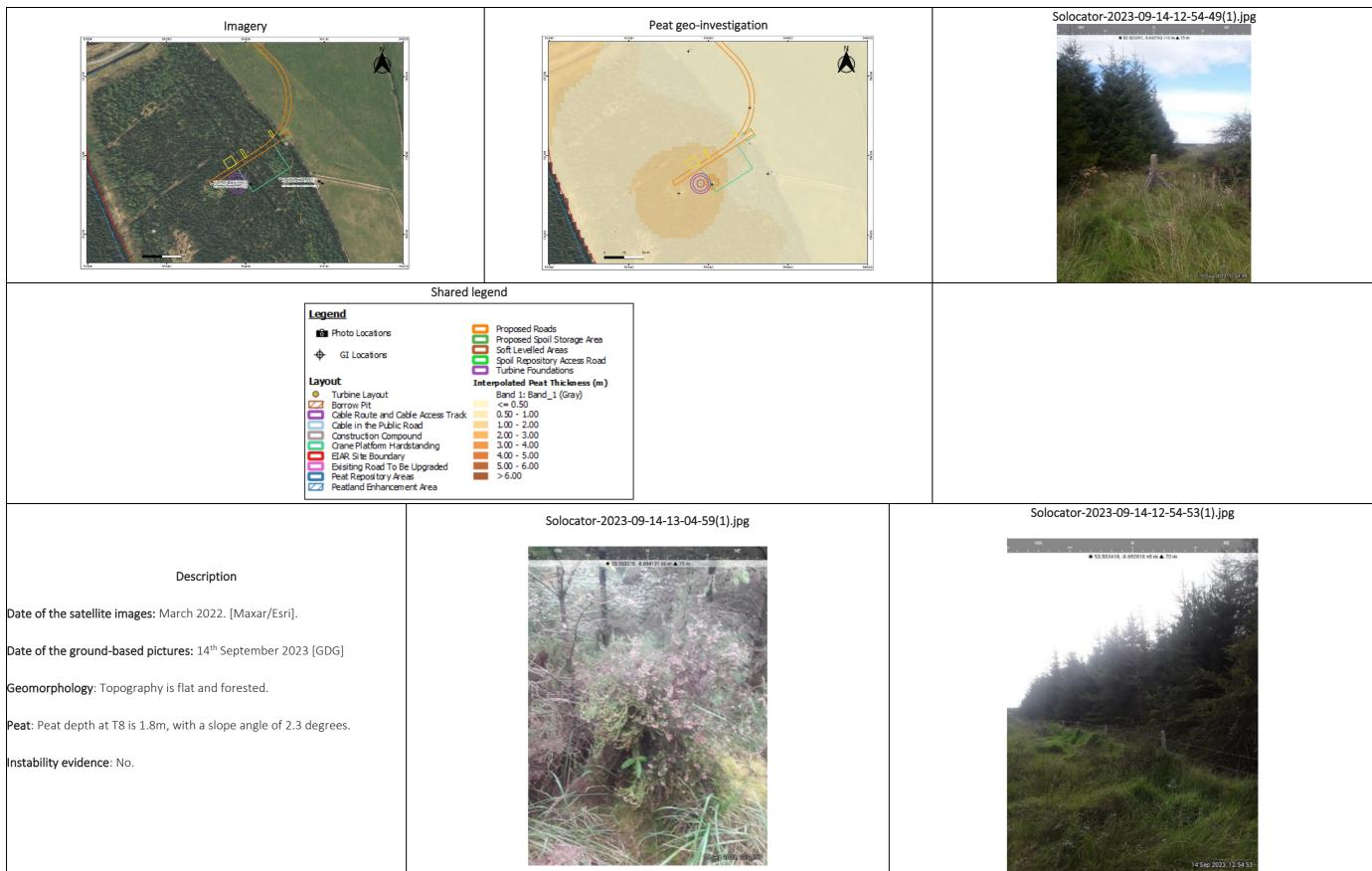


Solocator-2013-09-14-11-47-41(1).jpg





Table J- 8: Site reconnaissance of the Turbine 8 site.







Imagery Peat geo-investigation P_2020-02-26_17-_20200226_174921.jpg Shared legend Legend Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Photo Locations Spoil Repository Access Road Turbine Foundations Layout Interpolated Peat Thickness (m) Band 1: Band_1 (Gray) <= 0.50 0.50 - 1.00 Turbine Layout Cable Route and Cable Access Track Cable in the Public Road 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 Construction Compound Crane Platform Hardstanding 8 Cane Haltom Harostanding EAR Site Boundary Existing Road To Be Upgraded Peat Repository Areas Peatland Enhancement Area 4.00 - 5.00 5.00 - 6.00 > 6.00 P_2020-02-26_17-_20200226_175223.jgp P_2020-02-26_17-_20200226_171132.jgp Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 26th February 2020 [GDG] Geomorphology: Topography is flat. **Peat**: Peat depth at T9 is 0.09m, with a slope angle of 0.7 degrees. Instability evidence: No.

Table J- 9: Site reconnaissance of the Turbine 9 site.









Peat geo-investigation Imagery Shared legend <u>Legend</u> Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Soft Repository Access Road Turbine Foundations Photo Locations + GI Locations Spon ... Turbine Foundator erpolated Peat Thickness / Band 1: Band_1 (Gray) <= 0.50 0.59 - 1.00 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 4.00 - 5.00 5.00 - 6.00 > 6.00 Interpolated Peat Thickness (m) Layout In the second seco Solocator-2023-09-14-13-53-39(1).jpg 53,549972, -8,679647 ±4 m ▲ 66 m Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 14th of September 2023 [GDG] Geomorphology: Topography is flat and forested. Peat is underlain by soft lacustrine silts. Peat: Peat depth at T10 is 1.5m, with a slope angle of 0.98 degrees. Instability evidence: No. 14 Sep 2023, 13:53:39

Table J- 10: Site reconnaissance of the Turbine 10 site.









Peat geo-investigation Imagery Shared legend <u>Legend</u> Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Spoil Repository Access Road Turbine Foundations Photo Locations + GI Locations Layout Interpolated Peat Thickness (m) Band 1: Band_1 (Gray) <= 0.50 0.50 - 1.00 Turbine Layout Cable Route and Cable Access Track Cable in the Public Road 1.00 - 2.00 2.00 - 3.00 3.00 - 4.00 Cable in the Public Road Construction Compound Cane Platform Hardstanding EAR Site Boundary Exisiting Road To Be Upgraded Peat Repository Areas Peatland Enhancement Area 4.00 - 5.00 5.00 - 6.00 > 6.00 Photo 25-02-2020, 14 27 31.jpg Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures: 25th of February 2020 [GDG] Geomorphology: Topography is flat with turbary cutting ~50m from

Table J- 11: Site reconnaissance of the Turbine 11 site.

Geomorphology: Topography is flat with turbary cutting ~50m from turbine location.

Peat: Peat depth at T11 is 1.5m, with a slope angle of 1.4 degrees.

Instability evidence: No.







Photo 25-02-2020, 15 05 32.jpg



Photo 25-02-2020, 14 37 58.jpg



P_2020-02-24_15-_2020226_125308.jpg Imagery Peat geo-investigation Shared legend <u>Legend</u> Proposed Roads Proposed Spoil Storage Area Soft Levelled Areas Spoil Repository Access Road Turbine Foundations Photo Locations + GI Locations Layout Turbine Layout Borrow Pit Cable Route and Borrow Pit Cable Route and Cable Access Track Cable in the Public Road Canstruction Compound Canstruction Compound Crane Platform Hardstanding EIAR Site Boundary Existing Road To Be Upgraded Peat Repository Areas Peatland Enhancement Area ۲ P_2020226_125506.jpg P_2020226_125539.jpg Description Date of the satellite images: March 2022. [Maxar/Esri]. Date of the ground-based pictures 24th February 2020[GDG]. Geomorphology: Topography at site is mostly flat with existing founded roads adjacent to the location. **Peat**: Peat depth is 0.3m, with a slope angle of 3.3 degrees. Instability evidence: No.

Table J- 12: Site reconnaissance of the north Construction Compound site.





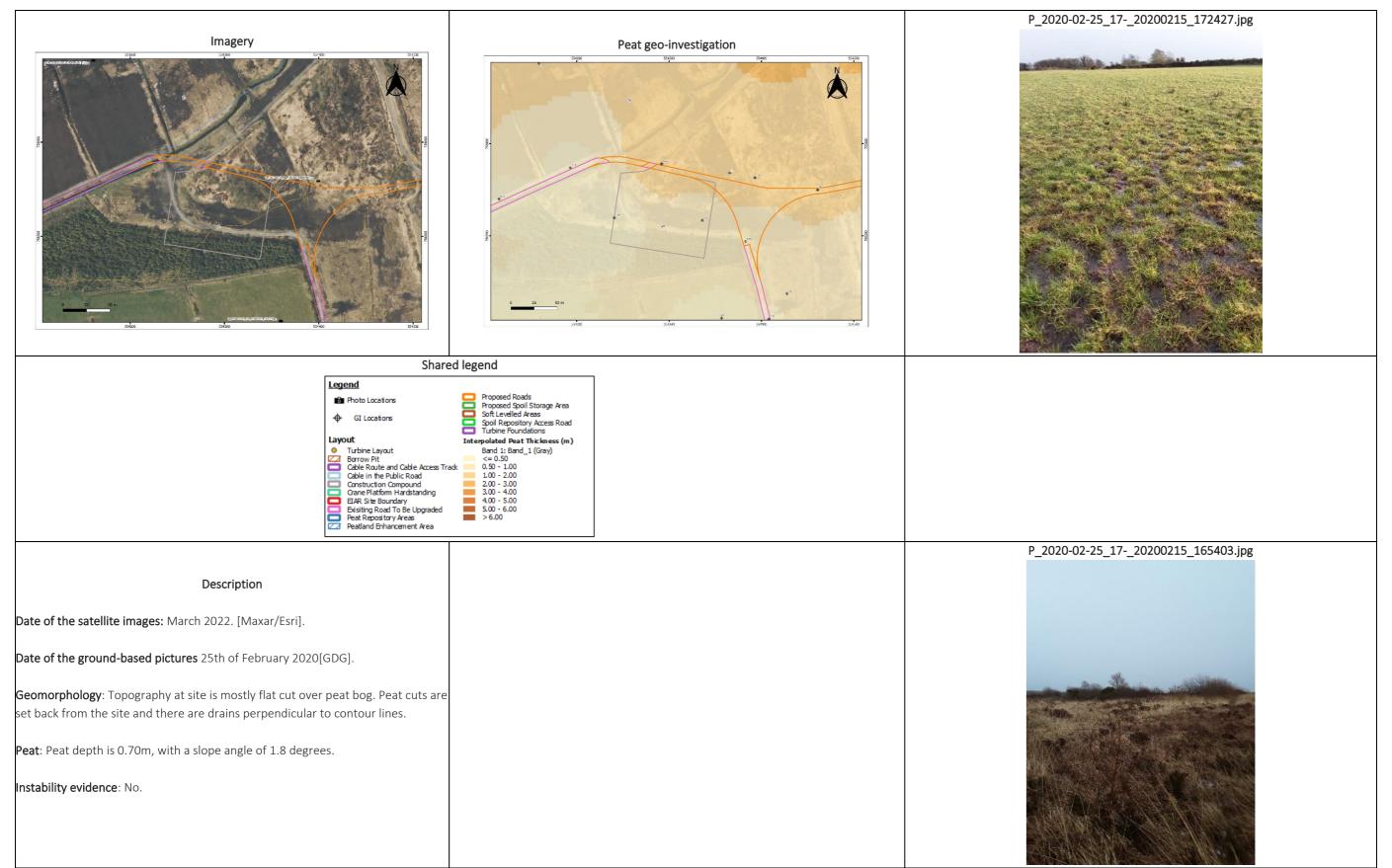
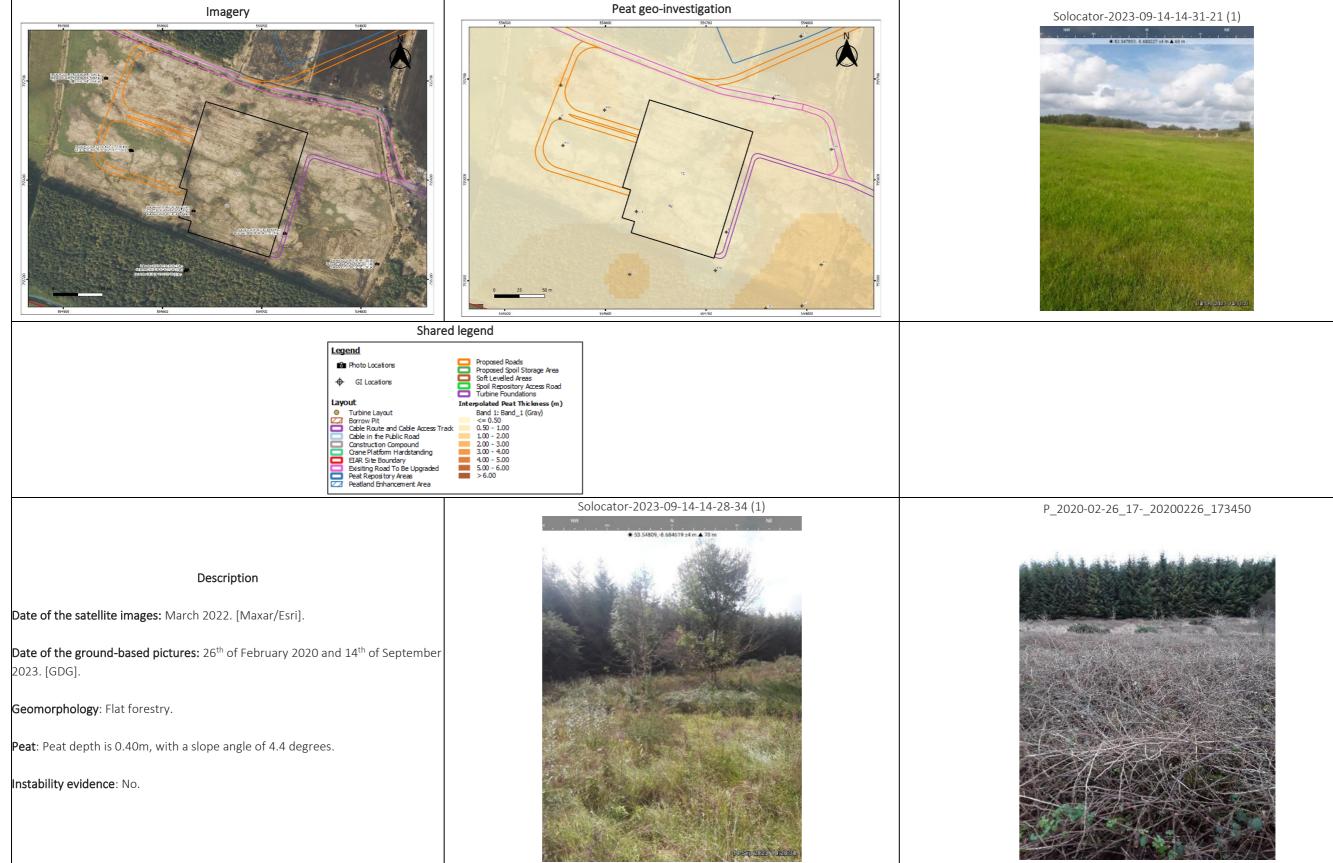


Table J- 13: Site reconnaissance of the south Construction Compound site.





Table J- 14: Site reconnaissance of substation site.







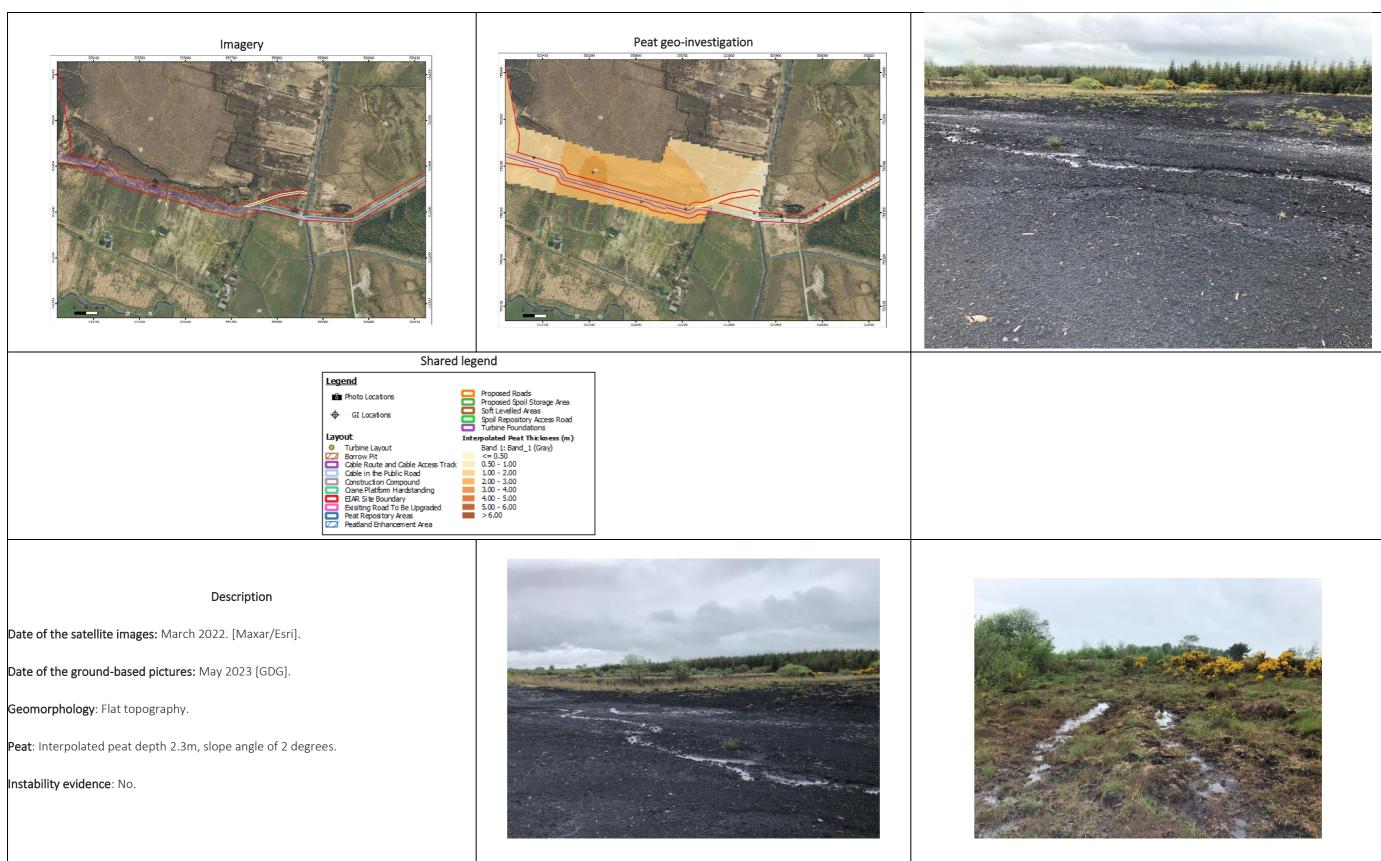


Table J- 15: Site reconnaissance of the Grid Connection.





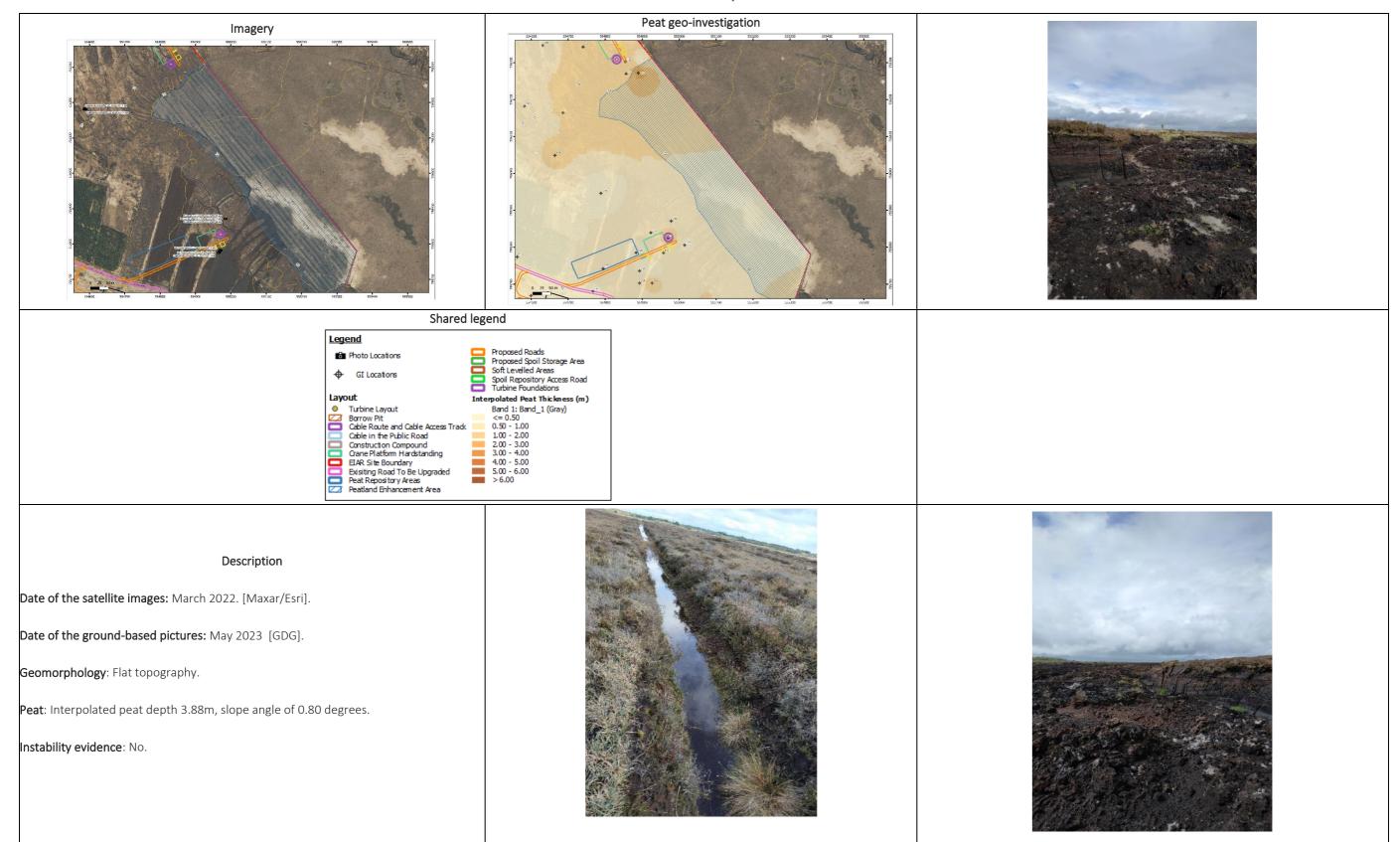


Table J- 16: Site reconnaissance of the Proposed Peatland Enhancement Area.





J.1 TRIAL PIT LOGS



	DG & DOHERTY OLUTIONS	[Tr	rial Pit Log	TrialPit TP-(Sheet 1)1	
Project	Clonbern	Windfarm			ect No.		Co-ords: 553996.00 - 756344.00		Date	
Name:	_			2002			Level: Dimensions	26/02/2 Scal		
Location	: Clonbern,	Co. Galw	ау				(m):	1:25		
Client:	McCarthy	Keville O'	Sullivan Ltd. (M	1KO)			Depth 2.50	Logge	ed	
Water Strike	Samp	oles & In Situ	Testing	Depth	Level	Legend	Stratum Description			
Str	Depth	Туре	Results	(m)	(m)	Legend	TOPSOIL (grassland)			
				0.20						
				0.20			Grey brown, stiff, high plasticity, sandy, gravelly	CLAY.		
				0.50						
✓				0.50			Light brown, loose to medium dense SAND with cobbles and large boulders. Boulders and cobb rounded to subrounded.	n many les are	2 -	
				2.50			End of Pit at 2.50m		3	
									4 -	
									5 -	
Remarks Stability:								A	п GS	

	DG & DOHERTY OLUTIONS	r r				Tr	rial Pit Log		TrialPit TP-0 Sheet 1)2
Project	Clonbern	Windfarm			ect No.		Co-ords: 554555.00 - 755661.0	0	Date	
Name:	-			2002	21		Level:		26/02/2 Scale	
Location	: Clonbern,	, Co. Galw	ay				Dimensions (m):		1:25	
Client:	McCarthy	Keville O'	'Sullivan Ltd. (N	MKO)			Depth		Logge	ed
r e	Sam	oles & In Situ	Testing	Depth	Level		3.55			
Water Strike	Depth	Туре	Results	(m)	(m)	Legend	Stratum Descript	ion		
				0.29 0.67 1.60 3.55			Peaty TOPSOIL with rootlet. Grey brown, stiff, sandy, gravelly CL cobbles. Light brown, loose to medium dense gravelly SAND with cobbles. Gravel rounded to subrounded. Grey, dense, gravelly, silty, fine to co large cobbles and boulders subrour Subrourded to subrounded. End of Pit at 3.55r	e slightly clay and cobbles	ey, are with	2
										4 -
										5 -
Remarks Stability:									A	L GS

3.00 End of Pt at 3.00m 4		DG & DOHERTY SOLUTIONS	۱ ۲ ۲				Tr	rial Pit Log	TrialPit TP-0 Sheet 1)3
Dipensions Dipensions Dipensions Scale Scale </th <th>Project</th> <th>Clonhern</th> <th>Windfarm</th> <th></th> <th></th> <th></th> <th></th> <th>Co-ords: 554478.00 - 756015.00</th> <th>Date</th> <th>;</th>	Project	Clonhern	Windfarm					Co-ords: 554478.00 - 756015.00	Date	;
Location: Compension Conservation Conservating Conservation Conservation Conservation Conse	Name:		Windlam		2002	21				
Client McCarthy Keville O'Sullivan Lid. (MKO) Depth Depth Logged 3.00 Stralue S & In Situ Testing Depth Level (m) Uogent Stralue Description Image: Second Secon	Location	n: Clonbern,	Co. Galw	ay						
Barbles & In Slut Testing Depth Level (n) Level (n) Stratum Description Barbles & In Slut Testing Depth Type Results 0.13 Brown TOPSOLL with notifet. Barbles & In Slut Testing 0.13 0.13 Brown TOPSOLL with notifet. Brown TOPSOLL with notifet. Barbles & In Slut Testing 0.13 0.13 Stratum Description Brown TOPSOLL with notifet. Barbles & In Slut Testing 0.13 0.13 Brown TOPSOLL with notifet. Brown TOPSOLL with notifet. Barbles & In Slut Testing 0.13 0.14 Brown TOPSOLL with notifet. Brown TOPSOLL with notifet. Barbles & In Slut Testing 0.11 0.14 Brown TOPSOLL with notifet. Brown TOPSOLL with notifet. Brown Soft, medium plasticity, sandy, gravelly CLAY with builders. Barbles & In Slut Testing 0.11 Brown Soft, medium plasticity, sandy. gravelly CLAY with builders. In Slut Testing In Slut Testing Barbles & In Slut Testing 0.11 In Slut Testing In Slut Testing In Slut Testing Barbles & In Slut Testing 0.11 In Slut Testing In Slut Testis In Slut Testing	Client [.]	McCarthy	Keville ()	Sullivan I td. (M	KO)			Depth		
Statum Description Type Results Line Line Statum Description Image: Statum Description 0.13 0.13 Image: Statum Description Statum Description Statum Description Image: Statum Description 0.13 0.13 Image: Statum Description Statum Description Statum Description Image: Statum Description 0.13 0.13 Image: Statum Description Statum Description Statum Description Image: Statum Description 0.71 0.71 Image: Statum Description Statum Description Statum Description Statum Description Image: Statum Description Image: Statum Description Statum Description Statum Description Statum Description Image: Statum Description Image: Statum Description Statum Description Statum Description Statum Description Image: Statum Description Image: Statum Description Statum Description Statum Description Statum Description Image: Statum Description Image: Statum Description Image: Statum Description Image: Statum Description Image: Statum Description Image: Statum Description Image: Statum Descriptio								3.00		
0.13 Brown, soft, medium plasticity, gravely, very sandy CLAY. 0.35 Gray, stiff, figh plasticity, sandy, gravely CLAY with boulders. 0.71 Graybrown loose to medium clayeyfaily coarse SAND with large cobbles and boulders subrounded to subangular. 1 Graybrown loose to medium clayeyfaily coarse SAND with large cobbles and boulders subrounded to subangular. 3.00 End of Pit at 300e.	Water Strike				_ Depth (m)	Level (m)	Legend			
0.35 0.35 0.71 Crey stift, ligh plasticity, starty CLAY with builders. 0.71 Creybrown loces to medium diavysitity coarse SAND with harde cobles and builders subrounded to aubargular. 1 Start and a star					0.13					
0.71 Grey thin ing peaking starty garacy carry with some								Brown, soft, medium plasticity, gravelly, very sa	ndy CLAY.	-
3.00 End of Pit at 3.00m 3					0.35			Grey, stiff, high plasticity, sandy, gravelly CLAY boulders.	with	
					0.71			with large cobbles and boulders subrounded to	SAND	2
					3.00			End of Pit at 3.00m		3 -
										4
Remarks:										5 -
Stability:			ı		·	I	<u> </u>		A	L GS

								TrialPit	No
		J				Tr	rial Pit Log	TP-C)4
	N & DOHER							Sheet 1	of 1
Proje	^{ct} Clonbei	n Windfar	m		oject No.		Co-ords: 555527.00 - 757431.00	Date	
Name):			20	021		Level: Dimensions	26/02/2020 Scale	
Locat	ion: Clonbei	n, Co. Gal	lway				(m):	1:25	5
Client	: McCart	hy Keville	O'Sullivan Ltd. (MK	(0)			Depth 1.20	Logge	ed
ter ke	Sa	mples & In S	itu Testing	Depth	n Level				
Water Strike	Depth	Туре	Results	(m)	(m)	Legend	Stratum Description		
							Dark/brown TOPSOIL with rootlet.		-
				0.17			Dark grey , slightly silty, very sandy GRAVEL, wi cobbles subrounded to rounded.	th	1 -
				0.84			Dark/grey very sandy GRAVEL with angular bou	Iders and	
							cobbles.		1 -
				1.20			End of Pit at 1.20m		1 =
									-
									-
									2 -
									-
									-
									3 -
									-
									-
									5 -
Rema	arks:					1			
								Δſ	29
Stabil	ity:								

CDC						TrialPit No
GAVIN & DOHERTY				Tr	ial Pit Log	TP-05
GEOSOLUTIONS						Sheet 1 of 1
Project Name: Clonbern Win	dfarm		oject No.		Co-ords: 554441.00 - 756242.00	Date
	Quburu	200	021		Level: Dimensions	27/02/2020 Scale
Location: Clonbern, Co.					(m):	1:25
-	ville O'Sullivan Ltd. (MK	C)		· · · · · · · · · · · · · · · · · · ·	Depth	Logged
1 # č	a In Situ Testing pe Results	Depth (m)	Level (m)	Legend	Stratum Description	
		0.56 0.78 2.10		Alle shie	Black/brown fibrous PEAT. Brown pseudo fibrous slightly clayey PEAT. Grey, firm to stiff, high plasticity, sandy, very gravels clay. Gravel is subrounded to subangular. At 1. many cobbles and boulders.	relly 2 mBGL 1 - 2 - 3 - 3 -
						4 -
Remarks: Stability:						AGS

GEOS	& DOHERTY OLUTIONS	(TrialPit No TP-06 Sheet 1 of 1					
Project	Clonbern	Windfarm			ect No.		Co-ords: 555026.00 - 757548.00	Date			
lame:	Cioinpein	vinuam		2002	21		Level:		26/02/2020		
ocation	n: Clonbern,	Co. Galwa	ау				Dimensions (m):	Scal			
Client:	McCarthy	Keville O'	Sullivan Ltd. (N				Depth	Logge			
		oles & In Situ	•				2.30				
Vater Strike	Depth	Туре	Results	Depth (m)	Level (m)	Legend	Stratum Description		-		
				0.05			Dark brown TOPSOIL with rootlet.	slightly bles are			
				0.25			Grey, stiff, medium strength, sandy, very gravell	y CLAY.			
				0.72			Dark grey soft, low strength, gravelly sandy, slig clayey SILT with cobbles and boulders. Cobbles gneiss angular, block with veins of quartz.	htly are	1		
				2.30			End of Pit at 2.30m		2 -		
									3 -		
									4 -		
									5 -		
Remarks		<u> </u>			1	1		A	∎ GS		

	SDC N & DOHERTY OSOLUTIONS	r r				Tr	ial Pit Log	TrialPit No TP-07 Sheet 1 of 1			
Proje	ct Clonbern	Windfarm			ect No.		Co-ords: 555729.00 - 757280.00	Date			
Name	e:	Windlam		2002	21		Level:	26/02/2020			
Loca	tion: Clonbern	, Co. Galw	ay				Dimensions (m):	Scale 1:25			
Clien	t. McCarthy	Kovillo ()	Sullivan Ltd. (M				Depth	Logged			
							2.80				
Water Strike	Depth	oles & In Situ Type	Results	_ Depth (m)	Level (m)	Legend	Stratum Description				
				0.10			TOPSOIL. Dark brown pseudo fibrous PEAT. Creamy grey, slightly organic, sandy, gravelly, s with high cobble content. Cobbles are subround subangular. Sandy lense at 1.6m.	ilty CLAY led to 1 - 2 - 3 - 4 - 5 -			
Rema	l arks:				<u> </u>			AGS			
Stabi	lity:							AUD			

	DGN & DOHERTY DSOLUTIONS	 				Tr	rial Pit Lo	g	TrialPit TP-0 Sheet 1	8		
Projec Name:	t Clonbern	Windfarm			ect No.		Co-ords: 555128.00 - 7	57063.00	Date			
				2002	21		Level: Dimensions		27/02/20 Scale			
Locati	on: Clonbern,	Co. Galw	ay				(m):		1:25			
Client:	McCarthy	Keville O'	Sullivan Ltd. (M	IKO)			Depth Logge 2.60					
Water Strike	Samp	oles & In Situ	Testing	Depth	Level	Legend		m Description				
Str	Depth	Туре	Results	(m)	(m)	Legend	TOPSOIL (grassland).			1		
							TOT OOIE (grassianu).					
				0.25			Grey, firm, sandy, gravelly	y CLAY.				
✓				0.52			Light brown, medium den gravelly, fine to coarse S/ boulders. Cobbles and bo subrounded.	se to dense, silghtly silt AND, with many cobbles bulders are rounded to	y, very s and	1		
				2.00			Grey, silghtly sandy GRA Cobbles and boulders are (possible weathered bedr	e angular to subangular	oulders.	2		
				2.60			End o	of Pit at 2.60m		3 -		
										4		
										5		
Remai Stabili				·	1				AC	I IS		

	DG N & DOHERTY DSOLUTIONS	۹ ۲				T	rial Pit Log	TrialPit TP-0 Sheet 1	9
Projec	t Clonbern	Windfarm			ect No.		Co-ords: 555577.00 - 756741.00	Date	;
Name:				2002	21			27/02/2 Scale	
Locatio	on: Clonbern,	, Co. Galw	ay				Dimensions (m):	1:25	
Client:	McCarthy	Keville O	'Sullivan Ltd. (I	MKO)			Depth 2.80	Logge	ed
Water Strike	Samp	oles & In Situ	ı Testing	Depth	Level	Legend	Stratum Description		
Str Str	Depth	Туре	Results	(m)	(m)	Legend	TOPSOIL (grassland)		1
				0.15			Greyish brown, firm, slightly gravelly, sandy CLA	V with	
							some cobbles. Cobbles are subrounded to subar	ngular.	-
									-
				0.80			Brownish grey high plasticity sandy gravelly silty	CLAY.	
									1 -
									-
									-
									-
									-
									-
				2.10					2 -
				2.10			Light grey, slightly clayey, slightly silty, sandy GR with cobbles and boulders (possible weathered b	AVEL edrock).	
									-
									-
									-
				2.80					
				2.00			End of Pit at 2.80m		-
									3 -
									-
									-
									-
									-
									-
									-
									4 -
									-
									-
									:
									5 -
Remar	ks:				1	1	1	Δ	
Stabilit	ty:								

	bolutions	۱ ۲ ۲				Tr	rial Pit Log	TrialPit TP-1 Sheet 1	1 of 1
Projec Name:	t Clonbern	Windfarm			ect No.		Co-ords: 554390.00 - 755804.00	Date	
				2002	21		Level: Dimensions	26/02/2 Scale	
Locatio	on: Clonbern,	Co. Galw	yay				_(m):	1:25	
Client:	McCarthy	Keville O	'Sullivan Ltd. (N	MKO)			Depth 2.90	Logge	ed
Water Strike		oles & In Situ	ı Testing	Depth	Level	Legend	Stratum Description	1	
	Depth	Type	Results	(m) 0.38 1.12 2.90	(m)		Brown peaty TOPSOIL with rootlets. Brown/grey firm sandy gravelly CLAY with cobb boulders. Cobbles and boulders are subangular subrounded. Dark grey/blue, soft, high plasticity, slightly sand gravelly CLAY. End of Pit at 2.90m		
Remai Stabili								A	5 – I I I I I I I I I I I I I I I I I I I

	& DOHERTY SOLUTIONS	-				Tr	TrialPit Log					
Project	Clonbern	Windfarm			ect No.		Co-ords: 554655.00 - 758787.00	Date				
Name:				2002	21		Level: Dimensions					
Locatio	n: Clonbern,	Co. Galw	ay				(m):					
Client:	McCarthy	Keville O	'Sullivan Ltd. (M	IKO)			Depth	Logge	d			
e é	Samp	les & In Situ	I Testing	Depth	Level							
Water Strike	Depth	Туре	Results	(m)	(m)	Legend	Stratum Description		-			
			0.15			TOPSOIL (grassland) Brown, firm, sandy, gravelly CLAY with cobbles. (are subrounded to subangular. Light grey, medium dense to dense, silty, sandy (with large cobbles and boulders. Boulders and co are angular to subrounded.	Cobbles					
				2.80			End of Pit at 2.80m		3			
Remark Stability								AC				

	A DOHERT	r r				Trial Pit Log						
Project Name:	Clonbern	Windfarm			ect No.		Co-ords: 555041.00 - 757	922.00	Date			
				2002	21		Level: Dimensions		27/02/2 Scale			
_ocation	n: Clonbern	, Co. Galw	ау				(m):		1:25	;		
Client:	-		Sullivan Ltd. (N	MKO)			Depth 2.25		Logge	¢		
Water Strike	Sam Depth	oles & In Situ Type	Testing Results	Depth (m)	Level (m)	Legend	Stratum I	Description				
				0.20			TOPSOIL (grassland) Brown firm to stiff sandy gra cobbles.	velly CLAY with som	e	-		
				1.10			Grey medium dense, sandy, cobbles. Cobbles are angula	silty GRAVEL with n ar to subangular.	nany	1		
				2.25			End of P	it at 2.25m		2		
										3		
										4		
										5		
Remark Stability									A	∎ ìS		

	DG a doherty plutions	-				Tr	rial Pit Log	TrialPit TPr-(Sheet 1)3	
Project	Clonbern	Windfarm			ect No.		Co-ords: 555291.00 - 757482.00	Date	;	
Name:				2002	21		Level: Dimensions	26/02/20 Scale		
Location:	Clonbern,	Co. Galw	ау				(m):	1:25		
Client:	McCarthy	Keville O'	Sullivan Ltd. (N	/IKO)			Depth 2.10	Logge	ed	
Water Strike		les & In Situ		Depth	Level	Legend	Stratum Description			
Sig	Depth	Туре	Results	(m)	(m)		Dark brown TOPSOIL with rootlets.			
							Dark grey medium dense sandy gravelly SILT wit cobbles and boulders. Grey brown, very soft, low strength, sandy, grave with cobbles and boulders.		1 -	
				2.10			End of Pit at 2.10m			
									3 -	
									4 -	
									5 -	
Remarks Stability:								AC	u GS	

	٦		1							TrialPit	No
			Γ			Trial Pit Log			TPr-0)5	
		DOHERTY	<u>/</u>							Sheet 1 of 1	
Proje				P	Project No.			Co-ords: 555342.00 - 756895.00	Date	;	
Name				2	2002	1		Level:	27/02/20		
Locat	ion:	Clonbern,	Co. Ga	Ilway					Dimensions (m):	Scale 1:25	
Client		McCarthy	Kovillo	O'Sullivan Ltd. (Mł	$\langle 0 \rangle$				Depth	Logge	
					(0)				3.05		
Water Strike		Depth	Type	Situ Testing Results	Dept (m)	th)	Level (m)	Legend	Stratum Description		
Rema	arks				3.05			Alke sike sike sike sike sike sike sike si	Dark brown fibrous PEAT with rootlets. Grey stiff high strength CLAY. End of Pit at 3.05m		
Stabil										AC	âS

Project No. Co-ordis 556413.00 - 759000.00 Date 270027000.00 Point 270027000.00 Point 270027000 Point 27002700 Point 2700	GEO	DG & DOHERTY SOLUTIONS	۱ ۲				Tr	rial Pit Log	TrialPit TPr-(Sheet 1	D6 of 1
Location: Clonbern, Co. Galway Client: McCarthy Kevile O'Sullivan Ltd. (MKO)	Project Name:	Clonbern	Windfarm					Co-ords: 554613.00 - 759000.00		
Clent: McCarthy Keville O'Sullivan Ltd. (MKO) Depth Depth Depth Longed Longed <thlonged< th=""> <thlonged< th=""> <thlonge< td=""><td colspan="3">[ſ</td><td>2002</td><td>21</td><td></td><td>Dimensions</td><td></td><td></td></thlonge<></thlonged<></thlonged<>	[ſ			2002	21		Dimensions			
Brown (no. 1) Case Cas Case Case										
Begin Type Results Cim Cim <thc< td=""><td>Client:</td><td></td><td></td><td></td><td>/KO)</td><td>1</td><td></td><td>2.80</td><td>LUgge</td><td></td></thc<>	Client:				/KO)	1		2.80	LUgge	
280 End of Pf at 28hm 3 Remarks: 6.30	Water Strike				Depth (m)	Level (m)	Legend	Stratum Description		
Remarks:								Brown to light brown sandy gravelly CLAY with co and some boulders. Cobbles are subrounded to subangular.	bbles	2
AGS										5 -
									A	□ GS





Figure K-1: Peat Factor of Safety for Undrained Conditions (1 of 3).

*The area at the northern entrance boundary contains no peat and so has not been assigned a peat FoS value, as this area was not included in the peat thickness interpolation.





- Crane Platform Hardstanding
- Proposed New Roads
- Soft Levelled Areas
- Temporary Construction Compounds
- **Turbine Foundations**
- Peat Factor of Safety for Undrained Conditions

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Checked: JOD



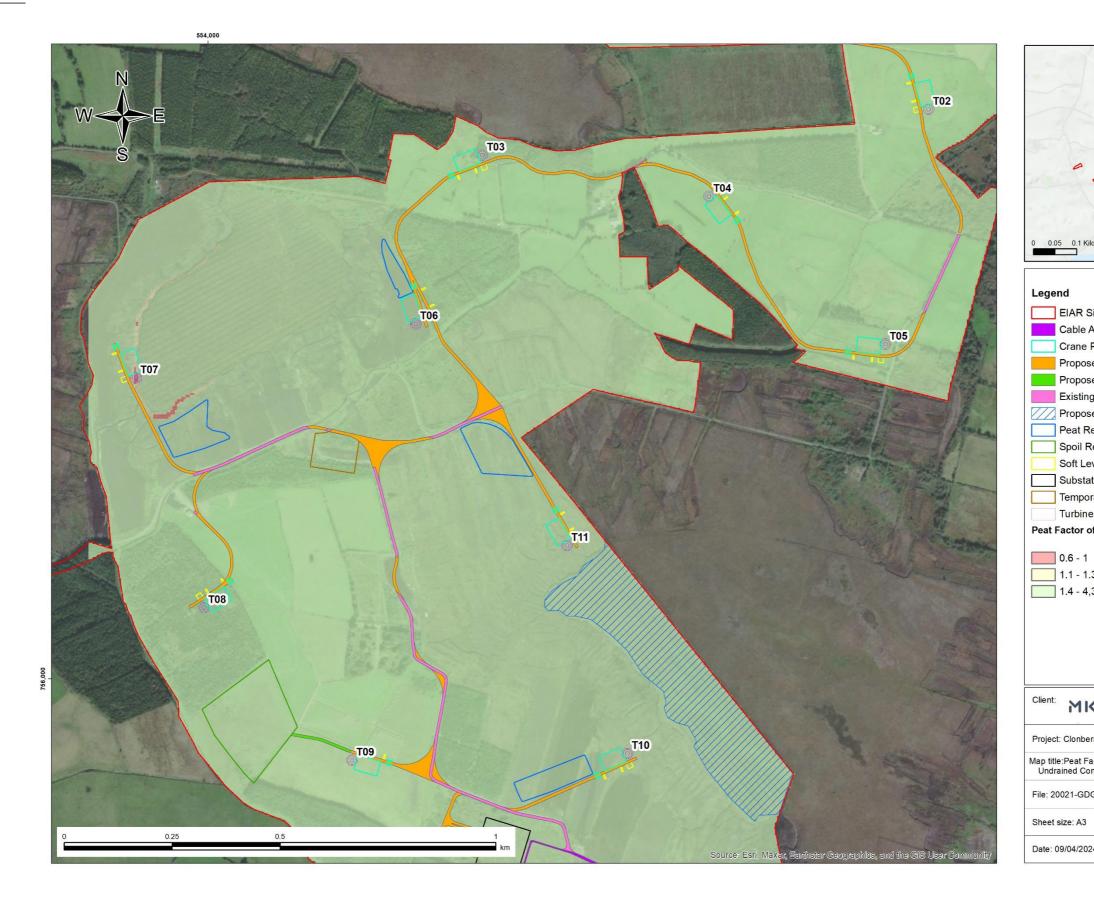
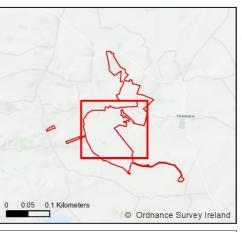


Figure K- 2: Peat Factor of Safety for Undrained Conditions (2 of 3).





- EIAR Site Boundary
- Cable Access Track
- Crane Platform Hardstanding
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Undrained Conditions
- 1.1 1.3 1.4 - 4,391.1





Project: Clonberne Wind Farm

Map title:Peat Factor of Safety for Undrained Conditions (2 of 3)

File: 20021-GDG-02-FS3-MP-C-27

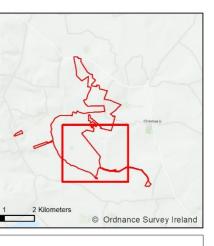
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/04/2024	Source: GDG	Checked: JOD





Figure K- 3: Peat Factor of Safety for Undrained Conditions (3 of 3).





- EIAR Site Boundary
 - Cable Access Track
 - Cable in the Public Road
 - Crane Platform Hardstanding
 - **Operational Access Road**
 - Proposed New Roads
 - Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Undrained Conditions
- 1.4 4,391.1





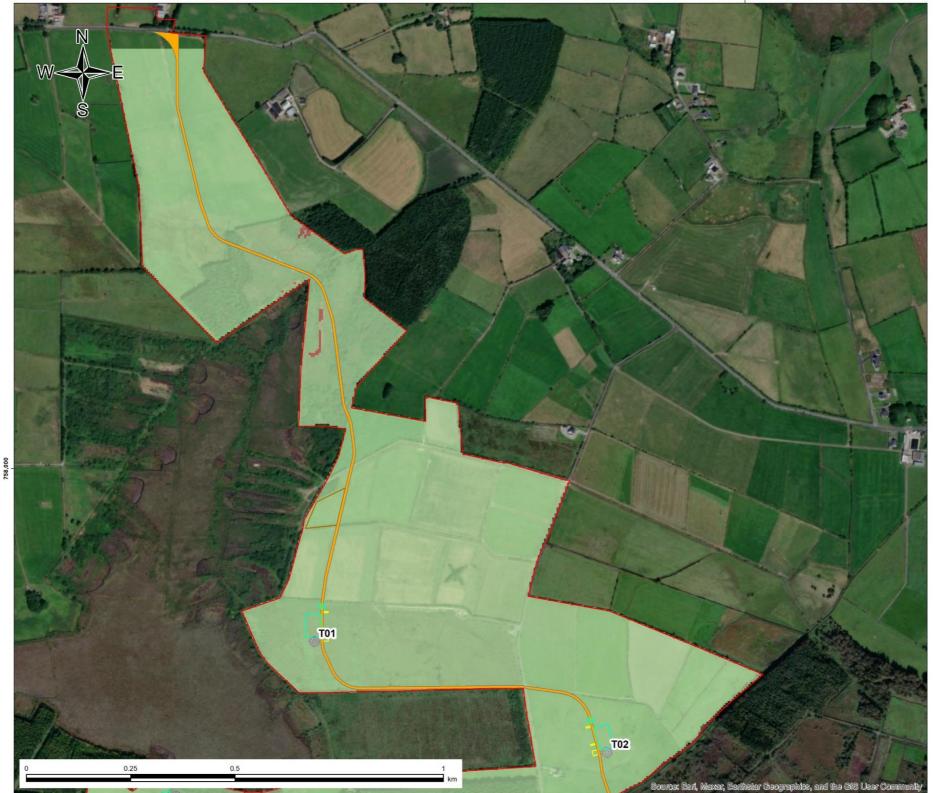
Project: Clonberne Wind Farm

Map title: Peat Factor of Safety for Undrained Conditions (3 of 3)

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Sheet size: A

Date: 26/02/2

Figure K- 4: Peat Factor of Safety for Undrained Conditions with 10kPa Surcharge (1 of 3).

556.000

*The area at the northern entrance boundary contains no peat and so has not been assigned a peat FoS value, as this area was not included in the peat thickness interpolation.





- EIAR Site Boundary
- Crane Platform Hardstanding
- Proposed New Roads
- Soft Levelled Areas
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Undrained Conditions with 10kPa Surcharge
- 0.7 1

Legend

- 1.1 1.3
- 1.4 7,140,493.5





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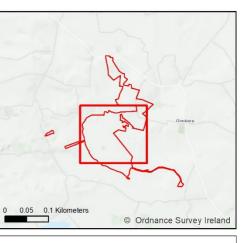
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Figure K- 5: Peat Factor of Safety for Undrained Conditions with 10kPa Surcharge (2 of 3).





Legend

- EIAR Site Boundary
- Cable Access Track
- Crane Platform Hardstanding
 - Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - Turbine Foundations

Peat Factor of Safety for Undrained Conditions with 10kPa Surcharge

- 0.7 1
- 1.1 1.3

1.4 - 7,140,493.5

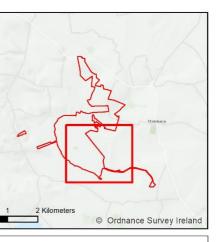
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Project: Clonberne	Project: Clonberne Wind Farm				
Map title:Peat Factor with 10	of Safety for Undra kPa Surcharge (2 o				
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Date: 09/04/2024	Source: GDG	Checked: JOD			





Figure K- 6: Peat Factor of Safety for Undrained Conditions with 10kPa Surcharge (3 of 3).





- EIAR Site Boundary
 - Cable Access Track
 - Cable in the Public Road
 - Crane Platform Hardstanding
 - Operational Access Road
 - Proposed New Roads
 - Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
- Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**

Peat Factor of Safety for Undrained Conditions with 10kPa Surcharge

- 1.4 7,140,493.5



Project: Clonberne Wind Farm

Map title: P	eat Factor of Safet	v for
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0/04/2024	Source: GDG	Checked: JOD

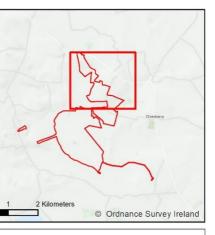




Figure K-7: Peat Factor of Safety for Drained Conditions (1 of 3).

*The area at the northern entrance boundary contains no peat and so has not been assigned a peat FoS value, as this area was not included in the peat thickness interpolation.





- EIAR Site Boundary
- Crane Platform Hardstanding
- Proposed New Roads
- Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations
- Peat Factor of Safety for Drained Conditions
- 1.4 5,712,394.5



Map title: Peat Factor of Safety for Drained Conditions (1 of 3)

File: 20021-GDG-02-FS1-MP-C-20

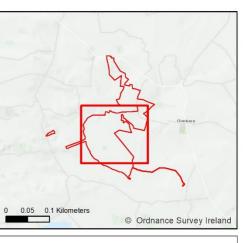
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Figure K-8: Peat Factor of Safety for Drained Conditions (2 of 3).





Legend

- EIAR Site Boundary
 - Cable Access Track
- Crane Platform Hardstanding
 - Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Drained Conditions
- 0.6 1

1.1 - 1.3 1.4 - 5,712,394.5

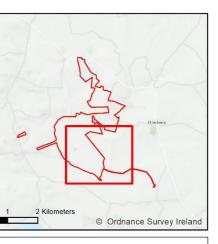
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Project: Clonberne	Project: Clonberne Wind Farm						
Map title:Peat Facto	or of Safety for Drain	ned Conditions (2 of 3)					
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Date: 09/04/2024	Source: GDG	Checked: JOD					





Figure K- 9: Peat Factor of Safety for Drained Conditions (3 of 3).





- EIAR Site Boundary
- Cable Access
 - Cable in the Public Road
- Crane Platform Hardstanding
- **Operational Access Road**
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Drained Conditions
- 1.1 1.3
- 1.4 5,712,394.5





Project: Clonberne Wind Farm

Map title: Peat Factor of Safety for Drained Conditions (3 of 3)

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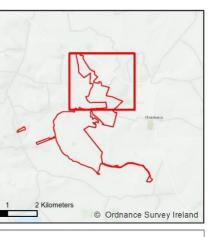




Figure K- 10: Peat Factor of Safety for Drained Conditions with 10kPa Surcharge (1 of 3).

*The area at the northern entrance boundary contains no peat and so has not been assigned a peat FoS value, as this area was not included in the peat thickness interpolation.





- EIAR Site Boundary
 - Crane Platform Hardstanding
- Proposed New Roads
- Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations
- Peat Factor of Safety for Drained Conditions with 10kPa Surcharge
- 1.4 5,712,394.5

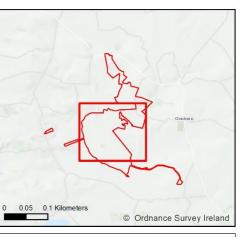






Figure K- 11: Peat Factor of Safety for Drained Conditions with 10kPa Surcharge (2 of 3).





- EIAR Site Boundary
 - Cable Access
 - Crane Platform Hardstanding
 - Proposed New Roads
- Proposed Spoil Repository Access
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement
- Peat Repository Areas
- Spoil Repository
 - Soft Levelled
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Drained Conditions with 10kPa Surcharge
- 1.4 5,712,394.5



Project: Clonberne Wind Farm

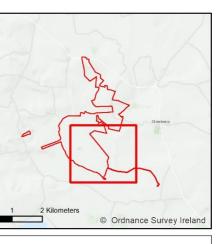
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Figure K- 12: Peat Factor of Safety for Drained Conditions with 10kPa Surcharge (3 of 3).





- EIAR Site Boundary
 - Cable Access Track
 - Cable in the Public Road
 - Crane Platform Hardstanding
- Operational Access Road
- Proposed New Roads
- Proposed Spoil Repository Access Road
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
- Substation
- Temporary Construction Compounds
 - **Turbine Foundations**
- Peat Factor of Safety for Drained Conditions with 10kPa Surcharge 1.4 - 5,712,394.5
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Project: Clonberne Wind Farm

Map title: Pe	at Fa	actor of	Safety for	
Conditions	with	10kPa	Surcharge (3 of 3)

File: 20021-GDG-02-FS2-MP-C-25

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/04/2024	Source: GDG	Checked: JOD



Table K- 1: Factor of Safety Calculation for Undrained Conditions.

				Undrained shear	Bulk unit weight				Factor of Safety with	
Proposed infrastructure	Slope	Cos Slope	Sin Slope	strength	of Peat	Peat depth	Factor of Safety	Surcharge	Surcharge	Slope
	(º)			Cu (kPa)	Y (kN/m ³)	(m)		(m)		Rad
T1	1.8	1.000	0.032	5	10	0.3	49.42	1	12.02	0.031508
Т2	2.1	0.999	0.037	5	10	0.1	151.31	1	12.32	0.037298
тз	0.4	1.000	0.008	5	10	1.0	62.12	1	31.61	0.007766
Т4	2.2	0.999	0.039	5	10	0.0	3968.94	1	12.80	0.038984
Т5	4.6	0.997	0.080	5	10	0.7	9.22	1	3.72	0.080515
Т6	0.6	1.000	0.010	5	10	0.6	76.83	1	30.10	0.010102
Т7	6.3	0.994	0.111	5	10	4.4	1.03	1	0.84	0.110732
Т8	2.3	0.999	0.040	5	10	1.8	7.06	1	4.53	0.03953
Т9	0.7	1.000	0.013	5	10	0.1	453.41	1	35.59	0.012946
Т10	1.0	1.000	0.017	5	10	1.5	20.17	1	11.94	0.017089
T11	1.4	1.000	0.025	5	10	1.5	12.91	1	7.82	0.025173
CC N	3.3	0.998	0.058	5	10	0.3	29.00	1	6.69	0.057596
CC S	1.8	1.000	0.031	5	10	0.7	22.75	1	9.37	0.031416
Substation	3.5	0.998	0.061	5	10	0.4	20.51	1	5.86	0.061087
Peatland Enhancement Area	0.8	1.000	0.014	5	10	3.9	9.23	1	7.34	0.013963
Grid Connection	3.0	0.999	0.052	5	10	2.4	3.99	1	2.81	0.05236
PRA 1	1.2	1.000	0.021	5	10	0.7	34.11	1	14.05	0.020944
PRA 2	1.8	1.000	0.031	5	10	1.1	14.48	1	7.58	0.031416
PRA 3	1.4	1.000	0.024	5	10	2.2	9.30	1	6.40	0.024435
PRA 4	0.4	1.000	0.007	5	10	0.4	179.06	1	51.16	0.006981
PRA 5	1.0	1.000	0.017	5	10	0.7	40.93	1	16.86	0.017453
SRA	1.7	1.000	0.030	5	10	0.4	42.15	1	12.04	0.029671

Undrained conditions

 C_u F = - $\gamma z \sin \alpha \cos \alpha$

Where,

- F = Factor of Safety
- c_u = Undrained strength
- γ = Bulk unit weight of material
- z = Depth to failure plane assumed as depth of peat
- α = Slope angle





Table K- 2: Factor of Safety Calculation for Drained Conditions.

													-	
	Drained shear	Bulk unit weight of		Bulk unit weight of	Height of water table above								Surcha rge	FoS
Proposed infrastructure		-	Doot dooth	C C	failure surface	Clana	Coclore	Cos ² Slope	Cin Clana	<u>ل</u> ا		Fas		
Proposed initiastructure	strength	Peat	Peat depth	water		Slope	cos siope	Cos siope	Sin Siope	ф'	Tan φ'	FoS	(m)	Surcharge
	Cu (kPa)	Y (kN/m ³)	(m)	Y (kN/m ³)	(m)	(º)								
T1	4	10	0.32	9.8	0.32	1.8		0.999	0.032	25	0.466	39.83	1	20.88
Т2	4	10	0.09	9.8	0.09	2.1	0.999	0.999	0.037	25	0.466	121.30	1	21.36
ТЗ	4	10	1.04	9.8	1.04	0.4	1.000	1.000	0.008	25	0.466	50.89	1	55.39
Τ4	4	10	0.00	9.8	0.00	2.2	0.999	0.998	0.039	25	0.466	3175.39	1	22.16
Т5	4	10	0.68	9.8	0.68	4.6	0.997	0.994	0.080	25	0.466	7.49	1	6.47
Тб	4	10	0.64	9.8	0.64	0.6	1.000	1.000	0.010	25	0.466	62.39	1	52.52
Τ7	4	10	4.44	9.8	4.44	6.3	0.994	0.988	0.111	25	0.466	0.90	1	1.51
Т8	4	10	1.79	9.8	1.79	2.3	0.999	0.998	0.040	25	0.466	5.88	1	8.00
Т9	4	10	0.09	9.8	0.09	0.7	1.000	1.000	0.013	25	0.466	363.45	1	61.72
T10	4	10	1.45	9.8	1.45	1.0	1.000	1.000	0.017	25	0.466	16.69	1	21.01
T11	4	10	1.54	9.8	1.54	1.4	1.000	0.999	0.025	25	0.466	10.70	1	13.78
CC N	4	10	0.30	9.8	0.30	3.3	0.998	0.997	0.058	25	0.466	23.36	1	11.61
CC S	4	10	0.70	9.8	0.70	1.8	1.000	0.999	0.031	25	0.466	18.50	1	16.35
Substation	4	10	0.40	9.8	0.40	4.4	0.997	0.994	0.077	25	0.466	13.07	1	8.02
Peatland Enhancement Area	4	10	3.88	9.8	3.88	0.8	1.000	1.000	0.014	25	0.466	8.05	1	13.25
Grid Connection	4	10	2.30	9.8	2.30	3.0	0.999	0.997	0.052	25	0.466	3.51	1	5.14
PRA 1	4	10	0.70	9.8	0.70	1.2	1.000	1.000	0.021	25	0.466	27.74	1	24.52
PRA 2	4	10	1.10	9.8	1.10	1.8	1.000	0.999	0.031	25	0.466	11.88	1	13.29
PRA 3	4	10	2.20	9.8	2.20	1.4	1.000	0.999	0.024	25	0.466	7.83	1	11.34
PRA 4	4	10	0.40	9.8	0.40	0.4	1.000	1.000	0.007	25	0.466	144.58	1	89.02
PRA 5	4	10	0.70	9.8	0.70	1.0	1.000	1.000	0.017	25	0.466	33.28	1	29.42
SRA	4	10	0.40	9.8	0.40	1.7	1.000	0.999	0.030	25	0.466	34.04	1	20.95

Drained conditions

$$F = \frac{c' + (\gamma z - \gamma_w h_w) \cos^2 \alpha \tan \phi'}{\gamma z \sin \alpha \cos \alpha}$$

Where,

- F = Factor of Safety
- *c'* = Effective cohesion
- γ = Bulk unit weight of material
- *z* = Depth to failure plane assumed as depth of peat
- $\gamma_w =$ Unit weight of water
- h_w = Height of water table above failure plane
- α = Slope angle
- ϕ' = Effective friction angle





Appendix L SAFETY BUFFER AREAS AND PEAT STOCKPILE RESTRICTION AREAS



Figure L- 1: Safety Buffer and Peat Stockpile Restriction Areas (1 of 3).





- Peat Stockpile Restriction Areas
- Crane Platform Hardstanding
- Proposed New Roads
- Soft Levelled Areas
- Temporary Construction Compounds
 - Turbine Foundations

ô>	GDG GAVIN & DOHERTY GEOSOLUTIONS
ne Wind Farm Buffer and Peat S	tockpile
on Areas (1 of 3) -02-SBZ-MP-C-3	2
CRS: 2157	Authored: CE

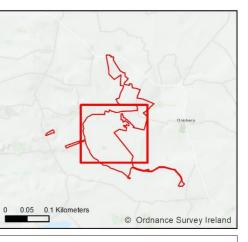
Checked: JOD





Figure L- 2: Safety Buffer and Peat Stockpile Restriction Areas (2 of 3).





- Peat Stockpile Restriction Areas
- Safety Buffer Areas
- EIAR Site Boundary
 - Cable Access Track
- Crane Platform Hardstanding
 - Proposed New Roads
 - Proposed Spoil Repository Access Road
 - Existing Roads to be Upgraded
- Proposed Peatland Enhancement Area
- Peat Repository Areas
- Spoil Repository Area
 - Soft Levelled Areas
 - Substation
 - Temporary Construction Compounds
 - **Turbine Foundations**

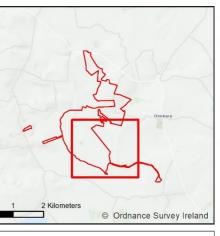
MK	>>	GAVIN & DOHERTY GEOSOLUTIONS
Clonberne	Wind Farm	
	fer and Peat Stock Areas (2 of 3)	pile
021-GDG-0	2-SBZ-MP-C-33	
ize: A3	CRS: 2157	Authored: CE
9/04/2024	Source: GDG	Checked: JOD





Figure L- 3: Safety Buffer and Peat Stockpile Restriction Areas (3 of 3).





- Peat Stockpile Restriction Areas
- EIAR Site Boundary
- Cable Access Track
- Cable in the Public Road
- Crane Platform Hardstanding
- **Operational Access**
- Proposed New Roads
- Proposed Spoil Repository Access
- Existing Roads to be Upgraded
- Proposed Peatland Enhancement
- Peat Repository Areas
- Spoil Repository
- Soft Levelled Areas
- Substation
- Temporary Construction Compounds
- **Turbine Foundations**

мк		GDDG GAVIN & DOHERTY GEOSOLUTIONS
Clonberne	Wind Farm	
	ffer and Peat Stock Areas (3 of 3)	pile
021-GDG-0	2-SBZ-MP-C-34	
ize: A3	CRS: 2157	Authored: CE
9/04/2024	Source: GDG	Checked: JOD





Appendix M PEAT STABILITY RISK ASSESSMENT

Table M- 1: Peat Stability Risk Assessment at Turbine 1.

				Location:	Turbine 1		onic 1.			
GDG	Peat Stability Risk Assessment (PSRA)			Conditions:	Undrained (U), undra	ined surcharge (US), c	lrained (D), draiı	ned surcharge ([DS)	
EOSOLUTIONS				Inspected on: Sep-23						
	Clonberne Wind Farm			Completed by:	CE					
				Date:	Nov-23]
		Value			Dating critoria					
	Hazard factors	U US D DS	0	1	2	3	Rating value	Weighting	Score	Comment
of Safety		49.4 12.0 39.8 20.9	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.3m. Slope angle: 1.8º.
	Distance to previous slides (km)	5 - 10	NA	5 - 10	< 5	On site	1	2	2	
Slide history	Evidence of peat movement (e.g. tension cracks, step features, compression features).	NA	NA	-	-	Yes	0	2	0	
Subsoil conditions	Subsoil type	Gravel / Firm glacial till	NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	1	1	1	Nearest TP (TP06) : Grey, stiff, medium strength, sandy, very gravelly CLAY.
(visible in trial pits)	Peat fibres across transition to subsoil	NA	NA	Yes	Partially	No	0	1	0	No peat
	Peat wetness	NA	NA	Dry / Stands well	Slowly squeezing	Extremely wet /	0	2	0	No peat
	General curvature downslope	NA	NA	-	Planar	Convex	0	1	0	Flat topography.
Topography	Distance to the convexity break	NA		> 100 m						
	(only if previous factor is Convex) Slope aspect									
	(for high latitudes in northern hemisphere)									
	Distance from watercourse (m)	> 300	NA	> 300	200 - 300	< 200	1	1	1	Nearest watercourse ~500m away
	Surface moisture index (NDMI)	96 -135	NA	0 - 96	96 -135	135 - 174	2	1	2	
	Surface water (water table level indicator)	Localised	NA	Localised	Ponded in drains	Springs	1	1	1	
Hydrology	Evidence of piping (subsurface flow)	NA	NA	-	-	Yes	0	1	0	No peat
	Significant surface desiccation (previous summer was dry?)	NA	NA	-	-	Yes	0	1.5	0	No evidence
	Existing drainage ditches	NA	NA	Down slope	Varied / Oblique	Across slope	0	1	0	Flat topography, but drains perpendicular to contours.
	Annual rainfall	1000 - 1400	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	
	Bush		NA	Dry heather	Grassland	Wetlands	2	1	2	
Vegetation	Forestry									
	(if applicable)			-						
Peat workings										No peat
	Peat cuts vs contour lines	NA	NA	Perpendicular	Oblique	Parallel	0	1	0	No peat
Existing loads	Roads	Solid	NA	Solid	-	Floating	1	1	1	Solid roads
Time of year for cons	struction	Late Summer, Autumn	NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
				Ha	ard	ſ		Hazard _{total}	25	
				0.0 - 0.3	Negligible			Max. possible	102	
				0.3 - 0.5	Low			Hazard	0.25	1
				0.7 - 1.0	High				0.25	1
Co	onsequence factors	Value	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
		NA	NA	Small	Medium	Large	0	3	0	
		Minor undefined	NA	Bowl / contained	Minor undefined	Valley	2	1	2	
	mont					Drinking water				
						supply				
roads in potential pea	t flow path	NA		Minor road	Local road	_	0	1		
ead lines in potential p	peat flow path	NA	NA	Phone lines	(LV)	(MV, HV)	0	1	0	
ngs in potential peat flo	ow path	NA	NA	Farm out-houses	-	Dwelling	0	1	0	
ility to respond (access	s and resources)	Fair	NA	Good	Fair	Poor	2	1	2	
			-	-			Co	nsequences _{total}	7	
	Subsoil conditions (visible in trial pits) Topography Hydrology Vegetation Peat workings Existing loads Time of year for cons Existing loads Time of year for cons Time of year for cons existing loads Time of year for cons construction of distance from near islope hydrology featur mity from defined valle istream aquatic enviror croads in potential peat flo	Conserver water of safety Subsol conditions Sub	Subsection Conserve Vind Farm Side history Is and factors Value Side history Distance to previous sides (km) 5 - 10 Subsel conditions heats be in triajents) Distance to previous sides (km) 5 - 10 Subsel conditions heats be in triajents) Distance to previous sides (km) 5 - 10 Subsel conditions heats be in triajents) Distance to previous sides (km) 5 - 10 Peat wetness NA Image: Side (km) Firm glacia till Topography General curvature downslope NA Distance to the convesity brak (km) 96 - 135 Surface water Image: Side (km) 96 - 135 Surface water Image: Side (km) NA Peat workings Peat cuts vactoruse (km) NA Peat workings Peat cuts vactoruse and peat depth in the area) NA Peat cuts vacontour lines		Pet Stability Risk Assessment (PSRA) Impacted or impacted by: Completed					<form> Analy Analy</form>

						consequences total	,						
			Conse	quences									
			0.0 - 0.3	Negligible		Max. possible	33						
			0.3 - 0.5	Low	_			_					
			0.5 - 0.7	Medium		Consequences 0-1	0.21						
			0.7 - 1.0	High	-			-					
	Risk rating												
		_											
R	lisk		Action required										
0.00 - 0.20	Negligible	Normal site investigation				Risk rating =	Hazard *	Consequences					
0.20 - 0.40	Low	Targeted site investigation, design of spec construction.	cific mitigation measu	on during	Risk rating =	0.25	0.21	=	0.05				
0.40 - 0.60	Medium	Avoid construction in the area if possible. mitigation measures. Full time supervisio			nd design of specific				-				
0.60 - 1.00	High	Avoid construction in this area.											





Table M- 2: Peat Stability Risk Assessment at Turbine 2.

GA		Peat Stability Risk Assessment	(PSRA)				Location: Conditions:	Turbine 2 Undrained (U), undra			ned surcharge (DS)	
G							Inspected on: Inspected by:	Sep-23 BMC					
2	ικό	Clonberne Wind Farm					Completed by:	CE					
	~						Date:	Nov-23					
					- I			Dation					
		Hazard factors			alue 5 D DS	0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment
Factor	of Safety			151 12.3		-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.09m. Slope angle: 2.1º.
		Distance to previous slides (km)			- 10	NA	5 - 10	< 5	On site	1	2	2	
	Slide history	Evidence of peat movement (e.g. te	ension cracks, step		NA NA Gravel / Firm glacial till NA		-	-	Yes	0	2	0	
	Subsoil conditions	features, compression features). Subsoil type					Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	1	1	1	TP 4 notes: Dark grey , slightly silty, very sandy GRAVEL, with cobbles subrounded to rounded
	(visible in trial pits)	Peat fibres across transition to sub	bsoil		NA	NA	Yes	Partially	No	0	1	0	No Peat
		Peat wetness				NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	0	2	0	No peat
		General curvature downslope		Р	anar	NA	-	Planar	Convex	2	1	2	
	Topography	Distance to the convexity break			NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		(only if previous factor is Convex) Slope aspect							NW, N, NE	1	1	1	SE
		(for high latitudes in northern hemisphere	2)		', S, SE	NA	SW, S, SE	W, E					
actors		Distance from watercourse (m)			200	NA	> 300	200 - 300	< 200	3	1	3	~110m
Secondary factors		Surface moisture index (NDMI)		96	-135	NA	0 - 96	96 -135	135 - 174	2	1	2	
econd		Surface water (water table level indicator)		Loc	alised	NA	Localised	Ponded in drains	Springs	1	1	1	
S	Hydrology	Evidence of piping (subsurface flow	w)		NA	NA	-	-	Yes	0	1	0	No peat
		Significant surface desiccation (previous summer was dry?)			NA	NA	-	-	Yes	0	1.5	0	No peat
		Existing drainage ditches		Dow	n slope	NA	Down slope	Varied / Oblique	Across slope	1	1	1	
		Annual rainfall		1000) - 1400	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	
					m/yr								
	Vegetation	Bush Forestry			tlands	NA	Dry heather	Grassland	Wetlands	3	1	3	
		(if applicable)		Good	l growth	NA	Good growth	Fair	Stunted growth	1	1.5	1.5	
	Peat workings	Peat cuts presence			-	NA	-	Cutaway / Turbary	Machine cut	1	1	1	No peat
		Peat cuts vs contour lines			NA	NA	Perpendicular	Oblique	Parallel	0	1	0	No peat
	Existing loads	ting loads Roads Solid			olid	NA	Solid	-	Floating	1	1	1	
	Time of year for con	struction			Summer, Itumn	NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
									Addinin		Hazard _{total}	34.5	
							Ha: 0.0 - 0.3	z ard Negligible			Max. possible	102	
							0.3 - 0.5	Low					_
							0.5 - 0.7 0.7 - 1.0	Medium High			Hazard ₀₋₁	0.34	1
		Consequence factors		v	alue	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
	e of potential peat flo				NA	NA	Small	 Medium	Large	0	3	0	
-	lope hydrology featu	rest watercourse and peat depth in the res	areaj		undefined	NA	Bowl / contained	Minor undefined	Valley	2	1	2	
	ity from defined valle				rcourse 500	NA	> 500	watercourse 200 - 500	< 200	1	1	1	
		- ,											
	ill slope angle				mediate	NA	Horizontal	Intermediate	Steep Drinking water	2	1	2	
	tream aquatic enviro				nsitive	NA	Non-sensitive	Sensitive	supply	2	1	2	
Public	roads in potential pea	at flow path			NA	NA	Minor road	Local road	Regional road	0	1	0	
Overh	ead lines in potential p	peat flow path			NA	NA	Phone lines	Electricity (LV)	Electricity (MV, HV)	0	1	0	
Buildir	gs in potential peat fl	low path			NA	NA	Farm out-houses	-	Dwelling	0	1	0	
Capab	lity to respond (acces	s and resources)			Fair	NA	Good	Fair	Poor	2	1	2	
							r	ļ	, 1	Cc	onsequences _{total}	9	
							Consec 0.0 - 0.3	uences Negligible			Max. possible	33	
							0.3 - 0.5	Low					7
							0.5 - 0.7 0.7 - 1.0	<mark>Medium</mark> High		Consequ	lences ₀₋₁	0.27	J
									I 				
							Ris	k rating					
										٦			
		Risk					Action required			-			
0.00 - 0.20 Negligible Normal site investigation								Risk rating = Hazard					Consequences
	0.20 - 0.40 Low Targeted site investigation, design of specific miti						s. Part time supervision during construction. Risk rating = 0.34					0.27 = 0.09	
	0.20 - 0.40	Low Tar	rgeted site investigat	tion, desi	gn of specif	ic miti	gation measures. Part t	ime supervision during	g construction.		Kisk lating -	0.54	0.27 - 0.09
		Δν					-		-		nisk ratilig –	0.04	0.27 - 0.09
	0.20 - 0.40 0.40 - 0.60	Ave		he area if	possible. If	unavo	- pidable, detailed site inv		-		KISK Fating –	0.54	0.27
		Medium Avo me	oid construction in t	he area if pervision	possible. If	unavo	- pidable, detailed site inv		-		Nisk lating –	0.54	0.27





Table M- 3: Peat Stability Risk Assessment at Turbine 3.

								ment at Turbi				
(GDG						Turbine 3					_
GA	VIN & DOHERTY EOSOLUTIONS	Peat Stability Risk Assessment (PSRA)					Undrained (U), undrai Sep-23	ined surcharge (US), d	rained (D), drair	ed surcharge (D	DS)	-
	~					-	BMC					
2	ικό	Clonberne Wind Farm					CE					
	~					Date:	Nov-23					
			Valu	2			Rating criteria					
		Hazard factors	U US		0	1	2	3	Rating value	Weighting	Score	Comment
ctor	of Safety		62.1 31.60	55.4	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~1.03 m. Slope angle: 0.
		Distance to previous slides (km)	5 - 1)	NA	5 - 10	< 5	On site	1	2	2	
	Slide history	Evidence of peat movement (e.g. tension cracks, step features, compression features).	NA		NA	-	-	Yes	0	2	0	
		Subsoil type	NA		NA	Gravel / Firm glacial	Smooth rock	Soft sensitive clay	0	1	0	No TP
	Subsoil conditions	Peat fibres across transition to subsoil	NA		NA	till Yes	Partially	No	0	1	0	Νο ΤΡ
	(visible in trial pits)							Extremely wet /				
		Peat wetness	NA		NA	Dry / Stands well	Slowly squeezing	Undiggable	2	2	4	No TP
		General curvature downslope	NA		NA	-	Planar	Convex	0	1	0	Flat
	Topography	Distance to the convexity break (only if previous factor is Convex)	NA		NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		Slope aspect (for high latitudes in northern hemisphere) Distance from watercourse (m)		SW, S, SE N		SW, S, SE	W, E	NW, N, NE	1	1	1	sw
				200 - 300		> 300	200 - 300	< 200	2	1	2	~280m
Ors		Surface moisture index (NDMI)	96 -13	5	NA	0 - 96	96 -135	135 - 174	2	1	2	
Secondary factors		Surface water	Localis						1	1		
ondar		(water table level indicator)		eu	NA	Localised	Ponded in drains	Springs			1	
Sec	Hydrology	Evidence of piping (subsurface flow)	NA		NA	-	-	Yes	0	1	0	
		Significant surface desiccation (previous summer was dry?)	NA		NA	-	-	Yes	0	1.5	0	
		Existing drainage ditches	Varied / O	blique	NA	Down slope	Varied / Oblique	Across slope	2	1	2	Varied
		Annual rainfall	> 1400 m	m/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	3	1	3	
		Bush	Grassla	nd	NA	Dry heather	Grassland	Wetlands	2	1	2	
	Vegetation	Forestry										
		(if applicable)	Good gro		NA	Good growth	Fair	Stunted growth	1	1.5	1.5	
	Peat workings	Peat cuts presence	NA		NA	-	Cutaway / Turbary	Machine cut	0	1	0	
		Peat cuts vs contour lines	NA		NA	Perpendicular	Oblique	Parallel	0	1	0	
	Existing loads	Roads	Solic		NA	Solid	-	Floating	1	1	1	
	Time of year for cor	nstruction	Late Sum Autun		NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
										Hazard _{total}	34.5	
						0.0 - 0.3	zard Negligible			Max. possible	102	
						0.3 - 0.5	Low					
												7
						0.5 - 0.7	Medium			Hazard ₀₋₁	0.34	1
						0.5 - 0.7	Medium High			Hazard ₀₋₁	0.34]
		Consequence factors	Valu	e ·	0	0.5 - 0.7	Medium	3	Rating value	Hazard ₀₋₁ Weighting	0.34 Score	Comment
	e of potential peat flo on of distance from nea		Valu		0 NA	0.5 - 0.7 0.7 - 1.0	Medium High Rating criteria	3 Large	Rating value			Comment
ncti		OW rest watercourse and peat depth in the area)	Smal Minor und	l efined		0.5 - 0.7 0.7 - 1.0 1	Medium High Rating criteria 2 Medium Minor undefined			Weighting	Score	Comment
wn	on of distance from nea	ow rest watercourse and peat depth in the area) rres	Smal	l efined urse	NA	0.5 - 0.7 0.7 - 1.0 1 Small	Medium High Rating criteria 2 Medium	Large	1	Weighting 3	Score 3	Comment
wn: oxin	on of distance from nea	ow rest watercourse and peat depth in the area) rres	Smal Minor und waterco	l efined urse)	NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained	Medium High Rating criteria 2 Medium Minor undefined watercourse	Large Valley	1	Weighting 3 1	Score 3 2	Comment
wn: oxin	on of distance from nea clope hydrology featu hity from defined vall hill slope angle	ow rest watercourse and peat depth in the area) ires ey (m)	Smal Minor und waterco > 500 Horizor	l efined urse) ntal	NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	Large Valley < 200 Steep Drinking water	1 2 1 1	Weighting 3 1 1 1	Score 3 2 1 1	Comment
wn: wn: wn wn	on of distance from nea clope hydrology featu hity from defined valle hill slope angle tream aquatic enviro	ow rest watercourse and peat depth in the area) irres ey (m) onment	Smal Minor und waterco > 500 Horizor Sensiti	l efined urse) ntal	NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive	Large Valley < 200 Steep Drinking water supply	1 2 1 1 2	Weighting 3 1 1 1 1 1 1	Score 3 2 1 1 2 2	Comment Comment
wn: wn: wn: wn:	on of distance from nea slope hydrology featu nity from defined valle nill slope angle tream aquatic enviro roads in potential per	ow rest watercourse and peat depth in the area) irres ey (m) onment at flow path	Smal Minor und waterco > 500 Horizor Sensiti	l efined urse) ntal	NA NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	Large Valley < 200 Steep Drinking water supply Regional road	1 2 1 1 2 0	Weighting 3 1 1 1 1 1 1 1 1	Score 3 2 1 1 2 2 0	Comment
wn: wn: wn: blic	on of distance from nea clope hydrology featu hity from defined valle hill slope angle tream aquatic enviro	ow rest watercourse and peat depth in the area) irres ey (m) onment at flow path	Smal Minor und waterco > 500 Horizor Sensiti	l efined urse) ntal	NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive	Large Valley < 200 Steep Drinking water supply	1 2 1 1 2	Weighting 3 1 1 1 1 1 1	Score 3 2 1 1 2 2	Comment Comment
wn: oxin wn: blic erh	on of distance from nea slope hydrology featu nity from defined valle nill slope angle tream aquatic enviro roads in potential per	ow rest watercourse and peat depth in the area) ires ey (m) onment at flow path peat flow path	Smal Minor und waterco > 500 Horizor Sensiti	l efined urse) ntal	NA NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity	Large Valley < 200 Steep Drinking water supply Regional road Electricity	1 2 1 1 2 0	Weighting 3 1 1 1 1 1 1 1 1	Score 3 2 1 1 2 2 0	Comment Comment
wn: wn: wn: blic erh	on of distance from nea clope hydrology featu hity from defined vall hill slope angle tream aquatic enviro roads in potential pe- ead lines in potential	ow rest watercourse and peat depth in the area) ires ey (m) onment at flow path peat flow path	Smal Minor und waterco > 500 Horizor Sensiti NA	l efined urse) ntal ve	NA NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	1 2 1 1 2 0 0	Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1	Score 3 2 1 1 2 2 0 0 0	Comment Comment
wn: wn: wn: blic erh	on of distance from nea slope hydrology featu nity from defined valle nill slope angle stream aquatic enviro roads in potential pea ead lines in potential gs in potential peat f	ow rest watercourse and peat depth in the area) ires ey (m) onment at flow path peat flow path	Small Minor und waterco > 500 Horizor Sensiti NA NA	l efined urse) ntal ve	NA NA NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 1 2 0 0 0 0 0 2	Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Score 3 2 1 1 2 0 0 0 0 2	Comment Comment
wn: wn: wn: blic erh	on of distance from nea slope hydrology featu nity from defined valle nill slope angle stream aquatic enviro roads in potential pea ead lines in potential gs in potential peat f	ow rest watercourse and peat depth in the area) ires ey (m) onment at flow path peat flow path	Small Minor und waterco > 500 Horizor Sensiti NA NA	l efined urse) ntal ve	NA NA NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 1 2 0 0 0 0 0 2	Weighting 3 1	Score 3 2 1 1 2 0 0 0 0 2	Comment Comment
unctio own: own own ublic verh uildir	on of distance from nea slope hydrology featu nity from defined valle nill slope angle stream aquatic enviro roads in potential pea ead lines in potential gs in potential peat f	ow rest watercourse and peat depth in the area) ires ey (m) onment at flow path peat flow path	Small Minor und waterco > 500 Horizor Sensiti NA NA	l efined urse) ntal ve	NA NA NA NA NA NA	0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec	Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Pair	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 1 2 0 0 0 0 0 2	Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 Nax. possible	Score 3 2 1 1 2 0 0 0 0 0 0 2 11	Comment

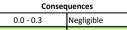
		Risk rating					
Risl	ĸ	Action required]				
0.00 - 0.20	Negligible	Normal site investigation	Risk rating =	Hazard *	Consequences		
0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.34	0.33	=	0.11
0.40 - 0.60	Medium	Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.					
0.60 - 1.00	High	Avoid construction in this area.					





Table M- 4: Peat Stability Risk Assessment at Turbine 4.

					Location:	Turbine 4					
GAN	SDG	Peat Stability Risk Assessment (PSRA)			Conditions:	Undrained (U), undra	ined surcharge (US), c	trained (D), drai	ned surcharge (I	DS)	
GI					Inspected on: Inspected by:	Sep-23 BMC					
	IKO	Clonberne Wind Farm			Completed by:	CE					
	•				Date:	Nov-23					
		Hazard factors	Value		_	Rating criteria		Rating value	Weighting	Score	Comment
			U US D	DS 0	1	2	3	Nating value	weighting	50012	comment
Factor	of Safety		3968.00 12.80 3175.00	22.16	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0 m. Slope angle: 2.2º.
	Slide history	Distance to previous slides (km)	5 - 10	NA	5 - 10	< 5	On site	1	2	2	
	Side history	Evidence of peat movement (e.g. tension cracks, step features, compression features).	NA	NA	-	-	Yes	0	2	0	No Peat
	Subsoil conditions (visible in trial pits)	Subsoil type	Gravel / Fir glacial till	N/A	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	1	1	1	Nearest TP (TPO8) records: Light brown, medium dense to dense, silghtly silty, very gravelly, fine to coarse SAND, with many cobbles and boulders. Cobbles and boulders are rounded to subrounded
		Peat fibres across transition to subsoil	NA		Yes	Partially	No	0	1	0	No Peat
		Peat wetness	NA	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	0	2	0	No Peat
	General curvature downslope		Planar	NA	-	Planar	Convex	2	1	2	
	Topography Distance to the convexity break (only if previous factor is Convex)		NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
	(only if previous factor is Convex) Slope aspect (for high latitudes in northern hemisphere)		SW, S, SE	NA	SW, S, SE	W, E	NW, N, NE	1	1	1	SE
tors	(for high latitudes in northern hemisphere)		> 300	NA	> 300	200 - 300	< 200	1	1	1	~300m
Secondary factors		Surface moisture index (NDMI)	96 -135	NA	0 - 96	96 -135	135 - 174	2	1	2	
econda		Surface water	NA	NA	Localised	Ponded in drains	Springs	0	1	0	
Š	Hydrology	(water table level indicator) Evidence of piping (subsurface flow)	NA	NA		-	Yes	0	1	0	No Peat
	iny di ciogy	Significant surface desiccation	NA	NA		_	Yes	0	1.5	0	No Peat
		(previous summer was dry?)									No reat
		Existing drainage ditches	Down slop 1000 - 140	2		Varied / Oblique	Across slope	1	1	1	
		Annual rainfall	mm/yr	NA		1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	
	Vegetation	Bush Forestry	Grassland		-	Grassland	Wetlands	2	1	2	Agricultural tillage land
		(if applicable)	NA	NA	Good growth	Fair	Stunted growth	0	1.5	0	No forestry. Agricultural land.
	Peat workings	Peat cuts presence	NA	NA	-	Cutaway / Turbary	Machine cut	0	1	0	No Peat
		Peat cuts vs contour lines	NA	NA	Perpendicular	Oblique	Parallel	0	1	0	No Peat
	Existing loads	Roads	Solid	NA	Solid	-	Floating	1	1	1	
	Time of year for cor	struction	Late Summe Autumn	er, NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
					На	zard	T		Hazard _{total}	28	
					0.0 - 0.3	Negligible			Max. possible	102	
					0.3 - 0.5 0.5 - 0.7	Low Medium			Hazard ₀₋₁	0.27]
					0.7 - 1.0	High					
		Consequence factors	Value	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
	e of potential peat flo	DW rest watercourse and peat depth in the area)	NA	NA		Medium	Large	0	3	0	No peat.
-	lope hydrology featu		Minor undefi	NA	Bowl / contained	Minor undefined	Valley	2	1	2	
	ity from defined valle		watercours > 500	e NA		watercourse 200 - 500	< 200	1	1	1	
<u> </u>	ill slope angle		Horizonta			Intermediate	Steep	1	1	1	
<u> </u>		nment	Sensitive	NA		Sensitive	Drinking water	2	1	2	
<u> </u>	· · · · · · · · · · · · · · · · · · ·				Minor road	Local road	supply Regional road	0	1	0	
<u> </u>	Public roads in potential peat flow path Overhead lines in potential peat flow path					Electricity	Electricity	0	1	0	
	gs in potential peat f		NA	NA NA		(LV)	(MV, HV)	0		0	
						Fair	Dwelling		1		
Capabi	lity to respond (acces	ss and resources)	Fair	NA	Good	Fair	Poor	2 Cc	1 onsequences _{total}	2 8	
					Conse	quences	Ī		, total	Ŭ	



Max. possible 33

		0.3 - 0.5 Low			_		
		0.5 - 0.7 Medium	Consequences 0-1	0.24]		
		0.7 - 1.0 High			-		
		Risk rating					
Ris	k	Action required					
0.00 - 0.20	Negligible	Normal site investigation	Risk rating =	Hazard *	Consequences		
0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.27	0.24	=	0.07
0.40 - 0.60	Medium	Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.				-	
0.60 - 1.00	High	Avoid construction in this area.					





Table M- 5: Peat Stability Risk Assessment at Turbine 5.

	DC				Location:	Turbine 5					
GAV	IDU IN & DOHERTY OSOLUTIONS	Peat Stability Risk Assessment (PSRA)			Conditions: Inspected on:	Undrained (U), undra Sep-23	ined surcharge (US), d	lrained (D), draiı	ned surcharge (I	DS)	-
N	ıkô>	Clonberne Wind Farm			Inspected by: Completed by:	BMC CE					
					Date:	Nov-23					
_			Value			Dating critoria					
		Hazard factors	Value U US D D	S 0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment
actor	of Safety	1	9.2 3.7 7.5	} -	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~ 0.68m. Slope angle: 4.6 ^o .
	Slide history	Distance to previous slides (km)	5 - 10	NA	5 - 10	< 5	On site	1	2	2	
	,	Evidence of peat movement (e.g. tension cracks, st features, compression features).	^{ep} NA	NA	-	-	Yes	0	2	0	
	Subsoil conditions (visible in trial pits)	Subsoil type	Gravel / Firm glacial till	NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	1	1	1	Nearest TP is TP09: LGreyish brown, firm, slightly gravelly, sandy CLAY with some cobbles. Cobbles are subrounded to subangular.
		Peat fibres across transition to subsoil	NA	NA	Yes	Partially	No	0	1	0	TP records no peat SE of turbine
		Peat wetness	NA	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	2	2	4	TP records no peat SE of turbine
		General curvature downslope	Planar	NA	-	Planar	Convex	2	1	2	
	Topography	Distance to the convexity break	NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
ctors		(only if previous factor is Convex) Slope aspect	NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
Secondary factors		(for high latitudes in northern hemisphere) Distance from watercourse (m)	< 200	NA	> 300	200 - 300	< 200	3	1	3	~100m
econd				-							
S		Surface moisture index (NDMI) Surface water	96 -135	NA	0 - 96	96 -135	135 - 174	2	1	2	
		(water table level indicator)	Localised	NA	Localised	Ponded in drains	Springs	1	1	1	
	Hydrology	Evidence of piping (subsurface flow)	NA	NA	-	-	Yes	0	1	0	
		Significant surface desiccation (previous summer was dry?)	NA	NA	-	-	Yes	0	1.5	0	
		Existing drainage ditches	Down slope	NA	Down slope	Varied / Oblique	Across slope	1	1	1	
		Annual rainfall	1000 - 1400 mm/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	
		Bush	Wetlands	NA	Dry heather	Grassland	Wetlands	3	1	3	
	Vegetation	Forestry (if applicable)	NA	NA	Good growth	Fair	Stunted growth	0	1.5	0	
		Peat cuts presence	-	NA	-	Cutaway / Turbary	Machine cut	1	1	1	No peat cutting
	Peat workings			_							
		Peat cuts vs contour lines	NA	NA	Perpendicular	Oblique	Parallel	0	1	0	No peat cutting
	Existing loads	Peat cuts vs contour lines	NA	NA	Perpendicular	Oblique	Parallel	0	1	0	No peat cutting
	Existing loads	Roads	NA Solid Late Summer	NA	Solid	Oblique - Winter, Early	Parallel Floating Late Summer,	1	1	1	No peat cutting
	Existing loads Time of year for con:	Roads	Solid	NA		-	Floating				
		Roads	Solid Late Summer	NA	Solid Spring Ha	Winter, Early Summer	Floating Late Summer,	1	1 1 Hazard _{total}	1 3 36	No peat cutting
		Roads	Solid Late Summer	NA	Solid	- Winter, Early Summer	Floating Late Summer,	1	1 Hazard _{total} Max. possible	1	No peat cutting
		Roads	Solid Late Summer	NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	- Winter, Early Summer zard Negligible Low Medium	Floating Late Summer,	1	1 1 Hazard _{total}	1 3 36	No peat cutting
		Roads	Solid Late Summer	NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5	- Winter, Early Summer Ard Negligible Low Medium High	Floating Late Summer,	1	1 Hazard _{total} Max. possible	1 3 36 96	No peat cutting
	Time of year for con	Roads	Solid Late Summer	NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	- Winter, Early Summer zard Negligible Low Medium	Floating Late Summer,	1	1 Hazard _{total} Max. possible	1 3 36 96	No peat cutting
	Time of year for con	Roads struction Consequence factors	Solid Late Summer Autumn	NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Zard Negligible Low Medium High Rating criteria	Floating Late Summer, Autumn	1 3	1 Hazard _{total} Max. possible Hazard ₀₋₁	1 3 36 96 0.38	No peat cutting No peat cutting
functio	Time of year for con	Roads struction Consequence factors ww rest watercourse and peat depth in the area)	Solid Late Summer Autumn Value Small Minor undefine	NA NA NA NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1	Winter, Early Summer Regligible Low Medium High Rating criteria 2 Medium Minor undefined	Floating Late Summer, Autumn	1 3 Rating value	1 1 Hazard total Max. possible Hazard 0.1 Weighting	1 3 36 96 0.38 Score	No peat cutting No peat cutting
functio Downs	Time of year for con: of potential peat flo n of distance from near	Roads struction Consequence factors ww rest watercourse and peat depth in the area) res	Solid Late Summer Autumn Value Small	NA NA O NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small	Winter, Early Summer Zard Negligible Low Medium High Rating criteria 2 Medium	Floating Late Summer, Autumn 3 Large	1 3 Rating value	1 Hazard total Max. possible Hazard 0-1 Weighting 3	1 3 36 96 0.38 Score 3	No peat cutting No peat cutting
functio Downs Proxim	Time of year for con of potential peat flo n of distance from near ope hydrology featur	Roads struction Consequence factors ww rest watercourse and peat depth in the area) res	Solid Late Summer Autumn Value Small Minor undefine watercourse	d NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained	Winter, Early Summer Zard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse	Floating Late Summer, Autumn Autumn Sa Large Valley	1 3 Rating value 1 2	1 Hazard total Max. possible Hazard 0-1 Weighting 3 1	1 3 36 96 0.38 Score 3 2	No peat cutting No peat cutting
functio Downs Proxim Downh	Time of year for con: e of potential peat flo n of distance from near ope hydrology featur ity from defined valle	Roads struction Consequence factors w rest watercourse and peat depth in the area) res ey (m)	Solid Late Summer Autumn Value Small Minor undefine watercourse > 500	NA NA NA NA NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	- Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water	1 3 Rating value 1 2 1 1 0	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1	1 3 36 96 0.38 Score 3 2 1 0	No peat cutting No peat cutting
functio Downs Proxim Downh Downs	Time of year for cons of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic environ	Roads struction Consequence factors w rest watercourse and peat depth in the area) res ey (m) nment	Solid Late Summer Autumn Value Small Minor undefine watercourse > 500 NA Sensitive	NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive	Floating Late Summer, Autumn	1 3 • Rating value 1 2 1 0 2	1 1 Hazard total Max. possible Hazard 0-1 () () () () () () () () () ()	1 3 36 96 0.38 Score 3 2 1 0 0 2	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public i	Time of year for cons of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle cream aquatic environ oads in potential pea	Roads struction Consequence factors w rest watercourse and peat depth in the area) res ey (m) nment at flow path	Solid Late Summer Autumn Value Small Minor undefine watercourse > 500 NA Sensitive NA	NA NA NA NA O O NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	- Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water	1 3 Rating value 1 2 1 0 2 0 2 0	1 1 Hazard total Max. possible Hazard 0.1 () () () () () () () () () ()	1 3 36 96 0.38 Score 3 2 1 0 2 1 0 2	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public I	Time of year for consistent of potential peat floon of distance from near ope hydrology feature ity from defined valle ill slope angle cream aquatic environ oads in potential peat ad lines in potential peat of the statement of	Roads struction Consequence factors W rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path	Solid Late Summer Autumn Value Minor undefine watercourse Small Minor undefine Scolid Sensitive NA NA NA NA	NA NA NA NA NA NA NA NA NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Horizontal Small Bowl / contained Small Bowl / contained Small Bowl / contained Non-sensitive Minor road Phone lines	- Winter, Early Summer ard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 0 0 0	1 1 Hazard total Max. possible Hazard o.1 () () () () () () () () () ()	1 3 36 96 0.38 Score 3 2 1 0 2 1 0 2 0 0	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Rating criteria Z Medium High Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 3 Rating value 1 2 1 2 1 0 2 0 2 0 0 0 0 1 1	1 1 Hazard total Max. possible Hazard o.1 () () () () () () () () () ()	1 3 36 96 0.38 Score 3 2 1 1 0 2 0 2 0 0 0 1	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat floon of distance from near ope hydrology feature ity from defined valle ill slope angle cream aquatic environ oads in potential peat ad lines in potential peat of the statement of	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Minor undefine watercourse Small Minor undefine Scolid Sensitive NA NA NA NA	NA NA NA NA NA NA NA NA NA NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Horizontal Small Bowl / contained Small Bowl / contained Small Bowl / contained Non-sensitive Minor road Phone lines	- Winter, Early Summer Rating criteria Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	1 3 8 8 1 1 2 1 1 2 1 0 0 2 0 0 0 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 1 1 1	1 Hazard total Max. possible Hazard o.1 (Meighting) 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 1 2	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Winter, Early Summer Rating criteria Z Medium High Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 8 8 1 1 2 1 1 2 1 0 0 2 0 0 0 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 1 1 1	1 1 Hazard total Max. possible Hazard o.1 () () () () () () () () () ()	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 1 2	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 8 8 1 1 2 1 1 2 1 0 0 2 0 0 0 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 1 1 1 1	1 Hazard total Max. possible Hazard o.1 (Meighting) 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 1 2	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Rating criteria Rating criteria Medium High Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 2 1 0 2 0 0 0 1 2 0 1 2 1 1 2 11	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained Small Bowl / contained Small Non-sensitive Minor road Phone lines Farm out-houses Good Consect 0.0 - 0.3 0.3 - 0.5	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard 0-1 (Meighting) 3 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 0 1 1 2 1 1 2 11 33	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Rating criteria Rating criteria Medium High Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard 0-1 (Meighting) 3 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 0 1 1 2 1 1 2 11 33	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors ow rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium High	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard 0-1 (Meighting) 3 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 0 1 1 2 1 1 2 11 33	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle tream aquatic enviror oads in potential peat ad lines in potential peat flo	Roads struction Consequence factors w rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path is and resources)	Solid Late Summer Autumn Value Small Minor undefine watercourse Solid Minor undefine Small Minor undefine Sensitive NA Sensitive NA Farm out-hous	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium High	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard 0-1 (Meighting) 3 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 Score 3 3 2 1 0 0 2 0 0 0 0 1 1 2 1 1 2 11 33	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for cons of potential peat flo n of distance from near ope hydrology featur ity from defined valle ill slope angle cream aquatic environ oads in potential peat ad lines in potential peat gs in potential peat fli ity to respond (acces	Roads struction Consequence factors w rest watercourse and peat depth in the area) res ey (m) nment at flow path peat flow path iow path is and resources)	Solid Late Summer Autumn Late Summer Autumn Small Minor undefine watercourse Small Minor undefine watercourse Small Minor undefine watercourse Scensitive NA Sensitive Ana Farm out-hous Fair	NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium High	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard 0-1 (Meighting) 3 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 36 96 0.38 3 3 3 2 1 3 2 1 1 0 2 1 1 0 0 2 1 1 0 0 1 2 1 1 2 0 1 1 2 0 1 1 3 3 3 3 3 3 2 2 1 1 0 0 2 1 1 0 0 1 2 1 1 1 0 1 1 1 1	No peat cutting No peat cutting
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for consistent of potential peat for non- ope hydrology feature of the second of the se	Roads struction Consequence factors rest watercourse and peat depth in the area) ress ey (m) nment at flow path peat flow path is and resources) k Negligible Normal site investiga	Image: Solid soli	NA NA NA O NA NA NA NA NA NA NA NA NA NA NA NA NA	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Regligible Low Medium High Rating criteria 2 Medium Junor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair uences Negligible Low Medium High	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1	1 3 36 96 0.38 3 3 3 2 1 3 2 1 1 0 2 1 1 0 0 2 1 1 0 0 1 2 1 1 2 0 1 1 2 0 1 1 3 3 3 3 3 3 2 2 1 1 0 0 2 1 1 0 0 1 2 1 1 1 0 1 1 1 1	No peat cutting No peat cutting Comment I
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for considered of potential peat floon of distance from near ope hydrology feature ity from defined valle its sin potential peat ad lines in potential peat floot in potential peat floot in potential peat floot is potential peat floot	Roads struction Consequence factors rest watercourse and peat depth in the area) ress ey (m) nment at flow path peat flow path ow path is and resources) k Negligible Normal site investiga Low Targeted site investiga	 Solid Solid Late Summer Autumn Small Small Minor undefine watercourse Small Minor undefine Sensitive Solid Sensitive Sensitive Sensitive Salid Tair 	ecific m	Solid Spring Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained Small Bowl / contained Small Bowl / contained Non-sensitive Minor road Phone lines Farm out-houses Good Consee 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Action required	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) Colaroad Electricity (LV) Fair Negligible Low Medium High Kisk rating	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1	1 3 36 96 0.38 Score 3 2 1 0 2 1 1 0 2 0 0 1 2 0 1 1 2 1 1 3 3 0.33	No peat cutting No peat cutting Comment Image: Im
functio Downs Proxim Downh Downs Public r Dverhe Buildin	Time of year for considered of potential peat for non- ope hydrology feature ity from defined valle its some angle its some angle its some and the peat and the present of	Roads struction Consequence factors Ww rest watercourse and peat depth in the area) res at flow path peat flow path iow path is and resources) k Negligible Normal site investiga Low Targeted site investiga	Image: state stat	ecific m	Solid Spring	Winter, Early Summer Rard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) Colaroad Electricity (LV) Fair Negligible Low Medium High Kisk rating	Floating Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 3 Rating value 1 2 1 2 1 2 1 0 2 0 2 0 2 0 2 0 2 0 2 0 1 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1	1 3 36 96 0.38 Score 3 2 1 0 2 1 1 0 2 0 0 1 2 0 1 1 2 1 1 3 3 0.33	No peat cutting No peat cutting Comment Image: Im





Table M- 6: Peat Stability Risk Assessment at Turbine 6.

				Ia	bie	IVI- 6: Peat S		Assessment		ne o.		1		
(GDG	Peat Stability Risk Asse	essment (PSRA)			Location: Conditions:	Turbine 6 Undrained (U), undra	ined surcharge (US), c	Irained (D), drai	ned surcharge (E)S)			
GAG	VIN & DOHERTY EOSOLUTIONS	-				Inspected on:	Sep-23	, ,,,,				1		
~	11<0>	Clonberne Wind Farm				Inspected by: Completed by:	BMC CE							
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					Date:	Nov-23					]		
		Hazard factors		Value U US D DS	0	1	Rating criteria 2	3	Rating value	Weighting	Score		Commen	t
actor	of Safety			76.8 30.10 62.63 52.52	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.64 m.	Slope angle: 0.5	3º.
	Clido bistory	Distance to previous slide	es (km)	5 - 10	NA	5 - 10	< 5	On site	1	2	2			
	Slide history	Evidence of peat moveme features, compression features)		NA	NA			Yes	0	2	0			
		Subsoil type		NA	NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	0	1	0	No TP		
	Subsoil conditions (visible in trial pits)	Peat fibres across transition	on to subsoil	No	NA	Yes	Partially	No	3	1	3	No TP		
		Peat wetness		No	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	3	2	6	No TP		
		General curvature downs	lope	NA	NA		Planar	Convex	0	1	0	Flat area.		
	Topography	Distance to the convexity (only if previous factor is Conve		NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0			
		Slope aspect (for high latitudes in northern h		SW, S, SE	NA	SW, S, SE	W, E	NW, N, NE	1	1	1	SE		
		Distance from watercours		< 200	NA	> 300	200 - 300	< 200	3	1	3	~50m		
tors		Surface moisture index (N	IDMI)	0 - 96	NA	0 - 96	96 -135	135 - 174	1	1	1			
Secondary factors		Surface water	-	Localised	NA	Localised	Ponded in drains	Springs	1	1	1			
sconda	Hydrology	(water table level indicator) Evidence of piping (subsu	rface flow)	NA	NA	-	-	Yes	0	1	0			
Se		Significant surface desicca		NA	NA	-	-	Yes	0	1.5	0			
		(previous summer was dry?) Existing drainage ditches		Down slope	NA	Down slope	Varied / Oblique	Across slope	1	1.5	1			
		Annual rainfall		1000 - 1400	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2			
				mm/yr Dry heather	NA		Grassland	Wetlands	1	1	1	No bush - forestry are		
	Vegetation	Bush Forestry			—	Dry heather						No bush - forestry are	d.	
		(if applicable)		Good growth	NA	Good growth	Fair	Stunted growth	1	1.5	1.5			
	Peat workings	Peat cuts presence		NA	NA	-	Cutaway / Turbary	Machine cut	0	1	0	No peat cuts.		
		Peat cuts vs contour lines		NA	NA	Perpendicular	Oblique	Parallel	0	1	0			
	Existing loads	Roads		NA Late Summer	NA	Solid	- Wintor Early	Floating	0	1	0			
	Time of year for con	astruction		Late Summer, Autumn	NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1		Wost case estimate		
						Ha	zard	]		Hazard _{total}	35.5			
						0.0 - 0.3	Negligible Low			Max. possible	93			
						0.5 - 0.7	Medium			Hazard ₀₋₁	0.38	]		
						0.7 - 1.0	High							
(olur	e of potential peat flo	Consequence factors		Value	0	1	Rating criteria 2	3	Rating value	Weighting	Score		Commen	t
		rest watercourse and peat dep	pth in the area)	Small Minor undefined	NA	Small	Medium Minor undefined	Large	1	3	3			
Down	slope hydrology featu	res		Minor undefined watercourse	NA	Bowl / contained	Minor undefined watercourse	Valley	2	1	2			
Proxin	nity from defined valle	ey (m)		> 500	NA	> 500	200 - 500	< 200	1	1	1			
Down	hill slope angle			Horizontal	NA	Horizontal	Intermediate	Steep Drinking water	1	1	1			
Down	stream aquatic enviro	onment		Sensitive	NA	Non-sensitive	Sensitive	supply	2	1	2			
	roads in potential pea			NA	NA	Minor road	Local road Electricity	Regional road Electricity	0	1	0			
	ead lines in potential	· · ·		NA	NA	Phone lines	(LV)	(MV, HV)	0	1	0			
	ngs in potential peat f			Farm out-houses	NA	Farm out-houses	-	Dwelling	1	1	1			
Capab	ility to respond (acces	ss and resources)		Fair	NA	Good	Fair	Poor	2	1 onsequences _{total}	2			
							quences	]						
						0.0 - 0.3	Negligible Low			Max. possible	33			
						0.5 - 0.7	Medium		Consequ	iences ₀₋₁	0.36	]		
						0.7 - 1.0	High	J						
							Risk ratin	g						
						A still a second in the			1					
	Ris		Normal site investigation	20		Action required			ł	Rick rating -	Uses-1 *	Consequences		
	0.00 - 0.20	Negligible	Normal site investigation						-	Risk rating =	nazaru *	consequences	1	
	0.20 - 0.40	Low	Targeted site investigat	tion, design of spe	cific mi	tigation measures. Par	t time supervision dur	ing construction.		Risk rating =	0.38	0.36 =	1	0.14

0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.38	0.36	=	0.14
0.40 - 0.60	Medium	Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.					
0.60 - 1.00	High	Avoid construction in this area.					





### Table M-7: Peat Stability Risk Assessment at Turbine 7.

							tability Risk					
(	GDG	Peat Stability Risk Assessmen	t (PSRA)			Location: Conditions:	Turbine 7 Undrained (U), undra	ined surcharge (US), c	drained (D), drai	ned surcharge (I	DS)	
GAG	IN & DOHERTY	,				Inspected on:	Sep-23	0.(,				
	ıkô>	Clashama Wind Farm				Inspected by:	BMC					
Ň		Clonberne Wind Farm				Completed by: Date:	CE Nov-23					
												-
		Hazard factors		Value U US D DS	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
-					0			3				
Factor	of Safety			1.0 0.84 0.90 1.51	-	≥ 1.3	1.3 - 1.0	≤ 1.0	3	10	30	Peat depth: ~4.4 m. Slope angle: 6.3º.
	Slide history	Distance to previous slides (km)		5 - 10	NA	5 - 10	< 5	On site	1	2	2	
	Side fiscory	Evidence of peat movement (e.g. features, compression features).	tension cracks, step	NA	NA	-	-	Yes	0	2	0	
		Subsoil type		NA	NA	Gravel / Firm glacial	Smooth rock	Soft sensitive clay	0	1	0	No TP
	Subsoil conditions					till						
	(visible in trial pits)	Peat fibres across transition to su	ubsoil	NA	NA	Yes	Partially	No Extremely wet /	0	1	0	No TP
		Peat wetness		NA	NA	Dry / Stands well	Slowly squeezing	Undiggable	3	2	6	No TP
		General curvature downslope		NA	NA		Planar	Convex	0	1	0	Flat area.
	Topography	Distance to the convexity break (only if previous factor is Convex)		NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		Slope aspect (for high latitudes in northern hemisphe	re)	NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
s		Distance from watercourse (m)		< 200	NA	> 300	200 - 300	< 200	3	1	3	~80m
Secondary factors		Surface moisture index (NDMI)		0 - 96	NA	0 - 96	96 -135	135 - 174	1	1	1	
ndary		Surface water (water table level indicator)		NA	NA	Localised	Ponded in drains	Springs	0	1	0	
Seco	Hydrology	ow)	NA	NA	-	-	Yes	0	1	0		
		Significant surface desiccation (previous summer was dry?)		NA	NA			Yes	0	1.5	0	
		Existing drainage ditches		Down slope	NA	Down slope	Varied / Oblique	Across slope	1	1	1	Very low slope angle, but large drain fairly near to turbine site (<50m).
		Annual rainfall		1000 - 1400	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	( <sutt).< td=""></sutt).<>
		Bush		mm/yr Dry heather	NA	Dry heather	Grassland	Wetlands	1	1	1	
	Vegetation	Forestry		NA	NA		Fair		0		0	
		(if applicable)		Cutaway /		Good growth		Stunted growth		1.5		
	Peat workings	Peat cuts presence		Turbary	NA	-	Cutaway / Turbary	Machine cut	2	1	2	No peat cuts.
		Peat cuts vs contour lines		Parallel	NA	Perpendicular	Oblique	Parallel	3	1	3	
	Existing loads	Roads		NA Loto Summor	NA	Solid	- Mintor Farks	Floating	0	1	0	
	Time of year for con	struction		Late Summer, Autumn	NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
						Ha	zard	1		Hazard _{total}	54	
						0.0 - 0.3	Negligible			Max. possible	93	
						0.3 - 0.5 0.5 - 0.7	Low Medium			Hazard ₀₋₁	0.58	]
						0.7 - 1.0	High					
		Consequence factors		Value	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
	e of potential peat flo			Medium	NA	Small	Medium	Large	2	3	6	
-	on of distance from near	rest watercourse and peat depth in th res	e area)	Minor undefined	NA	Bowl / contained	Minor undefined	Valley	2	1	2	
	ity from defined valle			watercourse > 500	NA	> 500	watercourse 200 - 500	< 200	1	1	1	
	ill slope angle			Horizontal	NA	Horizontal	Intermediate	Steep	1	1	1	
	tream aquatic enviro	nment		Sensitive	NA	Non-sensitive	Sensitive	Drinking water	2	1	2	
	roads in potential pea			NA	NA	Minor road	Local road	supply Regional road	0	1	0	
	ead lines in potential per			NA	NA	Phone lines	Electricity	Electricity	0	1	0	
	gs in potential peat fl			NA	NA		(LV) -	(MV, HV)	0		0	
	lity to respond (acces			Fair	NA	Farm out-houses Good	- Fair	Dwelling Poor	2	1	2	
Capab	to respond (acces	and resources		i ali	AM	5000	rdli	FUUI		1 onsequences _{total}	14	
							quences					
					0.0 - 0.3         Negligible         Max. possible         33           0.3 - 0.5         Low					33		
				0.5 - 0.7 0.7 - 1.0	<mark>Medium</mark> High		Consequ	iences ₀₋₁	0.42			
							Risk ratin	g				
	Ris	k				Action required			]			
	0.00 - 0.20	Negligible Norma	l site investigatio	on						Risk rating =	Hazard *	Consequences
									1			

0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.58	0.42	=	0.25
0.40 - 0.60		Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.					
0.60 - 1.00	High	Avoid construction in this area.					

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### Table M- 8: Peat Stability Risk Assessment at Turbine 8.

			Idi	ble	IVI- 8: Peat S	tability Risk	Assessment	at Turbi	ne 8.		
C	GDG	Peat Stability Risk Assessment (PSRA)				Turbine 8 Undrained (U), undra	ined surcharge (US)	drained (D) drai	ned surcharge (I	201	
	IN & DOHERTY OSOLUTIONS	reat stability hisk Assessment (rona)			Inspected on:	Sep-23	ineu surcharge (03), (	iraineu (D), urai	neu surcharge (i	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	ıkô>	Clonberne Wind Farm			Inspected by: Completed by:	BMC CE					
•					Date:	Nov-23					
		Hazard factors	Value U US D DS		4	Rating criteria	2	Rating value	Weighting	Score	Comment
				0	1	2	3				
Factor	of Safety		7.1 4.53 5.88 8.00	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~1.8 m. Slope angle: 2.3º.
		Distance to previous slides (km)	5 - 10	NA	5 - 10	< 5	On site	1	2	2	
	Slide history	Evidence of peat movement (e.g. tension cracks, step features, compression features).	NA	NA	-	-	Yes	0	2	0	
			Gravel / Firm		Gravel / Firm glacial	Currently used	Coff constitution along				
	Subsoil conditions	Subsoil type	glacial till	NA	till	Smooth rock	Soft sensitive clay	1	1	1	Nearest TP (TP01) records: Grey brown, stiff, high plasticity, sandy, gravelly CLAY.
	(visible in trial pits)	Peat fibres across transition to subsoil	NA	NA	Yes	Partially	No	0	1	0	
		Peat wetness	NA	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	3	2	6	
		General curvature downslope	NA	NA	-	Planar	Convex	0	1	0	Flat area.
	Topography	Distance to the convexity break (only if previous factor is Convex)	NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		Slope aspect (for high latitudes in northern hemisphere)	NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
		Distance from watercourse (m)	< 200	NA	> 300	200 - 300	< 200	3	1	3	
actors		Surface moisture index (NDMI)	0 - 96	NA	0 - 96	96 -135	135 - 174	1	1	1	
Secondary factors		Surface water (water table level indicator)	NA	NA	Localised	Ponded in drains	Springs	0	1	0	
Secon	Hydrology	Evidence of piping (subsurface flow)	NA	NA	-	-	Yes	0	1	0	
		Significant surface desiccation	NA	NA			Yes	0	1.5	0	
		(previous summer was dry?) Existing drainage ditches	NA	NA	Down slope	Varied / Oblique	Across slope	0	1	0	
		Annual rainfall	1000 - 1400	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	
		Bush	mm/yr NA	NA	Dry heather	Grassland	Wetlands	0	1	0	No bush - forestry area.
	Vegetation	Forestry								-	
		(if applicable)	Good growth	NA	Good growth	Fair	Stunted growth	1	1.5	1.5	
	Peat workings	Peat cuts presence	NA	NA	-	Cutaway / Turbary	Machine cut	0	1	0	No peat cuts.
		Peat cuts vs contour lines	NA	NA	Perpendicular	Oblique	Parallel	0	1	0	
	Existing loads	Roads	NA Late Summer,	NA	Solid	- Winter, Early	Floating Late Summer,	0	1	0	
	Time of year for con	struction	Autumn	NA	Spring	Summer	Autumn	3	1	3	Wost case estimate
					Ha	zard	1		Hazard _{total}	29.5	
					0.0 - 0.3	Negligible Low			Max. possible	96	
					0.5 - 0.7	Medium			Hazard ₀₋₁	0.31	]
					0.7 - 1.0	High					
		Consequence factors	Value	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
	e of potential peat flo n of distance from near	ow rest watercourse and peat depth in the area)	Small	NA	Small	Medium	Large	1	3	3	
	lope hydrology featu		Minor undefined watercourse	NA	Bowl / contained	Minor undefined watercourse	Valley	2	1	2	
Proxim	ity from defined valle	ey (m)	> 500	NA	> 500	200 - 500	< 200	1	1	1	
Downh	ill slope angle		Horizontal	NA	Horizontal	Intermediate	Steep	1	1	1	
Downs	tream aquatic enviro	nment	Sensitive	NA	Non-sensitive	Sensitive	Drinking water	2	1	2	
Public	roads in potential pea	at flow path	NA	NA	Minor road	Local road	supply Regional road	0	1	0	
	ad lines in potential		NA	NA	Phone lines	Electricity	Electricity	0	1	0	
	gs in potential peat fl		Farm out-houses		Farm out-houses	(LV) -	(MV, HV) Dwelling	1	1	1	
	lity to respond (acces		Fair	NA	Good	Fair	Poor	2	1	2	
									onsequences _{total}	12	
					Consec 0.0 - 0.3	Negligible			Max. possible	33	
					0.3 - 0.5	Low		-			
				0.5 - 0.7 0.7 - 1.0	Medium High		Consequ	iences ₀₋₁	0.36	1	
							• 				
						Risk ratin	3				
	Ris	k			Action required			]			
	0.00 - 0.20	Negligible Normal site investigation	on						Risk rating =	Hazard *	Consequences

0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.31	0.36	=	0.11
0.40 - 0.60		Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.					
0.60 - 1.00	High	Avoid construction in this area.					





### Table M- 9: Peat Stability Risk Assessment at Turbine 9.

GAN		Peat Stability Risk Ass Clonberne Wind Farm					Location: Conditions: Inspected on: Inspected by: Completed by: Date:	Turbine 9 Undrained (U), undra Sep-23 BMC CE Nov-23	ined surcharge (US), d	irained (D), drain	ned surcharge ([	DS)		
		Hazard factors		V	alue			Rating criteria		Rating value	Weighting	Score		Comment
					S D DS	0	1	2	3	hating falae		56010		
Factor	of Safety			453.4	363.45 61.72	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.09 m. Slo	pe angle: 0.7º.
	Slide history	Distance to previous slid			NA	NA	5 - 10	< 5	On site	0	2	0		
		Evidence of peat movem features, compression feature			NA	NA	-	-	Yes	0	2	0		
	Subsoil conditions	Subsoil type			el / Firm cial till	NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	1	1	1		own/grey firm sandy gravelly CLAY with cobbles and rs are subangular to subrounded.
	(visible in trial pits)	Peat fibres across transit	ion to subsoil		Yes	NA	Yes	Partially	No	1	1	1		
		Peat wetness		Dry / S	tands well	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	3	2	6		
		General curvature down	slope		NA	NA	-	Planar	Convex	0	1	0	Flat area.	
	Topography	Distance to the convexit (only if previous factor is Conv			NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0		
		Slope aspect (for high latitudes in northern	hemisphere)		NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0		
S		Distance from watercour	rse (m)	200	0 - 300	NA	> 300	200 - 300	< 200	2	1	2		
factor		Surface moisture index (	NDMI)	135	5 - 174	NA	0 - 96	96 -135	135 - 174	3	1	3		
Secondary factors		Surface water (water table level indicator)			NA	NA	Localised	Ponded in drains	Springs	0	1	0		
Secc	Hydrology	Evidence of piping (subs	urface flow)		NA	NA	-	-	Yes	0	1	0		
		Significant surface desico (previous summer was dry?)	cation		NA	NA	-	-	Yes	0	1.5	0		
		Existing drainage ditches	5		NA	NA	Down slope	Varied / Oblique	Across slope	0	1	0		
		Annual rainfall			) - 1400 m/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2		
		Bush			ssland	NA	Dry heather	Grassland	Wetlands	2	1	2		
	Vegetation	Forestry (if applicable)			NA	NA	Good growth	Fair	Stunted growth	0	1.5	0		
		Peat cuts presence			NA	NA		Cutaway / Turbary	Machine cut	0	1	0	No peat cuts.	
	Peat workings	Peat cuts vs contour line	s		NA	NA	Perpendicular	Oblique	Parallel	0	1	0	No peat cuts.	
	Existing loads	Roads		S	olid	NA	Solid	-	Floating	1	1	1		
	Time of year for con	struction			Summer,	NA	Spring	Winter, Early	Late Summer,	3	1	3	Wost case estimate	
				AU	tumn	<u> </u>		Summer	Autumn		Hazard _{total}	31		
							Ha: 0.0 - 0.3 0.3 - 0.5	zard Negligible Low			Max. possible	102		
							0.5 - 0.7 0.7 - 1.0	Medium High			Hazard ₀₋₁	0.30	]	
		Consequence factors		v	alue	0	1	Rating criteria	3	Rating value	Weighting	Score		Comment
	e of potential peat flo	w est watercourse and peat de	anth in the area)	s	mall	NA	Small	Medium	Large	1	3	3		
	lope hydrology featu		eptir in the area		undefined ercourse	NA	Bowl / contained	Minor undefined	Valley	2	1	2		
Proxim	ity from defined valle	ey (m)			500	NA	> 500	watercourse 200 - 500	< 200	1	1	1		
Downł	nill slope angle			Hor	izontal	NA	Horizontal	Intermediate	Steep	1	1	1		
Downs	tream aquatic enviro	nment		Sei	nsitive	NA	Non-sensitive	Sensitive	Drinking water	2	1	2		
Public	roads in potential pea	t flow path			NA	NA	Minor road	Local road	supply Regional road	0	1	0		
	ead lines in potential p				NA	NA	Phone lines	Electricity	Electricity (MV, HV)	0	1	0		
Buildin	igs in potential peat fl	ow path		Farm o	ut-houses	NA	Farm out-houses	(LV) -	Dwelling	1	1	1		
Capabi	ility to respond (acces	s and resources)			Fair	NA	Good	Fair	Poor	2	1	2		
						<u> </u>				Co	nsequences _{total}	12		
							Consec 0.0 - 0.3	quences Negligible			Max. possible	33		
							0.3 - 0.5 0.5 - 0.7	Low Medium		Concorr	iences ₀₋₁	0.36	-	
							0.5 - 0.7	Medium High		consequ	0-1	0.30	J	
								Risk ratin	5					
							A			1				
	Ris	k Negligible	Normal site investigation	on			Action required				Risk rating =	Hazard *	Consequences	
	0.20 - 0.40	Low	Targeted site investigat	ion, des	ign of spe	cific mi	fic mitigation measures. Part time supervision		ng construction.	]	Risk rating =	0.30	0.36 =	0.11
	0.40 0.60 Madium Avoid construction			ction in the area if possible. If unavoidable, detailed site investigation and design of specific asures. Full time supervision during construction.										
			Avoid construction in t	his area.										





### Table M- 10: Peat Stability Risk Assessment at Turbine 10.

Network         memeric model         memory model         memory model         memory model           Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model         Image: Model	
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Image: Problem         Image:	
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Idea         Distance is previous disks (in)         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1 <th1< th=""> <th1< th="">         1        &lt;</th1<></th1<>	Comment
Inter harm         Businer la prenous die lamin         1         2         2         N         5         5         0         0         1         2         2         0           Inder and services         inder and	n Slone angle: 0.989
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Patworking back working back working in a part of success and pack depin in the area)NANAPerpendicular PerpendicularOblique ObliqueParallelOIOOKisting loadsRadsNANASpringSpringFloating SummerOIIOIOIOIOIOIIOIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII <tdi< td="">&lt;</tdi<>	
kisting loadsRoadsNANASolidFloatingFloatingO1OOThe of year for constructionLate SummerLate SummerVinter, Early SummerLate Summer30100000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000 </td <td></td>	
Imme of year for construction       Late Summer, Autumn       NA       Spring       Winter, Early Summer       Late Summer, Autumn       3       1       3       Wost case estimates and the summer, Autumn         Hazard total         0.0       0.0       Na       Na       Spring       Winter, Early Summer       Na       3       1       3       Wost case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       Most case estimates and the summer, Autumn       3       1       3       3       1       3       3       1       3       3       1       3       1       3       3       1       3       3       1       3       3       1       3       3       1       3       3       1       3       3       1       3       3       1       3       3       1<	
$\begin{array}{                                    $	
Hared         Hared $0.0.0.3$ $ Valee $ $0.0.0.3$ $ Valee $	e
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
Note	
Consequence factors         Value $\overline{0}$ Rating criteria         Rating value         Weighting         Score           Volume of potential peat flow (function of distance from nearest watercourse and peat depth in the area)         Small         NA         Small         Medium         Large         1         3         3           Downslope hydrology features         Minor undefined watercourse         NA         Bowl / contained         Minor undefined watercourse         Value         2         1         3         3           Downslope hydrology features         Minor undefined watercourse         NA         Bowl / contained         Minor undefined watercourse         Value         2         1         3         3           Downslope hydrology features         Minor undefined watercourse         NA         Bowl / contained         Minor undefined watercourse         Value         2         1         1         1           Downslope hydrology features         Horizontal         NA         Asono-sensitive         200 - 500         <200	
Consequence factorsValue0123Rating valueWeightingScoreVolume of potential peat flow (function of distance from nearest watercourse and peat depth in the area)SmallNASmallMediumLarge133Downslope hydrology featuresMinor undefined watercourseNABowl / containedMinor undefined watercourseValue212Proximity from defined valley (m)> 500NA> 500200 - 500< 200	
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(function of distance from nearest watercourse and peat depth in the area)SmallNASmallMediumLarge1333Downslope hydrology featuresMinor undefined watercourseNABowl / containedMinor undefined watercourseValley21212Proximity from defined valley (m)>500NA>500200 - 500<200	comment
Downslope hydrology featuresValMaBowl / containedwatercourseValleyValley212Proximity from defined valley (m)> 500NA> 500200 - 500< 200 - 500	
Downhill slope angleHorizontalNAHorizontalIntermediateSteep111Downstream aquatic environmentSensitiveNANon-sensitiveSensitiveDrinking water supply212Public roads in potential peat flow pathNANAMinor roadLocal roadRegional road010Overhead lines in potential peat flow pathNANAPhone linesElectricity (LV)Electricity (MV, HV)010Buildings in potential peat flow pathFarm out-housesNAFarm out-houses-Dwelling111	
Downstream aquatic environment     Sensitive     NA     Non-sensitive     Sensitive     Drinking water supply     2     1     2       Public roads in potential peat flow path     NA     NA     Minor road     Local road     Regional road     0     1     0       Overhead lines in potential peat flow path     NA     NA     Phone lines     Electricity (LV)     Construction     1     0       Buildings in potential peat flow path     Farm out-houses     NA     Farm out-houses     -     Dwelling     1     1	
Downstream aquatic environment     Sensitive     NA     Non-sensitive     Sensitive     Sensitive<	
Public roads in potential peat flow path       NA       NA       Minor road       Local road       Regional road       0.0       1.0       0.0         Overhead lines in potential peat flow path       NA       NA       Phone lines       Electricity (LV)       Clear control of the state	
Buildings in potential peat flow path     Farm out-houses     NA     Prone lines     (LV)     (MV, HV)     O     1     O	
Buildings in potential peat flow path     Farm out-houses     NA     Farm out-houses     -     Dwelling     1     1	
cupuonicy to respond tocces and resources/	
Consequences total 12	
Consequences	
0.0 - 0.3         Negligible         Max. possible         33           0.3 - 0.5         Low	
0.5 - 0.7 Medium Consequences 0.1 0.36	
0.7 - 1.0 High	
Risk rating	
Risk Action required	
0.00 - 0.20     Negligible     Normal site investigation     Risk rating =     Hazard * Consequences	
0.20 - 0.40 Low Targeted site investigation, design of specific mitigation measures. Part time supervision during construction. Risk rating = 0.29 0.36	= 0.11
	- 0.11
0.40 - 0.60 Medium Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific initigation measures. Full time supervision during construction.	
0.60 - 1.00 High Avoid construction in this area.	





### Table M- 11: Peat Stability Risk Assessment at Turbine 11.

		Clonberne Wind Farm				Inspected on: Inspected by: Completed by: Date:	Sep-23 BMC CE Nov-23	Assessment				
		Hazard factors		Value			Rating criteria		Rating value	Weighting	Score	Comment
Factor	of Safety			12.9 C 7.82 G 10.70 U 13.78 G		1 ≥ 1.3	2	3 ≤ 1.0	1	10		Peat depth: ~1.5 m. Slope angle: 1.4º.
		Distance to previous slid		5 - 10		F 10		On site	1	2	2	
	Slide history		nent (e.g. tension cracks, step		NA NA	- 5 - 10	< 5	On site Yes	1	2	2	
		features, compression feature	25).			Gravel / Firm glacial		103				
	Subsoil conditions	Subsoil type		NA	NA	till	Smooth rock	Soft sensitive clay	0	1	0	No TP
	(visible in trial pits)	Peat fibres across transit	tion to subsoil	NA	NA	Yes	Partially	No	0	1	0	No TP
		Peat wetness		NA	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	3	2	6	No TP
		General curvature down Distance to the convexit		NA	NA		Planar	Convex	0	1	0	Flat area.
	Topography	(only if previous factor is Conv Slope aspect		NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		(for high latitudes in northern		NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
tors		Distance from watercou		> 300	NA	> 300	200 - 300	< 200	1	1	1	
Secondary factors		Surface moisture index ( Surface water	(וואנטוו)	0 - 96	NA	0 - 96	96 -135	135 - 174	1	1	1	
econd	Hydrology	(water table level indicator) Evidence of piping (subs	urface flow)	Localised	NA	Localised -	Ponded in drains	Springs	1	1	1	
S	Hydrology	Significant surface desice		NA	NA NA	-	-	Yes	0	1	0	
		(previous summer was dry?) Existing drainage ditches	,	Down slope	NA	- Down slope	- Varied / Oblique	Across slope	1	1.5	1	
		Annual rainfall	•	1000 - 1400	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	2	1	2	
		Bush		mm/yr NA	NA	Dry heather	Grassland	Wetlands	0	1	0	
	Vegetation	Forestry		NA	NA	Good growth	Fair	Stunted growth	0	1.5	0	
		(if applicable) Peat cuts presence		Cutaway /	NA	-	Cutaway / Turbary	Machine cut	2	1	2	Turbary cutting ~50m from turbine
	Peat workings	Peat cuts vs contour line	25	Turbary Parallel	NA	Perpendicular	Oblique	Parallel	3	1	3	
	Existing loads	Roads		NA	NA	Solid	-	Floating	0	1	0	
	Time of year for con	struction		Late Summer, Autumn	NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
						Ha: 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	rard Negligible Low Medium High			Hazard _{total} Max. possible Hazard ₀₋₁	32 93 <b>0.34</b>	]
		Consequence factors		Value			Rating criteria		Rating value	Weighting	Score	Comment
	e of potential peat flo	W est watercourse and peat d	anth in the area)	Small	0 NA	1 Small	2 Medium	3 Large	1	3	3	
	lope hydrology featu		epth in the area)	Minor undefined watercourse	NA	Bowl / contained	Minor undefined watercourse	Valley	2	1	2	
Proxim	nity from defined valle	ey (m)		> 500	NA	> 500	200 - 500	< 200	1	1	1	
Downł	nill slope angle			Horizontal	NA	Horizontal	Intermediate	Steep	1	1	1	
Downs	tream aquatic enviro	nment		Sensitive	NA	Non-sensitive	Sensitive	Drinking water supply	2	1	2	
Public	roads in potential pea	t flow path		NA	NA	Minor road	Local road	Regional road	0	1	0	
Overh	ead lines in potential	peat flow path		NA	NA	Phone lines	Electricity (LV)	Electricity (MV, HV)	0	1	0	
Buildin	igs in potential peat f	ow path		Farm out-house	NA	Farm out-houses	-	Dwelling	1	1	1	
Capabi	ility to respond (acces	s and resources)		Fair	NA	Good	Fair	Poor	2	1	2	
						Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	uences Negligible Low Medium High			Max. possible	12 33 <b>0.36</b>	]
							Risk ratin	3				
	Ris					Action required			1			
	0.00 - 0.20	Negligible	Normal site investigatio	on					]	Risk rating =	Hazard *	Consequences
	0.20 - 0.40	Low	Targeted site investigat	tion, design of spe	cific mi	tigation measures. Par	t time supervision duri	ng construction.		Risk rating =	0.34	0.36 = <b>0.13</b>
	0.40 - 0.60	Medium	Avoid construction in the mitigation measures. Fi				investigation and desig	n of specific				
_			initigation incusures. It		in durin							





### Table M- 12: Peat Stability Risk Assessment at northern construction compound.

(	GDG	Peat Stability Risk Ass	essment (PSRA)				Location: Conditions:	Temporary compound Undrained (U), undra		lrained (D). draii	ned surcharge (I	DS)	
GAT	VIN & DOHERTY EOSOLUTIONS						Inspected on:	Sep-23	0 ( "		0 1		
<u>م</u>	ικό	Clonberne Wind Farm					Inspected by: Completed by:	BMC CE					
	~						Date:	Nov-23					
				Va	luo			Rating criteria					
		Hazard factors		U US	D DS	0	1	2	3	Rating value	Weighting	Score	Comment
Factor	of Safety			29 6.7	23 11.6	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: 0.3, Slope angle: 3.3
	Slide history	Distance to previous slide	es (km)	5 -	10	NA	5 - 10	< 5	On site	1	2	2	
	Silde history	Evidence of peat movem features, compression features		N	A	NA	-	-	Yes	0	2	0	
		Subsoil type		N	A	NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	0	1	0	No TP
	Subsoil conditions (visible in trial pits)	Peat fibres across transit	ion to subsoil	N	A	NA	Yes	Partially	No	0	1	0	
		Peat wetness		N	A	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	1	2	2	
		General curvature downs	slope	N	A	NA	-	Planar	Convex	0	1	0	Flat
	Topography	Distance to the convexity (only if previous factor is Conv		N	A	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		Slope aspect		N	A	NA		W, E	NW, N, NE	0	1	0	
		(for high latitudes in northern Distance from watercour			NA	> 300	200 - 300	< 200	1	1	1		
ors		Surface moisture index (l	NDMI)	96 -	135	NA	0 - 96	96 -135	135 - 174	2	1	2	
iry fact		Surface water		Localised NA		NA	Localised	Ponded in drains	Springs	1	1	1	
Secondary factors	Hydrology	(water table level indicator) Evidence of piping (subsu	urface flow)			NA	-	-	Yes	0	1	0	
Se	.,	Significant surface desico				NA			Yes	0	1.5	0	
		(previous summer was dry?) Existing drainage ditches				NA		- Varied / Oblique	Across slope	1	1.5	0	
		Annual rainfall		< 1000		NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1	
	Vegetation	Bush Forestry		Dry he		NA	Dry heather	Grassland	Wetlands	1	1	1	
		(if applicable)		N		NA	Good growth	Fair	Stunted growth	0	1.5	0	
	Peat workings	Peat cuts presence		N	A	NA	-	Cutaway / Turbary	Machine cut	0	1	0	
		Peat cuts vs contour line	S	N	A	NA	Perpendicular	Oblique	Parallel	0	1	0	
	Existing loads	Roads		So		NA	Solid	-	Floating	1	1	1	Founded roads
	Time of year for con	struction		Late Su Auti		NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
							Ha	zard			Hazard _{total}	25	
							0.0 - 0.3	Negligible Low			Max. possible	93	
							0.5 - 0.7	Medium			Hazard ₀₋₁	0.27	]
							0.7 - 1.0	High					
		Consequence factors		Va	lue	0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment
	e of potential peat flo on of distance from near	ow rest watercourse and peat de	epth in the area)	Sm	all	NA	Small	Medium	Large	1	3	3	
Downs	lope hydrology featu	res	· · ·	Minor ur watere		NA	Bowl / contained	Minor undefined watercourse	Valley	2	1	2	
Proxim	ity from defined valle	ey (m)		> 5		NA	> 500	200 - 500	< 200	1	1	1	
Downh	ill slope angle			N	A	NA	Horizontal	Intermediate	Steep	0	1	0	
Downs	tream aquatic enviro	nment		Sens	itive	NA	Non-sensitive	Sensitive	Drinking water supply	2	1	2	
Public	roads in potential pea	at flow path		N	A	NA	Minor road	Local road	Regional road	0	1	0	
Overh	ead lines in potential	peat flow path		N	A	NA	Phone lines	Electricity (LV)	Electricity (MV, HV)	0	1	0	
Buildin	gs in potential peat f	low path		N	A	NA	Farm out-houses	-	Dwelling	0	1	0	
Capabi	lity to respond (acces	ss and resources)		Fa	ir	NA	Good	Fair	Poor	2	1	2	
<u> </u>						8		ļ	<u> </u>	Co	nsequences _{total}	10	
							Consec 0.0 - 0.3	uences Negligible			Max. possible	33	
							0.3 - 0.5	Low		6			1
							0.5 - 0.7 0.7 - 1.0	Medium High		Consequ	iences ₀₋₁	0.30	1
								Risk rating					
	Ris	k		Action required									
	0.00 - 0.20	Negligible	Normal site investigatio	e investigation Risk rating = Hazard								Hazard *	Consequences
	0.20 - 0.40	Low	Targeted site investigat	igation, design of specific mitigation measures. Part time supervision during construction. Risk rating = 0.27							0.27	0.30 = <b>0.08</b>	
	0.40 - 0.60	Medium	Avoid construction in the area if possible. If i					f unavoidable, detailed site investigation and design of specific					
		and the second	mitigation measures. Fi	ull time su		n durin	g construction.						
	0.60 - 1.00	High	mitigation measures. Fu Avoid construction in th			n durin	g construction.						





### Table M- 13: Peat Stability Risk Assessment at southern construction compound.

C	GDG	essment (PSRA)				Location: Conditions:	Temporary compoun Undrained (U), undra		lrained (D), drai	ned surcharge (I	DS)		
GAN	OSOLUTIONS						Inspected on:	Sep-23			0,	•	
							Inspected by:	BMC					
ľ		Clonberne Wind Farm					Completed by: Date:	CE Nov-23					
	•						Date.	100-23					
		Hazard factors			alue	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
Factor	of Safety			22.8 9.4		-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: 0.7, Slope angle: 1.8
		Distance to previous slid	or (km)		- 10	NA	5 - 10	< 5	On site	1	2	2	
	Slide history	Evidence of peat movem					5 - 10	< 5	On site				
		features, compression feature			NA	NA	-	-	Yes	0	2	0	
		Subsoil type			NA	NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	0	1	0	
	Subsoil conditions (visible in trial pits)	Peat fibres across transit	tion to subsoil		NA	NA	Yes	Partially	No	0	1	0	
		Peat wetness		Dry / St	tands well	NA	Dry / Stands well	Slowly squeezing	Extremely wet /	1	2	2	
		General curvature down	slope		NA	NA		Planar	Undiggable Convex	0	1	0	Flat
	Tonography	Distance to the convexity	-		NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
	Topography	(only if previous factor is Conv Slope aspect	vex)										
		(for high latitudes in northern	hemisphere)		NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
		Distance from watercour	rse (m)	<	200	NA	> 300	200 - 300	< 200	3	1	3	
ictors		Surface moisture index (	NDMI)	96	-135	NA	0 - 96	96 -135	135 - 174	2	1	2	
Secondary factors		Surface water (water table level indicator)		Loc	alised	NA	Localised	Ponded in drains	Springs	1	1	1	
econd	Hydrology	Evidence of piping (subst	urface flow)		NA	NA	-	-	Yes	0	1	0	
S		Significant surface desico			NA	NA		_	Yes	0	1.5	0	
		(previous summer was dry?)											Very low slope angle, but drains
		Existing drainage ditches	j		n slope	NA	Down slope	Varied / Oblique	Across slope	1	1	1	perpendicular to contour lines.
		Annual rainfall		< 100	0 mm/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1	
	Vegetation	Bush			NA	NA	Dry heather	Grassland	Wetlands	0	1	0	
	vegetation	Forestry (if applicable)		Good	l growth	NA	Good growth	Fair	Stunted growth	1	1.5	1.5	
		Peat cuts presence			NA	NA		Cutaway / Turbary	Machine cut	0	1	0	Peat cuts set back from site.
	Peat workings	Peat cuts vs contour line	S		NA	NA	Perpendicular	Oblique	Parallel	0	1	0	
	Evicting loads	Roads	-		-					-		2	Unsure if founded or floated.
	Existing loads			Late S	- Summer,	NA	Solid	- Winter, Early	Floating Late Summer,	2	1		
	Time of year for cor	nstruction			tumn	NA	Spring	Summer	Autumn	3	1	3	Wost case estimate
											Hazard _{total}	28.5	
							Hai	zard	[		total		
							0.0 - 0.3	Negligible			Max. possible	93	
							0.0 - 0.3 0.3 - 0.5	Negligible Low			Max. possible	93	1
							0.0 - 0.3	Negligible					]
				_			0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Negligible Low Medium High			Max. possible Hazard ₀₋₁	93	]
		Consequence factors		v	alue	0	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Negligible Low Medium	3	- Rating value	Max. possible	93	Comment
	e of potential peat fil n of distance from nea		epth in the area)		<b>alue</b> mall	0 NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Negligible Low Medium High Rating criteria	3 Large	<ul> <li>Rating value</li> <li>1</li> </ul>	Max. possible Hazard ₀₋₁	93 0.31	Comment
(functio		ow arest watercourse and peat de	epth in the area)	Si Minor I	mall undefined		0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Negligible Low Medium High Rating criteria 2 Medium Minor undefined		_	Max. possible Hazard ₀₋₁ Weighting	93 0.31 Score	Comment
(functio Downs	n of distance from nea	ow rrest watercourse and peat de ures	epth in the area)	Si Minor u wate	mall	NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small	Negligible Low Medium High Rating criteria 2 Medium	Large	1	Max. possible Hazard 0-1 Weighting 3	93 0.31 Score 3	Comment
(functio Downs Proxim	n of distance from nea lope hydrology featu ity from defined vall	ow rrest watercourse and peat de ures	epth in the area)	Si Minor u wate >	mall undefined rcourse 500	NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500	Large Valley < 200	1 2 1	Max. possible Hazard 0-1 Weighting 3 1 1	93 0.31 Score 3 2 1	Comment
(functio Downs Proxim Downh	n of distance from nea lope hydrology featu ity from defined vall iill slope angle	ow irrest watercourse and peat de ures ley (m)	epth in the area)	Si Minor i wate	mall undefined rcourse 500 NA	NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	Large Valley < 200 Steep	1 2 1 0	Max. possible Hazard 0-1 Weighting 3 1 1 1 1	93 0.31 Score 3 2 1 1 0	Comment
(functio Downs Proxim Downh Downs	n of distance from nea lope hydrology featu ity from defined vall ill slope angle tream aquatic enviro	ow irrest watercourse and peat de ures ley (m) onment	epth in the area)	Si Minor t wate > Ser	mall undefined rcourse 500 NA nsitive	NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive	Large Valley < 200 Steep Drinking water supply	1 2 1 0 2	Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1	93 0.31 Score 3 2 1 0 2	Comment
(functio Downs Proxim Downh Downs	n of distance from nea lope hydrology featu ity from defined vall iill slope angle	ow irrest watercourse and peat de ures ley (m) onment	epth in the area)	Si Minor t wate > Ser	mall undefined rcourse 500 NA	NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	Large Valley < 200 Steep Drinking water supply Regional road	1 2 1 0	Max. possible Hazard 0-1 Weighting 3 1 1 1 1	93 0.31 Score 3 2 1 1 0	Comment
(functio Downs Proxim Downh Downs Public	n of distance from nea lope hydrology featu ity from defined vall ill slope angle tream aquatic enviro	ow arrest watercourse and peat de ures ley (m) ponment tat flow path	epth in the area)	Si Minor o wate > Ser	mall undefined rcourse 500 NA nsitive	NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive	Large Valley < 200 Steep Drinking water supply	1 2 1 0 2	Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1	93 0.31 Score 3 2 1 0 2	Comment
(functio Downs Proxim Downh Downs Public Overhe	n of distance from nea lope hydrology featu iity from defined vall iill slope angle tream aquatic envirc roads in potential pe	ow irrest watercourse and peat de ures ley (m) comment tat flow path peat flow path	epth in the area)	Si Minor ( wate >	mall undefined rcourse 500 NA nsitive NA	NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity	Large Valley < 200 Steep Drinking water supply Regional road Electricity	1 2 1 0 2 0	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1	93 0.31 Score 3 2 1 1 0 2 2 0	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu ity from defined vall ill slope angle tream aquatic envirc roads in potential pe ead lines in potential	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA	NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	1 2 1 0 2 0 0	Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 0 2 0 0 0 0 0 2	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 2 0 0 0 2 2 0 0 0 0 2 2 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consect	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 0 2 0 0 0 0 0 2	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 005equences total	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 0 2 0 0 0 0 0 2	Max. possible Hazard 6-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 2 0 0 0 2 2 0 0 0 0 2 2 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Suences Negligible Low Medium	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 0 2 0 0 0 0 2 Co	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 005equences total	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Ruences Negligible Low	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	1 2 1 0 2 0 0 0 0 2 Co	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 3 3 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 10 33	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) comment tat flow path peat flow path flow path	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Suences Negligible Low Medium	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 2 1 0 2 0 0 0 0 2 Co	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 3 3 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 10 33	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iily from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f	ow rrest watercourse and peat de ures ley (m) onment tat flow path flow path flow path ss and resources)	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium High	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 2 1 0 2 0 0 0 0 2 Co	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 3 3 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 10 33	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iity from defined vall iill slope angle tream aquatic envirc roads in potential pe ead lines in potential gs in potential peat f lity to respond (acce	ow rrest watercourse and peat de ures ley (m) onment tat flow path flow path flow path ss and resources)	epth in the area)	Minor of wate	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium High	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 2 1 0 2 0 0 0 0 2 Co	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 3 3 1 1 1 1	93 0.31 Score 3 2 1 0 2 0 0 0 0 0 2 10 33	Comment
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iity from defined vall iill slope angle tream aquatic envirc roads in potential pe ead lines in potential gs in potential peat f lity to respond (acce	ow rrest watercourse and peat de ures ley (m) onment tat flow path flow path flow path ss and resources)	epth in the area)	Sin	mall undefined rcourse 500 NA nsitive NA NA	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low Medium High	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 2 1 0 2 0 0 0 0 2 Consequ	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 3 3 1 1 1 1	93  0.31  Score  3  2  1  0  2  0  0  2  0  0  2  10  33  0.30	Consequences
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iity from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f lity to respond (acce lity to respond (acce	ow rrest watercourse and peat de ures ley (m) onment tat flow path flow path flow path ss and resources) sk		Si S	mall undefined rcourse 500 NA NA NA NA Fair	NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High Risk rat	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 1 2 1 0 2 0 0 0 0 2 Consequent	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 Max. possible Jences 0.1	93  0.31  Score  3  2  1  0  2  0  0  2  0  0  2  10  33  0.30	
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iity from defined vali iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f lity to respond (acce lity to respond (acce Ris 0.00 - 0.20	ow irest watercourse and peat de ires ley (m) onment itat flow path flow path flow path ss and resources) sk Negligible	Normal site investigatio	Since in the series of the ser	mall undefined rcourse 500 NA NA NA NA Fair ign of spece	NA NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Action required tigation measures. Par	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High Risk rat	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 1 2 1 0 2 0 0 0 0 2 Consequent	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 Max. possible Jences 0.1 Risk rating =	93 0.31 Score 3 2 1 1 0 2 1 0 2 0 0 0 2 10 33 0.30 Hazard *	Consequences
(functio Downs Proxim Downh Downs Public Overhe Buildin	n of distance from nea lope hydrology featu iity from defined vall iill slope angle tream aquatic enviro roads in potential pe ead lines in potential gs in potential peat f lity to respond (acce lity to respond (acce nea 0.00 - 0.20 0.20 - 0.40	ow irrest watercourse and peat de irrest watercourse and irrest watercourse and peat de irres	Normal site investigation Targeted site investigation	Si Ninor i	mall undefined rcourse 500 NA NA NA NA Fair ign of spece	NA NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Action required tigation measures. Par	Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High Risk rat	Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	1 1 2 1 0 2 0 0 0 0 2 Consequent	Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 Max. possible Jences 0.1 Risk rating =	93 0.31 Score 3 2 1 1 0 2 1 0 2 0 0 0 2 10 33 0.30 Hazard *	Consequences





### Table M- 14: Peat Stability Risk Assessment at the Substation.

GDG Peat Stability Risk Assessment (PSRA)							Substation						
C	GDG	Peat Stability Risk Asse	essment (PSRA)			Conditions:	Undrained (U), undra	ined surcharge (US), d	Irained (D), drai	ned surcharge (I	DS)	1	
GA	VIN & DOHERTY EOSOLUTIONS					Inspected on:	Sep-23	5- (//				1	
~	11<0>					Inspected by:	BMC						
•		Clonberne Wind Farm				Completed by: Date:	CE Nov-23						
												-	
				Value			Rating criteria						
		Hazard factors		U US D DS	0	1	2	3	Rating value	Weighting	Score	Comr	nent
actor	of Safety			20.5 5.9 13 8	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.4 m. Sl	ope angle: 4.4º.
		Distance to previous slide	es (km)	NA	NA	5 - 10	< 5	On site	0	2	0		
	Slide history	Evidence of peat movem		NA	NA	-	-	Yes	0	2	0		
		features, compression features Subsoil type	5).	Gravel / Firm	NA	Gravel / Firm glacial	Smooth rock	Soft sensitive clay	1	1	1	Nearest TP (TP02, 30m awa	y from substation)
	Subsoil conditions			glacial till		till						records: sand.	
	(visible in trial pits)	Peat fibres across transit	ion to subsoil	NA	NA	Yes	Partially	No Extremely wet /	0	1	0	-	
		Peat wetness			NA	Dry / Stands well	Slowly squeezing	Undiggable	0	2	0		
		General curvature downs	slope	-	NA		Planar	Convex	1	1	1		
	Topography	Distance to the convexity (only if previous factor is Conve		NA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0		
		Slope aspect (for high latitudes in northern l	hemisphere)	NA	NA	SW, S, SE	W, E	NW, N, NE	0	1	0		
		Distance from watercour		< 200	NA	> 300	200 - 300	< 200	3	1	3		
tors		Surface moisture index (I		135 - 174	NA	0 - 96	96 -135	135 - 174	3	1	3		
Secondary factors		Surface water		NA	NA	Localised	Ponded in drains	Springs	0	1	0		
conda	Hydrology	(water table level indicator) Evidence of piping (subsu	urface flow)	NA	NA	-	-	Yes	0	1	0		
Se	yurology	Significant surface desicc											
		(previous summer was dry?)		NA	NA	-	-	Yes	0	1.5	0		
		Existing drainage ditches		NA	NA	Down slope	Varied / Oblique	Across slope	0	1	0		
		Annual rainfall		< 1000 mm/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1		
	Vegetation	Bush		NA	NA	Dry heather	Grassland	Wetlands	0	1	0		
	Vegetation	Forestry (if applicable)		Good growth	NA	Good growth	Fair	Stunted growth	1	1.5	1.5		
		Peat cuts presence		-	NA		Cutaway / Turbary	Machine cut	1	1	1		
	Peat workings	Peat cuts vs contour lines	S	NA	NA	Perpendicular	Oblique	Parallel	0	1	0		
	Existing loads	Roads		Solid	NA	Solid	_	Floating	1	1	1		
	Time of year for con			Late Summer,	NA	Spring	Winter, Early	Late Summer,	3	1	3	Wost case estimate	
	Time of year for con	istruction		Autumn	INA	Shung	Summer	Autumn	3	Hazard _{total}	25.5	wost case estimate	
						Ha	zard	]		total	23.5		
						0.0 - 0.3	Negligible Low			Max. possible	96		
						0.5 - 0.7	Medium			Hazard ₀₋₁	0.27	]	
						0.7 - 1.0	High					-	
		Consequence factors		Value			Rating criteria		Rating value	Weighting	Score	Comr	nent
	e of potential peat flo			NA	0 NA	1 Small	2 Medium	3 Large	0	3	0		
	on of distance from nea	rest watercourse and peat de res	pth in the area)	Minor undefined	NA	Bowl / contained	Minor undefined	Valley	2	1	2		
	nity from defined valle			> 500	NA	> 500	watercourse 200 - 500	< 200	1	1	1		
	nill slope angle			Horizontal	NA	Horizontal	Intermediate	Steep	1	1	1		
								Drinking water					
	stream aquatic enviro			Sensitive	NA	Non-sensitive	Sensitive	supply	2	1	2		
	roads in potential pe			NA	NA	Minor road	Local road Electricity	Regional road Electricity	0	1	0		
	ead lines in potential			NA	NA	Phone lines	(LV)	(MV, HV)	0	1	0		
Buildir	ngs in potential peat f	low path		NA	NA	Farm out-houses	-	Dwelling	0	1	0		
Capabi	ility to respond (acces	ss and resources)		Fair	NA	Good	Fair	Poor	2	1	2		
						Consec	quences	l	Cc	onsequences _{total}	8		
						0.0 - 0.3	Negligible	1		Max. possible	33		
						0.3 - 0.5 0.5 - 0.7	Low Medium		Consequ	iences ₀₋₁	0.24	1	
						0.7 - 1.0	High	1				-	
							Risk rati	ng					
							הוא ומנו	o					
	Ris	ik				Action required			1				
	KI3					. addit required			ł				
	0.00 - 0.20	Negligible	Normal site investigation	on						Risk rating =	Hazard *	Consequences	
	0.20 - 0.40	Low	Targeted site investigat	ion design of spec	ific mi	tigation measures Par	t time supervision dur	ing construction	1	Risk rating =	0.27	0.24 =	0.06

0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.27	0.24	=	0.06
0.40 - 0.60	Medium	Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.				•	
0.60 - 1.00	High	Avoid construction in this area.					





### Table M-15: Peat Stability Risk Assessment at the Proposed Peatland Enhancement Area.

	DC					Location:	Peatland Enhanceme						
GA		Peat Stability Risk Asse	essment (PSRA)				Conditions: Inspected on:	Undrained (U), undra May-23	iined surcharge (US), c	Irained (D), drai	ned surcharge (I	DS)	-
	<b>^</b>						Inspected by:	EFC					
ř	IKÖ>	Clonberne Wind Farm						CE					
	•						Date:	Nov-23					
		Hazard factors		Val				Rating criteria		Rating value	Weighting	Score	Comment
				0 US			1	2	3				
ctor	of Safety	Т		9.23 7.34	8 13	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~3.88 m. Slope angle: 0.8 ^o .
	Slide history	Distance to previous slide		5 - 3	10	NA	5 - 10	< 5	On site	1	2	2	
	-	Evidence of peat moveme features, compression features)		16		NA	-	-	Yes	3	2	6	
		Subsoil type		Gravel , glacia		NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	1	1	1	
	Subsoil conditions (visible in trial pits)	Peat fibres across transition	on to subsoil	NA	4	NA	Yes	Partially	No	0	1	0	
		Peat wetness		NA	4	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	0	2	0	
		General curvature downsl	lope	NA	4	NA	-	Planar	Convex	0	1	0	Flat
	Topography	Distance to the convexity (only if previous factor is Conve		NA	A	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		Slope aspect (for high latitudes in northern hemisphere)		SW, S	, SE	NA	SW, S, SE	W, E	NW, N, NE	1	1	1	
		Distance from watercourse (m)		> 30	00	NA	> 300	200 - 300	< 200	1	1	1	
ictors		Surface moisture index (N	IDMI)	135 -	174	NA	0 - 96	96 -135	135 - 174	3	1	3	
dary fa		Surface water (water table level indicator)		Ponded i	n drains	NA	Localised	Ponded in drains	Springs	2	1	2	
Secondary factors Adolouphth		Evidence of piping (subsur	rface flow)	NA	4	NA	-	-	Yes	0	1	0	
		Significant surface desicca (previous summer was dry?)	ation	NA	A.	NA	-	-	Yes	0	1.5	0	
		Existing drainage ditches		Down	slope	NA	Down slope	Varied / Oblique	Across slope	1	1	1	
		Annual rainfall		< 1000 r	nm/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1	
		Bush		Dry he	ather	NA	Dry heather	Grassland	Wetlands	1	1	1	
	Vegetation	Forestry (if applicable)		NA	4	NA	Good growth	Fair	Stunted growth	0	1.5	0	
		Peat cuts presence		Cutaw		NA		Cutaway / Turbary	Machine cut	2	1	2	
	Peat workings	Peat cuts vs contour lines	;	Turb		NA	Perpendicular	Oblique	Parallel	1	1	1	
	Existing loads	Roads		NA		NA	Solid	-	Floating	0	1	0	
	Time of year for cor			Late Sur	nmer,	NA	Spring	Winter, Early	Late Summer,	3	1	3	Wost case estimate
	Rewetting			Autu Blocked		NA	Blocked Drains	Summer Bunds	Autumn Blocked Drains +		1	1	
									Bunds	1	1	-	
							Ha 0.0 - 0.3	<b>zard</b> Negligible	Bunds	1	Hazard _{total} Max. possible	36 94	
				,			На	zard	Bunds	1	Hazard _{total}	36	
							Ha 0.0 - 0.3 0.3 - 0.5	<b>zard</b> Negligible Low	Bunds	1	Hazard _{total} Max. possible	36 94	
		Consequence factors		Valu		0	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	zard Negligible Low Medium	Bunds	Rating value	Hazard _{total} Max. possible	36 94	Comment
	e of potential peat flo		pth in the area)	Val	ue		Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	rard Negligible Low Medium High Rating criteria			Hazard _{total} Max. possible Hazard ₀₋₁	36 94 0.38	Comment
unctio	e of potential peat flo	ow rest watercourse and peat dep	pth in the area)		u <b>e</b> um defined	0	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1	zard Negligible Low Medium High Rating criteria 2	3	Rating value	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting	36 94 0.38 Score	Comment
unctic owns	e of potential peat flo n of distance from nea	ow rest watercourse and peat dep ires	pth in the area)	Medi Minor un	ue um defined ourse	0 NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small	zard Negligible Low Medium High Rating criteria 2 Medium Minor undefined	3 Large	Rating value	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3	36 94 0.38 Score 6	Comment
owns roxim	e of potential peat flo n of distance from nea lope hydrology featu	ow rest watercourse and peat dep ires	pth in the area)	Medi Minor un waterc	ue uum defined ourse 00	0 NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained	zard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse	3 Large Valley	- Rating value	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1	36 94 0.38 Score 6 2	Comment
unctic owns roxim ownh	e of potential peat flo n of distance from nea lope hydrology featu ity from defined valle	ow rest watercourse and peat dep rres ey (m)	pth in the area)	Medi Minor un waterc > 50	ue um defined ourse 00 yntal	0 NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500	zard Negligible Low Medium High Rating criteria 2 Minor undefined watercourse 200 - 500	3 Large Valley < 200 Steep Drinking water	Rating value	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1 1	36 94 0.38 Score 6 2 1	Comment
owns roxim ownh owns	e of potential peat fl n of distance from nea lope hydrology featu ity from defined vall ill slope angle	ow rest watercourse and peat dep ires ey (m) pnment	pth in the area)	Medi Minor un waterc > 50 Horizo	ue uum defined ourse 000 000 000 000 000 000 000 000 000 0	0 NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	zard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	3 Large Valley < 200 Steep	Rating value	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1	36 94 <b>0.38</b> <b>Score</b> 6 2 1 1 1	Comment
owns roxim ownf owns ublic	e of potential peat fil n of distance from nea lope hydrology featu ity from defined valk ill slope angle tream aquatic enviro	ow rest watercourse and peat dep rres ey (m) onment at flow path	pth in the area)	Medi Minor un waterc > 50 Horizo Sensi	ue um defined ourse 00 nntal tive	0 NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Rating criteria Addium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity	<ul> <li>Rating value</li> <li>2</li> <li>2</li> <li>1</li> <li>2</li> </ul>	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1	36 94 0.38 Score 6 2 1 1 1 2 2	Comment  Comment
owns roxim ownh owns ublic	e of potential peat flk n of distance from nea lope hydrology featu ity from defined valle ill slope angle tream aquatic enviro roads in potential pe	ow rest watercourse and peat dep ires ey (m) onment at flow path peat flow path	pth in the area)	Medi Minor un waterc > 50 Horizo Sensi	ue um defined ourse D0 ontal tive	0 NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road	Rating criteria Addium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	3 Large Valley < 200 Steep Drinking water supply Regional road	Rating value           2           1           2           0	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1	36 94 0.38 Score 6 2 1 1 1 2 2 0	Comment Comment
unctic owns roxim owns ublic ublic uildin	e of potential peat fli n of distance from nea lope hydrology featu ity from defined valle ill slope angle tream aquatic enviro roads in potential pe- ad lines in potential	ow rest watercourse and peat dep res ey (m) onment at flow path peat flow path low path	pth in the area)	Minor un waterc > 50 Horizo Sensi NA	ue um defined ourse 300 ontal tive	0 NA NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines	Rating criteria Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	Rating value           2           1           2           0           0	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1	36 94 0.38 Score 6 2 1 1 1 2 2 0 0 0	Comment
owns owns ownh owns ublic verhe uildin	e of potential peat flk n of distance from nea lope hydrology featu ity from defined vall- ill slope angle tream aquatic enviro roads in potential pe- ad lines in potential gs in potential peat f	ow rest watercourse and peat dep res ey (m) onment at flow path peat flow path low path	pth in the area)	Medi Minor un waterc: > 50 Horizo Sensi NA	ue um defined ourse 300 ontal tive	0 NA NA NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0   Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	rard Negligible Low Medium High Rating criteria Rating criteri	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	36 94 0.38 5core 6 2 1 1 1 2 2 0 0 0 0 0	Comment
unctic owns roxim owns ublic ublic uildin	e of potential peat flk n of distance from nea lope hydrology featu ity from defined vall- ill slope angle tream aquatic enviro roads in potential pe- ad lines in potential gs in potential peat f	ow rest watercourse and peat dep res ey (m) onment at flow path peat flow path low path	pth in the area)	Medi Minor un waterc: > 50 Horizo Sensi NA	ue um defined ourse 300 ontal tive	0 NA NA NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0   Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	zard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) -	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	36 94 0.38 5core 6 6 2 1 1 1 2 2 0 0 0 0 0 0 0 0 2	Comment  Comment
iowns roxim owns owns ublic uullic	e of potential peat flk n of distance from nea lope hydrology featu ity from defined vall- ill slope angle tream aquatic enviro roads in potential pe- ad lines in potential gs in potential peat f	ow rest watercourse and peat dep res ey (m) onment at flow path peat flow path low path	pth in the area)	Medi Minor un waterc: > 50 Horizo Sensi NA	ue um defined ourse 300 ontal tive	0 NA NA NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Conser 0.0 - 0.3 0.3 - 0.5	zard Negligible Low Medium High Rating criteria 2 Medium Monor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair auences Negligible Low	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           5           5           6           7           7           1           2           0           0           0           2           0           0           2           0           0           0           2           0           0           0           0           0           0           2           0           0           0           0           0           0           0	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 3 3 3 1 1 1 1	36 94 0.38 5core 6 2 1 1 1 2 2 0 0 0 0 0 0 0 0 0 0 2 1 4 33	Comment
unctio owns oxim ownh owns ublic verhe	e of potential peat flk n of distance from nea lope hydrology featu ity from defined vall- ill slope angle tream aquatic enviro roads in potential pe- ad lines in potential gs in potential peat f	ow rest watercourse and peat dep res ey (m) onment at flow path peat flow path low path	pth in the area)	Medi Minor un waterc: > 50 Horizo Sensi NA	ue um defined ourse 300 ontal tive	0 NA NA NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0  1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consee 0.0 - 0.3	Rating criteria A dedium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair suences Negligible	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           5           5           6           7           7           1           2           0           0           0           2           0           0           2           0           0           0           2           0           0           0           0           0           0           2           0           0           0           0           0           0           0	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	36 94 0.38 Score 6 2 1 1 1 2 0 0 0 0 0 0 0 0 0 2 1 4	Comment  Comment
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iowns roxim owns owns ublic uullic	e of potential peat fle n of distance from nea lope hydrology featu ity from defined vall- ill slope angle tream aquatic enviro roads in potential pe- ad lines in potential gs in potential peat f lity to respond (acces	ow rest watercourse and peat dep ires ey (m) onment at flow path peat flow path ilow path ss and resources) sk	pth in the area)	Media Minor un waterc > 50 Horizc Sensi N/ N/ Fai	ue um defined ourse 300 ontal tive	0 NA NA NA NA NA NA	Ha 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consee 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	zard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Vegligible Low Medium High	3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	Rating value         2         1         1         2         0         0         0         2         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <tr< td=""><td>Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 3 3 3 1 1 1 1</td><td>36 94 0.38 Score 6 2 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>Consequences</td></tr<>	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 3 3 3 1 1 1 1	36 94 0.38 Score 6 2 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Consequences

0.40 - 0.60	Medium	Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time supervision during construction.
0.60 - 1.00	High	Avoid construction in this area.





### Table M- 16: Peat Stability Risk Assessment at grid connection route.

G	DG	Peat Stability Risk Assessr	ment (PSRA)					Grid Connection Undrained (U), undra	ined surcharge (US), d	Irained (D), drair	ned surcharge (D	S)	-
GAVI	N & DOHERTY SOLUTIONS	,,						May-23	0-(,,	, , , , , , , , , , , , , , , , , , ,	0-1	-,	
M	ĸô>	a 1						EFC					
1~1	KÇ,	Clonberne Wind Farm						CE Nov-23					
		Hazard factors			lue			Rating criteria	-	Rating value	Weighting	Score	Comment
	£ C= {= }.				D DS		1	2	3			10	Deat death, 22.2 m. Class and a C.00
orc	f Safety			4 2.8	4 5.1		≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~2.3 m. Slope angle:6.99
	Slide history	Distance to previous slides (		-	10	NA	5 - 10	< 5	On site	1	2	2	
		features, compression features).	. (e.g. tension cracks, step	° Y	es	NA	- Gravel / Firm glacial	-	Yes	3	2	6	
		Subsoil type		N	A	NA	till	Smooth rock	Soft sensitive clay	0	1	0	No TP nearby
	Subsoil conditions visible in trial pits)	Peat fibres across transition	to subsoil	N	IA	NA	Yes	Partially	No	0	1	0	No TP nearby
		Peat wetness		N	A	NA	Dry / Stands well	Slowly squeezing	Extremely wet / Undiggable	0	2	0	No TP nearby
		General curvature downslop		N	IA	NA	-	Planar	Convex	0	1	0	Flat
	Topography	Distance to the convexity bre (only if previous factor is Convex)	eak	Ν	IA	NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		Slope aspect (for high latitudes in northern hemi	isphere)	sw,	S, SE	NA	SW, S, SE	W, E	NW, N, NE	1	1	1	
		Distance from watercourse (	(m)	> 3	300	NA	> 300	200 - 300	< 200	1	1	1	
		Surface moisture index (NDN	VI)	135	- 174	NA	0 - 96	96 -135	135 - 174	3	1	3	
		Surface water (water table level indicator)		Ponded	in drains	NA	Localised	Ponded in drains	Springs	2	1	2	
	Hydrology	Evidence of piping (subsurfa	ce flow)	Ν	IA	NA	-	-	Yes	0	1	0	
		Significant surface desiccatio (previous summer was dry?)	on	Ν	IA	NA	-	-	Yes	0	1.5	0	
		Existing drainage ditches		Dowr	slope	NA	Down slope	Varied / Oblique	Across slope	1	1	1	
		Annual rainfall		< 1000	mm/yr	NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1	
ł		Bush			eather	NA	Dry heather	Grassland	Wetlands	1	1	1	
	Vegetation	Forestry		N	IA	NA	Good growth	Fair	Stunted growth	0	1.5	0	
		(if applicable) Peat cuts presence		Cuta	way /	NA	-	Cutaway / Turbary	Machine cut	2	1	2	
	Peat workings	Peat cuts vs contour lines			bary ndicular	NA	Perpendicular	Oblique	Parallel	1	1	1	
	Existing loads	Roads		-				Oblique	Faraller	1	1		
	Existing loads								Election of	0	4		
	Time of year for cor			Late Su	IA ummer, umn	NA	Solid	- Winter, Early Summer	Floating Late Summer, Autumn	0	1	3	Wost case estimate
	Time of year for cor			Late Su	ummer,		Spring	Winter, Early Summer	Late Summer,				Wost case estimate
	Time of year for cor			Late Su	ummer,		Spring Haz 0.0 - 0.3	Winter, Early Summer ard Negligible	Late Summer,		1	3	Wost case estimate
	Time of year for cor			Late Su	ummer,		Spring	Winter, Early Summer	Late Summer,		1 Hazard _{total}	3 34	Wost case estimate
	Time of year for cor			Late Su	ummer,		Spring Haz 0.0 - 0.3 0.3 - 0.5	Winter, Early Summer ard Negligible Low	Late Summer,		1 Hazard _{total} Max. possible	3 34 93	Wost case estimate
	Time of year for cor			Late Si Aut	ummer,	NA	Spring 	Winter, Early Summer Negligible Low Medium High Rating criteria	Late Summer, Autumn		1 Hazard _{total} Max. possible	3 34 93	Wost case estimate
ume	of potential peat fl	Consequence factors	in the area)	Late Su Aut	ummer, umn		Spring 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Winter, Early Summer And Negligible Low Medium High	Late Summer,	3	1 Hazard _{total} Max. possible Hazard ₀₋₁	3 34 93 0.37	
ume	of potential peat fl	Consequence factors ow rest watercourse and peat depth	in the area)	Late So Aut	ummer, umn ilue dium ndefined	NA 0	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined	Late Summer, Autumn	3 Rating value	1 Hazard _{total} Max. possible Hazard ₀₋₁	3 34 93 0.37 Score	
ume	of potential peat fli	Consequence factors ow rest watercourse and peat depth irres	in the area)	Late So Aut	ummer, umn	NA 0 NA	Spring 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium	Late Summer, Autumn 3 Large	3 Rating value 2	1 Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3	3 34 93 0.37 Score 6	
ume ictior wnsk	of potential peat fl of distance from nea ope hydrology featu	Consequence factors ow rest watercourse and peat depth irres	in the area)	Late So Aut	ummer, umn lue dium ndefined course	NA 0 NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse	Late Summer, Autumn 3 Large Valley	Rating value	1 Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1	3 34 93 0.37 5core 6 2	
ume actior wnsk ximi	of potential peat fl of distance from nea ope hydrology featu cy from defined vall	Consequence factors ow rest watercourse and peat depth rres ey (m)	in the area)	Late Su Aut	lue dium ndefined course	NA 0 NA NA	Spring 	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water	3 Rating value 2 2 1	1 Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1	3 34 93 0.37 5core 6 2 1	
ume actior ximi ximi wnhi	of potential peat fli of distance from nea ope hydrology featu cy from defined vall l slope angle	Consequence factors ow rest watercourse and peat depth irres ey (m) onment	in the area)	Late St Aut Aut Va Mee Minor u water > 5 Horiz Sen:	ummer, umn lue dium ndefined course 500 contal	NA O NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply	Rating value 2 2 1 1	1 Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1	3 34 93 0.37 5core 6 2 1 1	
ume nction wnsli wnhi wnst	of potential peat fil of distance from nea ope hydrology featu :y from defined vall I slope angle ream aquatic envirc	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path	in the area)	Late Si Aut Va Minor u water > 5 Horiz Sen:	ummer, umn umn dium dium indefined course 500 contal sittive	NA O NA NA NA NA	Spring Maz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity	3       Rating value       2       2       1       2	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 1 1 2	
ume nctior wnski wnski wnst blic re erhea	of potential peat fl of distance from nea ope hydrology featu cy from defined vall I slope angle ream aquatic envirc bads in potential pe ud lines in potential	Consequence factors Ow rest watercourse and peat depth ires ey (m) onment at flow path peat flow path	in the area)	Late St Aut Aut Minor u water Horiz Sen: N	llue dium dium indefined course 500 contal isitive kA	NA O NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	3 Rating value 2 2 1 1 2 0 0 0	1 Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 2 1 1 1 2 2 1 1 2 0 0	
ume action wnsk wnsk blic ro erhea lding	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut Minor u water Sen: Sen: N N	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring 	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) -	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	3 • Rating value 2 2 1 1 2 0 0 0 0 0 0	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 1 1 2 2 0 0 0 0 0 0	
ume action wnski wnst blic re erhea Iding	of potential peat fl of distance from nea ope hydrology featu cy from defined vall I slope angle ream aquatic envirc bads in potential pe ud lines in potential	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut	llue dium dium indefined course 500 contal isitive kA	NA O NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	3  Rating value 2 2 1 1 2 0 0 0 0 2 2	1 Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 2 1 1 1 2 2 1 1 2 0 0	
lume nctior wnsk wnst blic re erhea	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	3  Rating value 2 2 1 1 2 0 0 0 0 2 2	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 0.37 5core 6 2 1 1 2 1 1 2 0 0 0 0 0 0 0 0 0 0 0 1 4	
lume nctior wnsk wnst blic re erhea	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consect 0.0 - 0.3 0.3 - 0.5	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Negligible Low	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	
ume ctior vnsk ximi vnst llic re erhea	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consec 0.0 - 0.3	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	3  Rating value 2 2 1 1 2 0 0 0 0 2 2	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 0.37 5core 6 2 1 1 2 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 1 4	
ume ctior vnsk ximi vnst llic re erhea	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair vences Negligible Low Medium	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	
ume ctior vnsk kimi vnhi lic ru erhea ding	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Consequence factors OW rest watercourse and peat depth rres ey (m) onment at flow path low path low path	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair vences Negligible Low Medium	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	
ume action wnski wnst blic re erhea Iding	of potential peat fl of distance from nea ope hydrology featu ry from defined vall I slope angle ream aquatic envirc pads in potential peat d lines in potential peat f ty to respond (acce	Instruction         Consequence factors         OW         rest watercourse and peat depth         rress         ey (m)         onment         at flow path         low path         ss and resources)	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Spring 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consect 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	
lume nctior wnsk wnst blic re erhea	of potential peat fli of distance from nea ope hydrology featu ty from defined vall il slope angle ream aquatic envirc bads in potential peat ti lines in potential s in potential peat f	Instruction         Consequence factors         OW         rest watercourse and peat depth         rress         ey (m)         onment         at flow path         low path         ss and resources)	in the area)	Late St Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Co	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	
ume action wnski wnst blic re erhea Iding	of potential peat fl of distance from nea ope hydrology featu ry from defined vall I slope angle ream aquatic envirc pads in potential peat d lines in potential peat f ty to respond (acce	Consequence factors         ow         rest watercourse and peat depth         ress         ey (m)         onment         at flow path         low path         ss and resources)	in the area)	Late Si Aut Aut	Jummer, Jummer, Jium dium Jium Jium Jium Jium Jium Jium Jium J	NA O NA NA NA NA NA NA NA	Spring Spring 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consect 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Conseque Conseque	1 Hazard total Max. possible Hazard o.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 34 93 0.37 0.37 0.37 0.37 0.37 0.37 0.37 0.42 0.37 0.42 0.42	
ume action wnski wnst blic re erhea Iding	of potential peat fil of distance from nea ope hydrology featu :y from defined vall I slope angle ream aquatic enviro ads in potential peat id lines in potential s in potential peat f ty to respond (acce	consequence factors       ow       rest watercourse and peat depth       rey (m)       onment       at flow path       peat flow path       ilow path       ss and resources)	rmal site investigati	Late Si Aut Aut Aut	Jummer, Jummer, Jummer, Jummer, Jummer, Jumer, Jume	NA O NA NA NA NA NA NA	Spring Spring 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consect 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Winter, Early Summer Negligible Low Medium High Rating criteria 2 Medium Minor undefined Watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair Regligible Low Medium High Risk ratir	Late Summer, Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor 8 8	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Conseque Conseque	1       Hazard total       Max. possible       Hazard o.1       Weighting       3       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	3 34 93 0.37 0.37 0.37 0.37 0.37 0.37 0.37 0.42 0.37 0.42 0.42	Consequences
lume nctior wnsk wnst blic re erhea	of potential peat fli of distance from nea ope hydrology featu sy from defined vall I slope angle ream aquatic envirc bads in potential pe td lines in potential is in potential peat f ty to respond (acce ty to respond (acce Ris 0.00 - 0.20	Consequence factors       ow       rest watercourse and peat depth       rest watercourse and peat depth       rest watercourse and peat depth       ow       ey (m)       onment       at flow path       peat flow path       low path       ss and resources)       st       Negligible       Negligible       Avdium	ormal site investigati	<ul> <li>Late Si Aut</li> <li>Late Si Aut</li> <li>Late Si Aut</li> <li>Aut</li> <li>Minor u</li> <li>Minor u</li> <li>Water</li> <li>Sen:</li> <li>Horiz</li> <li>Sen:</li> <li>Horiz</li> <li>Sen:</li> <li>Minor u</li> <li>Min</li></ul>	Inmer, umn dium dium indefined solo solo solo and intive intive intive and and solo solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and solo and and solo and and and solo and and and and and and and and and and	NA O NA NA NA NA NA NA I NA I NA I I I I I I	Spring Haz 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Small Bowl / contained Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Consee 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 Action required tigation measures. Par voidable, detailed site l	Winter, Early Summer Negligible Low Medium High 2 Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Sensitive Local road Electricity (LV) Cor Fair Sair Electricity (LV) Cor Risk ratir	Late Summer, Autumn 3 Large Valley < 200 Steep Driking water supply Regional road Electricity (MV, HV) Dwelling Poor 1 g ag ag ag ag ag ag ag ag ag	3 Rating value 2 2 1 1 2 0 0 0 0 0 2 Conseque Conseque	1       Hazard total       Max. possible       Hazard o.1       Max. possible       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <td>3 34 93 0.37 0.37 0.37 0.37 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td>Consequences</td>	3 34 93 0.37 0.37 0.37 0.37 0 0 0 0 0 0 0 0 0 0 0 0 0	Consequences





### Table M- 17: Peat Stability Risk Assessment at PRA 1.

GAVIN	DOHERTY	Peat Stability Risk Assessment (P	SRA)						PRA 1 Undrained (U), undrain May-23	ed surcharge (US), dra	ined (D), dr	rained surcharg	e (DS)							
МІ	< <u>ô</u> >	Carrig Wind Farm						Inspected by: Completed by: Date:	BMC CE Dec-23											
	На	zard factors	U	Va US	ue D	DS	0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment						
actor of S	Safety		34.1	14.1	27.7	24.5	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.7m. Slope angle: 1.2º.						
	Slide history	Distance to previous slides (km) Evidence of peat movement (e.g.		5 - N			NA NA	5 - 10	< 5	On site	1 0	2	2							
	Subsoil conditions (visible in trial pits)	Subsoil type		N			NA	- Gravel / Firm glacial till	- Smooth rock	Yes Soft sensitive clay	0	1	0	No TP						
		Peat fibres across transition to	NA				NA	Yes	Partially	No	0	1	0							
		Peat wetness					NA	Dry / Stands well	Slowly squeezing	Extremely wet /	0	2	0							
		General curvature downslope		N	A		NA	-	Planar	Undiggable Convex	0	1	0	Flat						
ors	Topography	Distance to the convexity break (only if previous factor is Convex)		N	A		NA	> 100 m	50 - 100 m	< 50 m	0	1	0							
Secondary factors		Slope aspect (for high latitudes in northern hemisphere)		N	A		NA	SW, S, SE	W, E	NW, N, NE	0	1	0							
Sec		Distance from watercourse (m)	< 200				NA	> 300	200 - 300	< 200	3	1	3							
		Surface moisture index (NDMI)		96 -			NA	0 - 96	96 -135	135 - 174	2	1	2							
	Hydrology	Surface water		Loca			NA	Localised	Ponded in drains	Springs	1	1	1							
		Evidence of piping (subsurface flow)		N	A		NA	-	-	Yes	0	1	0							
		Significant surface desiccation (previous summer was dry?)		N			NA	-	-	Yes	0	1.5	0							
		Existing drainage ditches Annual rainfall	Varied / Oblique < 1000 mm/yr			Varied / Oblique < 1000 mm/yr		•					NA NA	Down slope < 1000 mm/yr	Varied / Oblique 1000 - 1400 mm/yr	Across slope > 1400 mm/yr	2	1	2	
	Vegetation	Bush	NA	NA		NA	Dry heather	Grassland	Wetlands	0	1	0								
		Forestry Peat cuts presence		Good growth Cutaway / Turbary			NA NA	Good growth	Fair Cutaway / Turbary	Stunted growth Machine cut	1 2	1.5 1	1.5 2							
	Peat workings	Peat cuts vs contour lines		Para	allel		NA	Perpendicular	Oblique	Parallel	3	1	3							
	Existing loads Time of year for	Roads		So Late Summ		1	NA	Solid Spring	- Winter, Early Summer	Floating Late Summer, Autumn	1	1	1	Wost case estimate						
								0.0 - 0.3 0.3 - 0.5 0.5 - 0.7	Hazard Negligible Low Medium		•	Hazard _{total} Max. possible Hazard ₀₋₁	31.5 93 <b>0.34</b>	1						
								0.7 - 1.0	High		Dating			J						
		quence factors		Va			0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment						
	potential peat flo			Sm			NA	Small	Medium Minor undefined	Large	1	3	3							
	e hydrology featu		Mi	nor undefine		urse	NA	Bowl / contained	watercourse	Valley	2	1	2							
	from defined valle lope angle	ey (m)		> 5 N			NA NA	> 500 Horizontal	200 - 500 Intermediate	< 200 Steep	1 0	1	1							
	am aquatic enviro	nment		Sens			NA	Non-sensitive	Sensitive	Drinking water	2	1	2							
	ds in potential pea			N	A		NA	Minor road	Local road	supply Regional road	0	1	0							
	lines in potential			N			NA	Phone lines	Electricity (LV)	(MV, HV)	0	1	0							
-	n potential peat fl			N			NA	Farm out-houses	-	Dwelling	0	1	0							
capability	to respond (acces	s and resources)		Fa	ir		NA	Good Con 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Fair sequences Negligible Low Medium High	Poor		1 nsequences _{total} Max. possible quences ₀₋₁		]						
								Risk rating												
	Risk					A+:	on required				1									
0	.00 - 0.20	Negligible Normal site investigation				Acti		-			1	Risk rating =	Hazard *	Consequences						

0.00 - 0.20	Negligible	Normal site investigation	Risk rating =	Hazard *	Consequen	ces	
0.20 - 0.40	Low	Targeted site investigation, design of specific mitigation measures. Part time supervision during construction.	Risk rating =	0.34	0.30	=	0.10
0.40 - 0.60	Medium	Avoid construction in the area if possible. If unavoidable, detailed site investigation and design of specific mitigation measures. Full time					
0.60 - 1.00	High	Avoid construction in this area.					





#### Table M- 18: Peat Stability Risk Assessment at PRA 2.

					Idui	e w-	18: Pe	at Stabilit	y Risk Assess	ment at PK	ΑΖ.			
CI		Peat Stability Risk Assessment (PSRA)						-	PRA 2 Undrained (U), undrain	ed surcharge (US), dra	ined (D), dr	ained surcharge	e (DS)	
GAVIN &	DOHERTY	reat stability risk Assessment (rsra)						Inspected on:						
		Carrig Wind Farm						Inspected by: Completed by:						
MI	<0>								CE Dec-23					]
		Hazard factors	U	Va US	lue D	DS	0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment
				03			0		2		Value			Part dauth at 4 an Class and
Factor of S	afety		14.5	7.6	11.9	13.3	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~1.1 m. Slope angle 1.8 ^o .
		Distance to previous slides (km)	5 - 10					5 - 10	< 5	On site	1	2	2	
	Slide history	Evidence of peat movement (e.g. tension			IA		NA NA	-	-	Yes	0	2	0	
								Gravel / Firm						
	Subsoil	Subsoil type		N	IA		NA	glacial till	Smooth rock	Soft sensitive clay	0	1	0	No neaby trial pit
	conditions (visible in trial pits)													
		Post fibres across transition to subsail			IA		NA	Voc	Dartially	No	0	1	0	No pophytrial pit
		Peat fibres across transition to subsoil Peat wetness		K	IA		NA	Yes Dry / Stands well	Partially Slowly squeezing	No Extremely wet /	0	2	0	No neaby trial pit No neaby trial pit
		reat wettless					INA	Dry / Stands well	Slowly squeezing	Undiggable	0	2	0	No heady that pit
		General curvature downslope		N	IA		NA	-	Planar	Convex	0	1	0	Flat
	Topography	Distance to the convexity break		N	IA		NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
		(only if previous factor is Convex)												
ctors		Slope aspect		N	IA		NA	SWA S SE	\A/ E	NW, N, NE	0	1	0	
ary fa		(for high latitudes in northern hemisphere)					NA	SW, S, SE > 300	W, E 200 - 300 96 -135	NVV, N, NE	0	-	0	
Secondary factors		Distance from watercourse (m)		200	- 300		NA			< 200	2	1	2	
Se														
		Surface moisture index (NDMI)		96 -	-135		NA	0 - 96		135 - 174	2	1	2	
		Surface water	Localised				NA	Localised	Ponded in drains	Springs	1	1	1	
	Hydrology	Evidence of piping (subsurface flow)		N	IA		NA	-	-	Yes	0	1	0	
		Circulficant and the design of the	NA											
		Significant surface desiccation (previous summer was dry?)					NA	-	-	Yes	0	1.5	0	
		Existing drainage ditches		Down	slope		NA	Down slope	Varied / Oblique	Across slope	1	1	1	
		Annual rainfall Bush			mm/yr lands		NA	< 1000 mm/yr Dry heather	1000 - 1400 mm/yr Grassland	> 1400 mm/yr Wetlands	1 3	1	1 3	
	Vegetation	Forestry		N	IA		NA	Good growth	Fair	Stunted growth	0	1.5	0	
	Peat workings	Peat cuts presence Peat cuts vs contour lines			/ Turbary ique		NA NA	- Perpendicular	Cutaway / Turbary Oblique	Machine cut Parallel	2	1	2	
	Existing loads	Roads		50	lid		NA	Solid	-	Floating	1	1	1	
	Existing loads	Noads				INA	5010	-		1	-	1		
	Time of year for	construction		Late Summ	ier, Autumn	I	NA	Spring	Winter, Early Summer	Late Summer, Autumn	3	1	3	Wost case estimate
							-					Hazard _{total}	30	
									Hazard Negligible			Max. possible	93	
								0.3 - 0.5	Low Medium			Hazard ₀₋₁	0.32	1
								0.7 - 1.0	High			1142414 0-1	0.52	1
									Rating criteria		Rating		_	-
Volume of		nsequence factors			lue		0	1 Small	2	3	value	Weighting	Score	Comment
	potential peat flo		N/I	nor undefine	nall ed waterco	irse	NA	Small Bowl / contained	Medium Minor undefined	Large Valley	1	3	2	
	rom defined valle		IVII		500		NA	> 500	watercourse 200 - 500	< 200	1	1	1	
Downhill s					zontal		NA	Horizontal	Intermediate	Steep	1	1	1	
Downstrea	im aquatic enviror	nment		Sens	sitive		NA	Non-sensitive	Sensitive	Drinking water supply	2	1	2	
Public road	ls in potential pea	t flow path		N	IA		NA	Minor road	Local road	Regional road	0	1	0	
Overhead	lines in potential p	peat flow path		N	IA		NA	Phone lines	Electricity (LV)	Electricity (MV, HV)	0	1	0	
Buildings in	Buildings in potential peat flow path				IA		NA	Farm out-houses	-	Dwelling	0	1	0	
Capability	to respond (acces	s and resources)		Fa	air		NA	Good	Fair	Poor	2	1	2	
								Con	sequences	1	Co	nsequences _{total}	11	
									Negligible			Max. possible	33	
									Low Medium		Conse	quences 0-1	0.33	1
								0.5 - 0.7 0.7 - 1.0	High					4
								Ris	k rating					
	Risk					Action	required				]			
	00 - 0.20	Negligible Normal site investigation	ian of com	ific mist-st		. Dort the	cupon del	during construction			-	Risk rating =		Consequences
	20 - 0.40 40 - 0.60	Low Targeted site investigation, des Medium Avoid construction in the area								time supervision		Risk rating =	0.32	0.33 = <b>0.11</b>
	60 - 1.00	High Avoid construction in this area.												

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#### Table M- 19: Peat Stability Risk Assessment at PRA 3.

GI								Location:	DDA 2					
	GDG Peat Stability Risk Assessment (PSRA) Location: PRA 3 Conditions: Undrained surcharge (US), drained (D), drained surcharge (DS)													
GAVIN & GEOSO	DOHERTY								May-23					
	~							BMC CE						
Carrig Wind Farm														
	~							Date.	Dec-23					
	На	zard factors	U	Va US	alue D	DS	0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment
ctor of Sa	afety		9.3	6.4	7.8	11.3	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: 2.2m. Slope ang 1.4º.
1	Slide history	Distance to previous slides (km)			- 10		NA	5 - 10	< 5	On site	1	2	2	
ľ	,	Evidence of peat movement (e.g.		1	NA		NA	-	-	Yes	0	2	0	-
	Subsoil conditions (visible in trial pits)	Subsoil type		٦	A		NA	Gravel / Firm glacial till	Smooth rock	Soft sensitive clay	0	1	0	No nearby TP
ł		Peat fibres across transition to		1	NA		NA	Yes	Partially	No	0	1	0	No nearby TP
		Peat wetness					NA	Dry / Stands well	Slowly squeezing	Extremely wet /	0	2	0	No nearby TP
ľ										Undiggable				
		General curvature downslope		1	A		NA	-	Planar	Convex	0	1	0	Flat
	Topography	Distance to the convexity break (only if previous factor is Convex)		١	A		NA	> 100 m	50 - 100 m	< 50 m	0	1	0	
Secondary factors		Slope aspect (for high latitudes in northern hemisphere)		1	NA		NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
Seco		Distance from watercourse (m)		<	200		NA	> 300	200 - 300	< 200	3	1	3	
	Hydrology	Surface moisture index (NDMI)			-135		NA	0 - 96	96 -135	135 - 174	2	1	2	
ł		Surface water	Localised				NA	Localised	Ponded in drains	Springs	1	1	1	
		Evidence of piping (subsurface flow)	NA				NA	-	-	Yes	0	1	0	
		Significant surface desiccation (previous summer was dry?)	NA				NA	-	-	Yes	0	1.5	0	
ľ		Existing drainage ditches			n slope		NA	Down slope	Varied / Oblique	Across slope	1	1	1	
ľ		Annual rainfall	< 1000 mm/yr				NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1	
ł	Vegetation	Bush Forestry	NA				NA NA	Dry heather Good growth	Grassland Fair	Wetlands Stunted growth	0	1	0 0	
ł		Peat cuts presence	NA Cutaway / Turbary				NA	-	Cutaway / Turbary	Machine cut	2	1.5	2	
ł	Peat workings	Peat cuts vs contour lines	Cutaway / Turbary Perpendicular				NA	Perpendicular	Oblique	Parallel	1	1	1	
ł	Existing loads	Roads	Solid				NA	Solid		Floating	1	1	1	
1	Time of year for	construction	Late Summer, Autumn				NA	Carling	Minter Fort Commen	Late Summer,		1	3	Wost case estimate
1				Late Summ				Spring	Winter, Early Summer		3			
				Late Summ	ier, Autum			Spring	Winter, Early Summer	Autumn	3			wost case estimate
							<u> </u>	0.0 - 0.3	Hazard Negligible		3	Hazard _{total} Max. possible	27 93	Wost case estimate
				Late Summ					Hazard		3	Hazard _{total}	27	
		vauence factors						0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria	Autumn	Rating	Hazard _{total} Max. possible <b>Hazard ₀₋₁</b>	27 93 0.29	]
	Conse	equence factors		Vá	alue		0	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria 2	Autumn 3	Rating value	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting	27 93 0.29 Score	Comment
lume of	<b>Conse</b> potential peat flo	W		Va	<b>ilue</b> dium		0 NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 <b>1</b> Small	Hazard Negligible Low Medium High Rating criteria 2 Medium	Autumn Bandaria Automotional Bandaria Bandaria	Rating value 2	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3	27 93 0.29 Score 6	]
lume of	Conse	W		Vá	<b>ilue</b> dium	urse	0	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria 2	Autumn 3	Rating value	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting	27 93 0.29 Score	]
lume of j wnslope pximity fi	Conse potential peat flo hydrology featur rom defined valle	res		Va Me nor undefin	lue dium ed waterco 500	urse	0 NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500	Autumn 3 Large Valley < 200	Rating value 2 2 1	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1 1	27 93 0.29 Score 6 2 1	]
lume of j wnslope pximity fi	Conse potential peat flo hydrology featur	res		Va Me nor undefin	<b>ilue</b> dium ed waterco	urse	0 NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse	Autumn 3 Large Valley < 200 Steep	Rating value 2 2	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1	27 93 0.29 Score 6 2	]
lume of winslope oximity fi winhill sla	Conse potential peat flo hydrology featur rom defined valle	res ey (m)		Va Me nor undefin > Hori	lue dium ed waterco 500	urse	0 NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500	Autumn 3 Large Valley < 200 Steep Drinking water	Rating value 2 2 1	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1 1	27 93 0.29 Score 6 2 1	]
lume of j wnslope oximity fi wnhill sla wnstreal	Conse potential peat flo hydrology featu rom defined valle ope angle	res ey (m)		Va Me nor undefin Hori Sen	dium ed waterco 500 zontal	urse	0 NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate	Autumn 3 Large Valley < 200 Steep	Rating value 2 2 1 1	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1 1 1 1	27 93 0.29 Score 6 2 1 1 1	]
lume of j wnslope oximity fi wnhill sla wnstreai blic road	Conse potential peat flo hydrology featu rom defined valle ope angle m aquatic enviro	ey (m) nment at flow path		Va Me nor undefin > : Hori Sen	lue dium ed waterco 500 zontal sitive	urse	O NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive	Autumn 3 Large Valley < 200 Steep Drinking water supply	Rating value 2 2 1 1 2	Hazard _{total} Max. possible Hazard ₀₋₁ Weighting 3 1 1 1 1 1 1	27 93 0.29 Score 6 2 1 1 1 2	]
lume of j wnslope oximity fi wnhill sla wnstreai blic road erhead li	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential pea	res ey (m) nment at flow path peat flow path		Va Me nor undefin > : Hori Sen N	lue dium ed waterco 500 zontal sitive NA	urse	O NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity	Rating value 2 2 1 1 2 0	Hazard total Max. possible Hazard 0.1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 1 2 0	]
ume of j winslope winity fr wnhill sli wnstreaa Jolic road Jolic road	Conse potential peat flc i hydrology featur rom defined valle ope angle m aquatic enviro is in potential pea ines in potential p	ey (m) nment at flow path peat flow path		Va Me nor undefin Hori Sen N	lue dium ed waterco 500 zontal sitive NA	urse	O NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines	Hazard Negligible Low Medium High Rating criteria Z Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV)	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV)	Rating           value           2           1           2           0           0	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 1 2 0 0	]
ume of p vinslope kimity fr vnhill sli vnstreau lic road lic road dings in	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential peat ines in potential p	ey (m) nment at flow path peat flow path		Va Me nor undefin Hori Sen N	alue dium ed waterco 500 zontal sitive NA NA	urse	O NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria Rating criteria Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 Score 6 2 1 1 1 2 0 0 0 0 0	]
ume of p wnslope ximity fr wnstreau olic road olic road lic road	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential peat ines in potential p	ey (m) nment at flow path peat flow path		Va Me nor undefin Hori Sen N	alue dium ed waterco 500 zontal sitive NA NA	urse	O NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Hazard Negligible Low Medium High Rating criteria Rating criteria Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair sequences Negligible Low	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           Control	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 1 2 0 0 0 0 0 0 0 2 14 33	]
ume of j winslope winity fr wnhill sli wnstreaa Jolic road Jolic road	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential peat ines in potential p	ey (m) nment at flow path peat flow path		Va Me nor undefin Hori Sen N	alue dium ed waterco 500 zontal sitive NA NA	urse	O NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good	Hazard Negligible Low Medium High Rating criteria 2 Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) - Fair sequences Negligible	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           Control	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 2 0 0 0 0 0 0 0 2 14	]
ume of p vnslope vnhill sli vnstreau vlic road vlic road vlic road vlic road	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential peat ines in potential p	ey (m) nment at flow path peat flow path		Va Me nor undefin Hori Sen N	alue dium ed waterco 500 zontal sitive NA NA	urse	O NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria Rating criteria Medium Minor undefined watercourse 200 - 500 Intermediate Sensitive Local road Electricity (LV) Fair Sequences Negligible Low Medium	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           Control	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 1 2 0 0 0 0 0 0 0 2 14 33	]
ume of p vinslope kimity fr vnhill sli vnstreau lic road lic road dings in	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential peat ines in potential p	ey (m) nment at flow path peat flow path		Va Me nor undefin Hori Sen N	alue dium ed waterco 500 zontal sitive NA NA		O NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Con 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria Rating criteria Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Cocal road Electricity Local road Electricity Electricity Local road Electricity Electric	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           Control	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 1 2 0 0 0 0 0 0 0 2 14 33	]
ume of µ vnslope ximity fr vnhill sli vnstread li dings in ability t	Conse potential peat flo thydrology featur rom defined valle ope angle m aquatic enviro is in potential peat ines in potential peat fl to prespond (access	ey (m) nment at flow path peat flow path	Min	Va Me nor undefin Hori Sen N	alue dium ed waterco 500 zontal sitive NA NA		O NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Con 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria Rating criteria Minor undefined watercourse 200 - 500 Intermediate 200 - 500 Intermediate Cocal road Electricity Local road Electricity Electricity Local road Electricity Electric	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling	Rating value           2           1           2           0           0           0           2           Conset	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 2 14 14 33 33 0.42	
ume of j vnslope kimity fi vnstreaa lic road dings in ability t dings in ability t 0.0.0.0.0.0	Conse potential peat flo hydrology featur rom defined valle ope angle m aquatic enviro is in potential peat n potential peat fl o respond (access Risk	ey (m) nment at flow path peat flow path ow path ss and resources)	Mir	Va Me nor undefin Hori Sen N P F F	alue dium ed waterco 500 zontal sitive NA JA JA JA JA	Actio	0 NA NA NA NA NA NA NA NA	0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0 1 Small Bowl / contained > 500 Horizontal Non-sensitive Minor road Phone lines Farm out-houses Good Com 0.0 - 0.3 0.3 - 0.5 0.5 - 0.7 0.7 - 1.0	Hazard Negligible Low Medium High Rating criteria Rating criteria Medium Minor undefined watercourse 200 - 500 Intermediate Cov Sensitive Local road Electricity Electricity CUV	Autumn 3 Large Valley < 200 Steep Drinking water supply Regional road Electricity (MV, HV) Dwelling Poor	Rating           value           2           1           2           0           0           0           2           Conset	Hazard total Max. possible Hazard 0-1 Weighting 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27 93 0.29 5core 6 2 1 1 2 0 0 0 0 0 0 0 0 2 14 14 33 33 0.42	Comment  Comment

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### Table M- 20: Peat Stability Risk Assessment at PRA 4.

GI	DG	Peat Stability Risk Assessment (PSRA)					Location: Conditions:	Conditions: Undrained (U), undrained surcharge (US), drained (D), drained surcharge (DS)							
GAVIN 8 GEOSC	DUTIONS						May-23								
м	<ô>	Carrig Wind Farm					BMC CE								
1*11								Date:	Dec-23						
	-														
		Hazard factors	U	-	alue	DS	0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment	
				US	D	DS	0	1	2	3	value				
Factor of S	afety		179.0	51.2	144.6	89.0	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~0.4 m. Slope angle: 0.4 ^o .	
	r														
	Slide history	Distance to previous slides (km) Evidence of peat movement (e.g. tension			- 10 NA		NA NA	5 - 10 -	< 5	On site Yes	1	2	2 0		
		Subsoil type			NA		NA	Gravel / Firm	Smooth rock	Soft sensitive clay	0	1	0	No nearby TPs	
	Subsoil conditions							glacial till		,					
	(visible in trial pits)														
		Peat fibres across transition to subsoil			NA		NA	Yes	Partially	No	0	1	0	No nearby TPs	
		Peat wetness					NA	Dry / Stands well	Slowly squeezing	Extremely wet /	0	2	0	No nearby TPs	
							NA	Dry / Stands well	Slowly squeezing	Undiggable	0	2	0		
		General curvature downslope			NA		NA		Planar	Convex	0	1	0	Flat	
	<b>T</b>	Distance to the convexity break													
	Topography	(only if previous factor is Convex)			NA		NA	> 100 m	50 - 100 m	< 50 m	0	1	0		
Secondary factors															
ry fa		Slope aspect (for high latitudes in northern hemisphere)			NA		NA	SW, S, SE	W, E	NW, N, NE	0	1	0		
onda							-								
Sec	Hydrology	Distance from watercourse (m)		>	300		NA	> 300	200 - 300	< 200	1	1	1		
		Surface moisture index (NDMI)		0	- 96		NA	0 - 96	96 -135	135 - 174	1	1	1		
		Surface water		Loc	alised		NA	Localised	Ponded in drains	Springs	1	1	1		
		Evidence of piping (subsurface flow)	NA NA				NA		-	Yes	0	1	0		
		Significant surface desiccation (previous summer was dry?)					NA	-	-	Yes	0	1.5	0		
		Existing drainage ditches	Down slope				NA	Down slope	Varied / Oblique	Across slope	1	1	1		
		Annual rainfall			0 mm/yr		NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1		
	Vegetation	Bush			NA		NA	Dry heather	Grassland	Wetlands	0	1	0		
		Forestry Peat cuts presence	NA NA				NA NA	Good growth -	Fair Cutaway / Turbary	Stunted growth Machine cut	0	1.5 1	0		
	Peat workings	Peat cuts vs contour lines			NA		NA NA	Perpendicular	Oblique	Parallel	0	1	0		
	Existing loads Roads							Solid	-	Floating Late Summer,	1	1	1		
	Time of year for	construction		Late Sum	ner, Autum	n	NA	Spring	Winter, Early Summer	Autumn	3	1	3	Wost case estimate	
									Hazard	1		Hazard _{total}	21		
								0.0 - 0.3	Negligible			Max. possible	93		
								0.3 - 0.5	Low			Hazard	0.22	1	
								0.5 - 0.7 0.7 - 1.0	Medium High			Hazard ₀₋₁	0.23	1	
							-	-	Detine suiterie	·	Detine				
	Cor	nsequence factors		v	alue		0	1	Rating criteria 2	3	Rating value	Weighting	Score	Comment	
Volume of	potential peat flo	W		S	mall		NA	Small	Medium	Large	1	3	3		
Downslop	e hydrology featu	res			NA		NA	Bowl / contained	Minor undefined watercourse	Valley	0	1	0		
	from defined valle	ey (m)			500		NA	> 500	200 - 500	< 200	1	1	1		
	lope angle				zontal		NA	Horizontal	Intermediate	Steep Drinking water	1	1	1		
	am aquatic enviro				isitive		NA	Non-sensitive	Sensitive	supply	2	1	2		
	ds in potential pea				NA		NA	Minor road	Local road	Regional road Electricity	0	1	0		
Overhead	Overhead lines in potential peat flow path				NA		NA	Phone lines	Electricity (LV)	(MV, HV)	0	1	0		
Buildings in potential peat flow path					NA		NA	Farm out-houses	-	Dwelling	0	1	0		
Capability	Capability to respond (access and resources)				Fair			Good	Fair	Poor	2	1	2		
										1	Co	nsequences _{total}	9		
								0.0 - 0.3	sequences Negligible	1		Max. possible	33		
								0.3 - 0.5	Low		_			7	
								0.5 - 0.7 0.7 - 1.0	Medium High		Conse	quences ₀₋₁	0.27	J	
										·					
								R	isk rating						
											-				
0	Risk .00 - 0.20	Negligible Normal site investigation				Action	required				1	Risk rating =	Hazard *	Consequences	
	.20 - 0.40	Low Targeted site investigation, de	sign of spec	ific mitigat	ion measur	es. Part tim	e supervisio	n during construction	on.		1	Risk rating =	0.23	0.27 = 0.06	
	.40 - 0.60	Medium Avoid construction in the area	if possible.							time supervision	1	-			
	.60 - 1.00	High Avoid construction in this area													





### Table M- 21: Peat Stability Risk Assessment at the SRA.

								Location:	SRA					
GAVIN	DOHERTY	Peat Stability Risk Assessment (PS	SRA)					Conditions: Inspected on:	_					
GEOS								Inspected by:	May-23 BMC					
M	<0>	Carrig Wind Farm						Completed by: Date:	CE Dec-23					
	~													
	На	zard factors	U	Val US	ue D	DS	0	1	Rating criteria	3	Rating value	Weighting	Score	Comment
				0	1	2	5	Value			Deat dauth 204 m Claus and a			
Factor of	afety		42.2	12.0	34.0	21.0	-	≥ 1.3	1.3 - 1.0	≤ 1.0	1	10	10	Peat depth: ~01m. Slope angle: 2º.
	Slide history	Distance to previous slides (km)		5 -			NA	5 - 10	< 5	On site	1	2	2	
		Evidence of peat movement (e.g.		N	A		NA	-	-	Yes	0	2	0	
		Culture II to use						Gravel / Firm						No. of the The
	Subsoil	Subsoil type		N	A		NA	glacial till	Smooth rock	Soft sensitive clay	0	1	0	No nearby TPs
	conditions (visible in trial pits)													
		Peat fibres across transition to		N	•		NA	Vee	Destight	No	0	1	0	No persola The
				N	A		NA	Yes	Partially	No Extremely wet /	0	1	0	No nearby TPs
		Peat wetness					NA	Dry / Stands well	Slowly squeezing	Undiggable	0	2	0	No nearby TPs
		General curvature downslope		Con	vex		NA	-	Planar	Convex	3	1	3	
		Distance to the convexity break												
	Topography	(only if previous factor is Convex)		< 50	) m		NA	> 100 m	50 - 100 m	< 50 m	3	1	3	
Secondary factors														
iry fa		Slope aspect (for high latitudes in northern hemisphere)	NA				NA	SW, S, SE	W, E	NW, N, NE	0	1	0	
onda		······												
Sec		Distance from watercourse (m)		< 2	00		NA	> 300	200 - 300	< 200	3	1	3	
		Surface moisture index (NDMI)		96 -	135		NA	0 - 96	96 -135	135 - 174	2	1	2	
		Surface water	Localised				NA	Localised	Ponded in drains	Springs	1	1	1	
	Hydrology	Evidence of piping (subsurface flow)	NA				NA	-	-	Yes	0	1	0	
		Significant surface desiccation (previous summer was dry?)		N	A		NA	-	-	Yes	0	1.5	0	
		Existing drainage ditches	Down slope				NA	Down slope	Varied / Oblique	Across slope	1	1	1	
		Annual rainfall		< 1000	mm/yr		NA	< 1000 mm/yr	1000 - 1400 mm/yr	> 1400 mm/yr	1	1	1	
	Vegetation	Bush Forestry	NA Good growth				NA NA	Dry heather Good growth	Grassland Fair	Wetlands Stunted growth	0	1	0 1.5	-
	Peat workings	Peat cuts presence					NA	-	Cutaway / Turbary	Machine cut	1	1	1	
	Existing loads	Peat cuts vs contour lines Roads		N So			NA NA	Perpendicular Solid	Oblique -	Parallel Floating	0	1	0 1	
	Time of year for				er, Autumr		NA	Spring	Winter, Early Summer	Late Summer,	3	1	3	Wost case estimate
	nine of year for	construction		ate summ	ci, Adtaini			Spring	winter, Early Summer	Autumn	5	Hazard _{total}	32.5	wost case estimate
									Hazard	[		total	52.5	
								0.0 - 0.3	Negligible Low			Max. possible	93	
								0.5 - 0.7	Medium			Hazard ₀₋₁	0.35	
								0.7 - 1.0	High					
	Conse	quence factors		Val	110				Rating criteria		Rating	Weighting	Score	Comment
Volume o	potential peat flo			Sm			0 NA	1 Small	2 Medium	3 Large	value 1	3	3	No peat.
	e hydrology featur		Mino		d waterco	urse	NA	Bowl / contained	Minor undefined	Valley	2	1	2	
	from defined valle			> 5			NA	> 500	watercourse 200 - 500	< 200	1	1	1	
	lope angle	-1 5 7		Horiz			NA	Horizontal	Intermediate	Steep	1	1	1	
Downstre	am aquatic enviro	nment		Sens	itive		NA	Non-sensitive	Sensitive	Drinking water supply	2	1	2	
Public roa	ds in potential pea	at flow path		N	A		NA	Minor road	Local road	Regional road	0	1	0	
Overhead	lines in potential p	peat flow path		N	A		NA	Phone lines	Electricity (LV)	Electricity (MV, HV)	0	1	0	
Buildinge	n potential peat fl	low path		N	A		NA	Farm out-houses	-	Dwelling	0	1	0	
-	to respond (acces			Fa			NA	Good	Fair	Poor	2	1	2	
capability							ha	0000	, and	1001		nsequences _{total}	11	
									Negligible			May por-thi-	22	
								0.0 - 0.3	Negligible Low			Max. possible	33	
									Medium		Conse	quences ₀₋₁	0.33	
								0.7 - 1.0	High					
									Risk rating					
	<b>Risk</b>	Negligible Normal site investigation				Actio	on required					Pick ration -		1* Consequences
	<b>Risk</b> .00 - 0.20 .20 - 0.40	Negligible Normal site investigation	n, design of s	specific mit	igation me				truction.			Risk rating = Risk rating =	0.35	d * Consequences 0.33 = <b>0.12</b>
( (	.00 - 0.20		area if possit			asures. Par	t time supe	rvision during cons		5. Full time		Risk rating = Risk rating =		





#### **GLOBAL PROJECT REACH**



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