8. LAND, SOILS AND GEOLOGY

8.1 Introduction

8.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO Ireland (MKO) to carry out an assessment of the potential likely and significant effects of the Prospective Development on the land, soils and geological aspects of the receiving environment.

The Prospective Development is described in full in Chapter 4 of this Environmental Impact Assessment Report (EIAR). The Prospective Development relates to the completion of the construction, operation and decommissioning of the Meenbog Wind Farm. As detailed in Section 1.1.1 in Chapter 1 of this EIAR, the various development components are described and assessed using the following references: ‘Subject Development’, ‘Existing Development’, ‘Prospective Development’, 'Permitted Development', ‘Site’, 'Wind Farm Site', ‘Grid Connection Site’, 'BMEP Site', 'Grid Connection', ' November 2020 Peat Slide', '2017 EIAR' and 'proposed turbines' or 'proposed turbine locations'

This chapter provides a baseline assessment of the environmental setting of the Site, as described in Chapter 4 of this EIAR, in terms of land, soils and geology, and discusses the potential likely significant effects that the construction, operation and decommissioning of the Prospective Development will have. Where required, appropriate mitigation measures to avoid any identified significant effects to land, soils and geology are recommended and the residual effects of the Prospective Development post-mitigation are assessed. This chapter also includes an assessment of the potential cumulative effects arising from the Prospective Development in combination with other relevant plans and projects, and considers the potential for transboundary effects where relevant. The chapter also assesses the potential in-cumulation effects with the Existing Development.

8.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist geological, hydrological, hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core areas of expertise and experience include soils, subsoils and geology. We routinely complete impact assessments for land, soils and geology, hydrology and hydrogeology for a large variety of project types including wind farms and renewable energy projects.

This chapter of the EIAR was prepared by Michael Gill and Conor McGettigan.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 24 years’ environmental consultancy experience in Ireland. Michael has completed numerous geological, hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. Michael has worked on over 100 wind farm-related projects including original application for Meenbog Wind Farm.

Conor McGettigan (BSc, MSc) is an Environmental Scientist with over 5 years’ experience in the environmental sector in Ireland. Conor holds an M.Sc. in Applied Environmental Science (2020) and a B.Sc. in Geology (2016) from University College Dublin. Conor routinely prepares the land, soils and geology chapters of environmental impact assessment reports for wind farm development on peatlands.

8.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Section 2.9 of Chapter 2 of this EIAR. Consultation responses relating to the land, soils and geological environment were received from the Geological Survey of Ireland (GSI), the Health Service Executive (HSE), Donegal County Council (DCC) and the Irish Peatland Conservation Council (IPCC). Summaries of the responses are detailed below in Table 8-1. Further details are outlined in Section 2.5.2 of this EIAR.

Table 8-1: Summary Consultations with respect to the land, soils and geological environment

Consultee	Description	Addressed in Section
GSI	*"Our records show that there is a CGS in the study area of the proposed wind farm[...]This site should be assessed as an environmental constraint. Ideally, the site should not be damaged or integrity impacted or reduced in any manner due to the proposed construction and modification of access roads, from traffic due to access road construction and turbine installation. This would include impacts that may be related to altered drainage patterns, changes in soil profiles and structures etc. However, this is not always possible, and in this situation appropriate mitigation measures should be put in place to minimize or mitigate potential impacts."*	Section 8.5.2.7
	Landslides are common in areas of peat, rock near surface and in fine to coarse range materials (such as glacial tills), areas which are found within the proposed wind farm area. The Landslide Susceptibility map indicates variable landslide susceptibility within the study area, including areas of 'Moderately High' to 'High' susceptibility. We note in the scoping document, reference to the peat slide close to the wind farm that occurred in November 2020. The potential for run-out from peat failure should be addressed.	Sections 8.3.8 and 8.5.2.9
HSE	*"A detailed assessment of the current ground stability of the site for the proposed renewable energy development and all proposed mitigation measures should be detailed in the EIAR. The assessment should include the impact construction work may have on the future stability of ground conditions, taking into consideration extreme weather events, site drainage and the potential for soil erosion."*	Sections 8.3.8 and 8.5.2.9
	"The Environmental Health Service recommends that a detailed Peat Stability/Geotechnical Assessment of the proposed site should be undertaken to assess the suitability of the soil for the proposed development. The EIAR should include provision for a peat stability monitoring programme to identify early signs of potential bog slides ('pre-failure indicators' see the Scottish Government's 'Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments 2017)"	Sections 8.3.8 and 8.5.2.9
DCC	*"Given the previous peat stability failure events at Meenbog, any rEIAR should focus a greater emphasis on "Land, Soils and Geology" and "Hydrology and Hydrogeology" of the site to ensure*	A Peat Stability Risk Assessment

	no repeat of previous events at the wind farm site. Any rEIAR should set out risk management measures particularly with regards to existing site drainage being maintained during construction that may include: › *Prevent undercutting of sloped and unsupported excavations* › *Maintain and manage a robust drainage system* › *Prevent placement of loads/overburden on marginal grounds* › *Set up monitoring systems* › *Maintain hydrology of the area by maintaining existing drains to water pressure in the peat to avoid peat becoming buoyant* › *Use of experienced geotechnical for site investigations and experienced contractors to carry out the work* › *Detailed ground investigation to confirm peat, mineral soil and bedrock condition and properties* › *Placement of buttresses on upslope side of access road to retain peat should any instabilities be noted"*	(PSA) was completed for the Prospective Development by FT (2026) and is summarised in Section 8.3.8.2. An assessment of the potential peat instability is presented in Section 8.5.2.9. Peat Stability has also been addressed in the rEIAR for the Existing Development.
IPCC	The IPCC requested that several items were addressed with respect to the Existing Development. No comments were raised in relation to the Prospective Development.	All comments relating to the Existing Development are addressed in the rEIAR.

8.1.4 Relevant Legislation

The EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. The requirements of the following legislation are complied with:

- Planning and Development Act, 2000 (as amended);
- Planning and Development Regulations, 2001 (as amended);
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment;
- S.I. No. 296/2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018;
- The Heritage Act 1995, as amended; and,
- European Communities (Environmental Impact Assessment) Regulation 1989 to 2006.

8.1.5 Relevant Guidance

The Land, Soils and Geology chapter of this EIAR was prepared in accordance with the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports; (hereafter referred to as 'EPA, 2022');
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Commission 2017).

8.2 Assessment Methodology

8.2.1 Desk Study

A desk study of the Site and the study area (refer to Section 8.2.4 below for a definition of the study area) was completed in January and February 2024 to collect all relevant geological data. The desk study was completed to supplement site specific data which has been gathered for the Site and is detailed in Section 8.2.2. This desk study was checked and updated, where necessary (as new data may have been published) in June 2026.

The desk study included consultation with the following sources of information:

- Environmental Protection Agency database (**www.epa.ie**);
- Corine Land Cover and Land Cover Change Maps (**www.land.copernicus.eu**);
- Geological Survey of Ireland - Groundwater and Geology Databases (**www.gsi.ie**);
- Geological Survey of Ireland – Geological Heritage site mapping (**www.gsi.ie**);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 3 (Geology of South Donegal). Geological Survey of Ireland (GSI, 1999);
- Geological Survey of Ireland – 1:25,000 Field Mapping Sheets;
- General Soil Map of Ireland 2nd edition (**www.epa.ie**); and,
- Aerial Photography, 1:5000 and 6" base mapping.

The desk study also included a review of all available site-specific reports and assessments which have been previously completed for the Permitted Development. The consulted documents included the following:

- 2017 EIAR (Meenbog Wind Farm Environmental Impact Assessment Report. Prepared for Planree Ltd, (Planning Reference ABP-300460-17); and,
- Meenbog Wind Farm 2019 Construction and Environmental Management Plan (CEMP) updated from 2017 under condition compliance and submitted to Donegal County Council).

Fehily Timoney (FT) produced a Peat Stability Assessment (PSA) Report for the Prospective Development (FT, 2026) which is included as Appendix 8-1 of this EIAR. This PSA relies on a comprehensive site specific geological dataset which is detailed below in Section 8.2.2. The desk study components of the PSA included a detailed review of the following documents:

- FT (2021): Meenbog Wind Farm – Peat Stability Assessment of Meenbog Wind Farm Site. This report included a site-wide geomorphological assessment undertaken by FT which is included as Appendix 8-2 of this EIAR (Note that FT acquired AGEC Ltd (AGEC) in 2019);
- Ionic (2021) completed a peat stability assessment of the Existing Development in 2021;
- AFRY (2023) completed a site visit in October 2023 to assess the overall site stability of the constructed works. AFRY's Technical Note is included in Appendix A of Appendix 8-1 (Note that AFRY acquired Ionic Consulting Ltd (Ionic) in July 2022); and,
- All available notes and construction records which were recorded during the construction of the Existing Development.

8.2.2 Baseline Monitoring and Site Investigations

A comprehensive and robust geological dataset has been collected at the Site across multiple phases of site investigations which included site investigations completed as part of the baseline assessment for the 2017 EIAR, site investigations completed during the construction phase of the Existing Development, site investigations completed in the aftermath of the November 2020 Peat Slide and site investigations completed specifically for the purposes of this EIAR.

HES completed a detailed review of the 2017 EIAR and site investigations which were completed as part of the baseline assessment of this EIAR. The site investigations completed to inform the 2017 EIAR, accumulated an extensive site-specific dataset and consisted of site surveys, extensive peat probing and geotechnical investigations. A Peat Stability Risk Assessment Report (PSRA) (AGEC, 2017) was also completed for the permitted wind farm development which was appended to the 2017 EIAR.

Further site investigations were completed during the construction of the Existing Development to inform detailed design decisions, with further site investigations completed following the November 2020 Peat Slide. These site investigations comprised of the following:

- Peat probes and in-situ shear vanes were undertaken within the wind farm footprint area by AFRY (formerly Ionic Consulting Ltd – note that Ionic Consulting was acquired by AFRY in July 2022);
- A total of 9 no. rotary core boreholes were drilled at various infrastructure locations (at the substation and 8 no. turbine locations) across the Wind Farm Site in May 2020 by Irish Drilling Ltd (IDL);
- A total of 4 no. trial pits were excavated at the Wind Farm Site in 2021 (close to T4, T5, T7 and T18) in order to provide more detail on peat classification and peat strength at depth and to retrieve subsoil peat samples for laboratory analysis; and,
- Peat cores at turbine locations were obtained using an RPS (Russian Peat Sampler) to confirm the nature of characteristics of peat at the Wind Farm Site and all samples were logged in accordance with the Von Post classification to determine the degree of peat humidification.

The above site investigations and associated geological dataset informed an assessment of the Wind Farm Site stability which was submitted to the EPA in 2021 (FT, 2021 – attached as Appendix 8-2). Furthermore, AFRY completed an inspection of the works completed at the Wind Farm Site in October 2023 in order to comment on the status of the Wind Farm Site in relation to peat stability. A Technical Note arising from this site inspection is included in Appendix A of Appendix 8-1.

For the specific purposes of this EIAR:

- MKO have completed several multi-disciplinary walkover surveys at the Site between 2019 and 2026;
- 5 no. groundwater monitoring wells were drilled at the Wind Farm Site in April 2025 by Peterson Drilling Services Ltd under the supervision of HES (Appendix 8-3);
- FT completed additional peat probing at the Site in 2025; and,
- FT utilised all of the above data to inform a PSA report completed for the Prospective Development (FT, 2026). This PSA is attached as Appendix 8-1 and is summarised in Section 8.3.8.2.

In total, over 3,400 no. peat probes have been completed at the Site across the multiple phases of site investigations discussed above.

The data obtained from all of these site investigations have been used in the characterisation and description of the baseline land, soils and geological environment presented in Section 8.3.

8.2.3 Impact Assessment Methodology

EPA, 2022 states that there are 7 no. steps in the preparation of the EIAR. The initial steps relate to screening, scoping, the consideration of alternatives and the description of the project. Step 5 relates to the description of the baseline environment which is presented in Section 8.3 for the land, soils and geological environment. Step 6 relates to the assessment of impacts and is presented in Section 8.5.

The guideline criteria in EPA, 2022 require that the baseline environment is described in terms of the context, character, significance and sensitivity of the existing environment. In addition, using information from the desk study and data from the site investigations, an assessment of the importance of the land, soil and geological environment within the study area and Site is assessed using the criteria set out in Table 8-2 (NRA, 2008).

Table 8-2: Estimation of Importance of Soil and Geology Criteria (NRA, 2008).

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying site is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site). Well drained and/or highly fertility soils. Moderately sized existing quarry or pit Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying site is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

The assessment of effects follows the description of the baseline environment and is Step 6 of the information which must be included in an EIAR. The guideline criteria for the assessment of effects states that the purpose of an EIAR is to identify, describe and present an assessment of the likely significant effects. The likely effects are described with respect to their quality (positive, neutral or negative), significance (imperceptible to profound), extent (i.e. size of area or number of sites affected), context (is the effect unique or being increasingly experienced), probability (likely or unlikely), duration (momentary to permanent), frequency and reversibility. The descriptors used in this environmental impact assessment are those set out in the EPA, 2022 classification of effects as shown in Section 1.7.2 of Chapter 1 of this EIAR.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of effects are related to examples of potential likely significant effects on the geology and morphology of the existing environment, as listed in Table 8-3.

Table 8-3: Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Geological and Hydrological Effects
Quality	Significance	
Negative only	Profound	Widespread permanent impact on: The extent or morphology of a cSAC. Regionally important aquifers. Extents of floodplains. Mitigation measures are unlikely to remove such impacts.
Positive or Negative	Significant	Local or widespread time-dependent impacts on: The extent or morphology of a cSAC / ecologically important area. A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area. Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.
Positive or Negative	Moderate	Local time-dependent impacts on: The extent or morphology of a cSAC / NHA / ecologically important area. A minor hydrogeological feature. Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	Local perceptible time-dependent impacts not requiring mitigation.
Positive, Negative or Neutral	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

8.2.4 Study Area

The study area for the land, soils and geological impact assessment is limited to within the Site boundary. Due to the localised nature of the construction works and the habitat enhancement works,

there is no potential for the Prospective Development to affect the land, soils and geological environment outside of the Site.

8.2.5 Limitations and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of the Land, Soils and Geology Chapter of this EIAR. An extensive geological database is available for the Site.

8.3 Establishing the Baseline Environment

8.3.1 Site Description and Topography

The Site, which refers to the three distinct elements – the Wind Farm Site, Grid Connection Site, and BMEP Site combined, measures approximately 1,018 hectares (ha) within the townlands of Meenbog, Croaghonagh, Ardinawark, Keadew Upper, Keadew Lower, Cullionboy, Cashelnavean, Tawnawully Mountains, Friarsbush and Tievecloghoge.

The Wind Farm Site is located within a rural, agricultural setting in County Donegal approximately 8 km southwest of the twin towns of Ballybofey and Stranorlar and approximately 12 km northeast of Donegal Town at its nearest point. The Grid Connection Site extends southwest from the Wind Farm Site for approximately 6 km along the N15 National Road towards Donegal Town before exiting the N15 National Road to the southeast and following Local Roads, adjacent agricultural land and private access track to the Clogher 110kV substation. The BMEP Site is comprised of two parcels of land consisting of coniferous forestry and associated forestry access tracks. The BMEP Site is located in the townland of Tievecloghoge and comprises two land parcels, referred to as Parcel 1 (to the east) and Parcel 2 (to the west). Parcel 2 is located approximately 2.3km east of the Wind Farm Site, and Parcel 1 is located approximately 4.2km east of the Wind Farm Site. The Wind Farm Site has a total area of ~892ha in area.

8.3.1.1 Wind Farm Site

Current land-use at the Wind Farm Site is comprised of the partially constructed Meenbog Wind Farm, areas of commercial forestry and blanket bog, and public roadways. The surrounding land-use predominantly comprises peat bogs, commercial forestry and other seminatural areas with limited residential use along local roads.

Prior to the construction of the Existing Development, a network of existing forestry roads provided access in and around the Wind Farm Site. The Wind Farm Site was covered by blanket bog with very few natural mineral subsoil or bedrock exposures. However, a number of pre-existing borrow pits where the subsoil and bedrock profile were observed and showed that the peat directly overlies bedrock, weathered bedrock or very thin pockets of subsoils.

The elevation of the Wind Farm Site ranges between ~180 and 313mOD (metres above Ordnance Datum), with elevations generally decreasing and sloping in a north or north-westerly direction. A small section in the south of the Wind Farm Site slopes to the southeast. The Wind Farm Site is generally bordered on all sides by forestry plantations with the eastern and southern boundaries also being defined by the Northern Ireland border. The Wind Farm Site drains directly to the Bunadowen River, and the Shruhangarve stream to the north, each of which are tributaries of the larger Mourne Beg River that proceeds to flow downstream into the River Derg. The Wind Farm Site also drains into the Glendergan River to the south-southeast, which is also a tributary of the River Derg.

Existing access is from the N15 National Road in the northwest of the Wind Farm Site and via a local road in the north Wind Farm Site. The N15 National Road runs south-west to north-east, with the Wind Farm Site lying about 2km east of the road.

Construction of the Existing Development commenced in November 2019, at which point the majority of the civil engineering works, including wind farm access roads, 110kV onsite electrical substation, turbine hardstands, turbine foundations, and ancillary works were substantially completed over the following 12-month period up to the November 2020 Peat Slide. The Existing Development footprint (~32.6ha) covers only a very small percentage (~3.7%) of the overall Wind Farm Site (892ha).

8.3.1.2 Grid Connection Site

The Grid Connection Site extends southwest from the Wind Farm Site for approximately 6 km along the N15 National Road towards Donegal Town before continuing south and east along local roads and through agricultural fields to the Clogher 110kV substation. The Grid Connection Site covers a total area of 9ha.

Within the Grid Connection Site, the Grid Connection underground cabling route originates at the onsite 110kV substation within the Wind Farm Site and travels to the northwest along an existing wind farm access road. The Grid Connection then exits the Wind Farm Site entrance and follows the N15 southwest for approximately 6 km, before exiting the N15 National Road onto the L-2595 Local Road. It is then routed southeast along the L-1985 Local Road and through agricultural lands adjacent to the L-1985 Local Road before continuing along and adjacent to a private road to reach the Clogher 110kV substation.

The Clogher substation is situated approximately 6.5 km southwest of the on-site 110kV Substation. The Grid Connection Site traverses the townlands of Ardinawark, Keadew Upper, Keadew Lower, Cullionboy, Cashelnavean, Tawnawully Mountains and Friarsbush.

The landcover/landuse in the lands surrounding the Grid Connection Site is predominantly forestry with sections of peat cutting, farming and open peatlands.

Ground elevations along the Grid Connection Site are greatest in the vicinity of the Wind Farm Site entrance where ground elevations stand at ~153mOD. Elevations decrease along the N15 National Road to the southwest, with the lowest elevations being at ~80mOD. Ground elevations along the Grid Connection rise again from the N15 National Road towards Clogher 110kV substation which stands at ~142mOD.

8.3.1.3 BMEP Site

The BMEP Site is comprised of two parcels of land both contained entirely within the townland of Tievecloghoge, referred to as Parcel 1 (to the east) and Parcel 2 (to the west), which have a combined area of approximately 117ha, ~108ha of which are intended for enhancement. Land use on site within Parcel 1 and Parcel 2 currently comprises coniferous forestry and associated forestry access tracks, which is proposed to be felled and converted to peatland and scrub habitats. There is an elevation difference of 4m (174m elevation SW to 170 m elevation NE) on the BMEP Site.

Site access to Parcel 1 is via a new access track located along the L-65242 Local Road, whilst site access to Parcel 2 is via an existing access track (to be extended and upgraded) located along the L-2974 Local Road. Parcel 2 is located approximately 2.3km east of the Wind Farm Site, and Parcel 1 is located approximately 4.2km east of the Wind Farm Site. There are also existing forestry access tracks, which are proposed for upgrade and extension to facilitate the tree felling works at both sites. A full description of the proposed enhancement/restoration measures is contained in Chapter 4 of this EIAR and Appendix 6-4 Biodiversity Management and Enhancement of the EIAR.

8.3.2 Land (Land Cover)

8.3.2.1 Wind Farm Site

Corine land cover maps (2018) show that the Wind Farm Site is comprised of coniferous forestry in the east, transitional woodland scrub in the northwest and a small area of peat bogs in the northwest and northeast. It is worth noting that Corine land cover maps are based on the interpretation of satellite imagery and national data, with a minimum mapping unit of 25ha and a minimum feature width of 100m. Therefore, this is a large-scale landuse dataset, and it does not pick up smaller scale variations in

land and land cover. Such local (small scale) variations are confirmed during walkover surveys and ground truthing as outlined below.

Current land-use at the Wind Farm Site is comprised of the Existing Development, areas of commercial forestry and blanket bog, and public roadways.

The footprint of the Existing Development is 32.6ha, representing 3.7% of the Site. Within the Wind Farm Site, the Existing Development consists of site access roads, hardstand areas, blade set-down areas, turbine foundations, borrow pits, temporary construction compounds, temporary security cabin and peat and spoil management areas. The majority of the footprint of the Existing Development is located in areas of coniferous forestry which required felling during the construction phase. Only 2 no. turbines (T16 and T19) are located on open peatland.

Details of the Prospective Development are provided in Section 8.4.

8.3.2.1.1 *Grid Connection Site*

Corine land cover maps (2018) show that the Grid Connection Site is located in areas of peat bogs in the north, in the vicinity of the Wind Farm Site, and further to the south at Clogher 110kV substation. The lower elevations at the Grid Connection Site surrounding the N15 National Road are mapped by Corine as agricultural land. Clogher 110kV substation itself is also mapped in an area of peat bogs.

Land and land-use at the Grid Connection Site was verified during surveys completed by HES and MKO. Current land-use at the Grid Connection Site comprises of the public roads as far as the Clogher 110kV substation.

8.3.2.1.2 *BMEP Site*

Corine land cover maps (2018) show that the BMEP Site is located in areas of transitional woodland scrub surrounded by peat bogs. Walkover surveys have revealed that these lands are comprised of coniferous forestry plantation.

8.3.3 Soils and Subsoils

8.3.3.1 Desk Study

8.3.3.1.1 *Wind Farm Site*

The published Teagasc soils map (www.gsi.ie) for the local area shows that the Wind Farm Site is predominantly overlain by blanket peat (BktPT), with small local areas of mainly acidic, shallow, rock, peaty mineral soils (AminSRPT). In terms of the Prospective Development, all infrastructure is mapped in areas of blanket peat. Other soils mapped in close proximity to the Prospective Development include areas of AminSRPT soils mapped in the vicinity of the Wind Farm Site entrance.

The published subsoils map (www.gsi.ie) shows that the Wind Farm Site is underlain almost entirely by blanket peat (BktPt), with some small local areas of bedrock outcrop or subcrop (Rck) and till derived from metamorphic rocks (TMp). In terms of the Prospective Development, all infrastructure is mapped to be underlain by blanket peat. Local areas of bedrock outcrop and till derived from metamorphic rocks are mapped in the vicinity of the Wind Farm Site entrance.

A subsoil geology map for the Site is shown as Figure 8-1.

8.3.3.1.2 Grid Connection Site

The published Teagasc soils map (www.gsi.ie) for the local area shows that the lands in the vicinity of the Grid Connection Site are predominantly overlain by acid poorly drained mineral soils (AminPD), with blanket peat mapped in the north in the vicinity of the Wind Farm Site and in the south in the vicinity of the Clogher 110kV substation. Alluvial soils are also mapped along the Lowerymore River adjacent to the N15 National Road. Acidic poorly drained mineral soils (AminPD) are also mapped along sections of the N15 National Road.

The published subsoils map (www.gsi.ie) shows that the lands in the vicinity of the Grid Connection Site are predominantly underlain by metamorphic till, with blanket peat mapped in the vicinity of the Wind Farm Site and near Clogher 110kV substation. Alluvial subsoils are mapped along the Lowerymore River, while the GSI also map granite till along a section of the N15 National Road. The GSI also map areas of bedrock outcrop or subcrop in the lands surrounding the Grid Connection Site, particularly in Barnesmore Gap and with smaller pockets of bedrock outcrop mapped near Clogher 110kV substation.

8.3.3.1.3 BMEP Site

The published Teagasc soils map (www.gsi.ie) for the local area shows that the BMEP Site is overlain by blanket peat. The published subsoils map (www.gsi.ie) shows that the BMEP Site is underlain by blanket peat. Small pockets of bedrock outcrop are mapped in the surrounding lands whilst a larger area of till derived from metamorphic rocks is mapped to the southeast of the eastern parcel of land proposed for habitat enhancement.

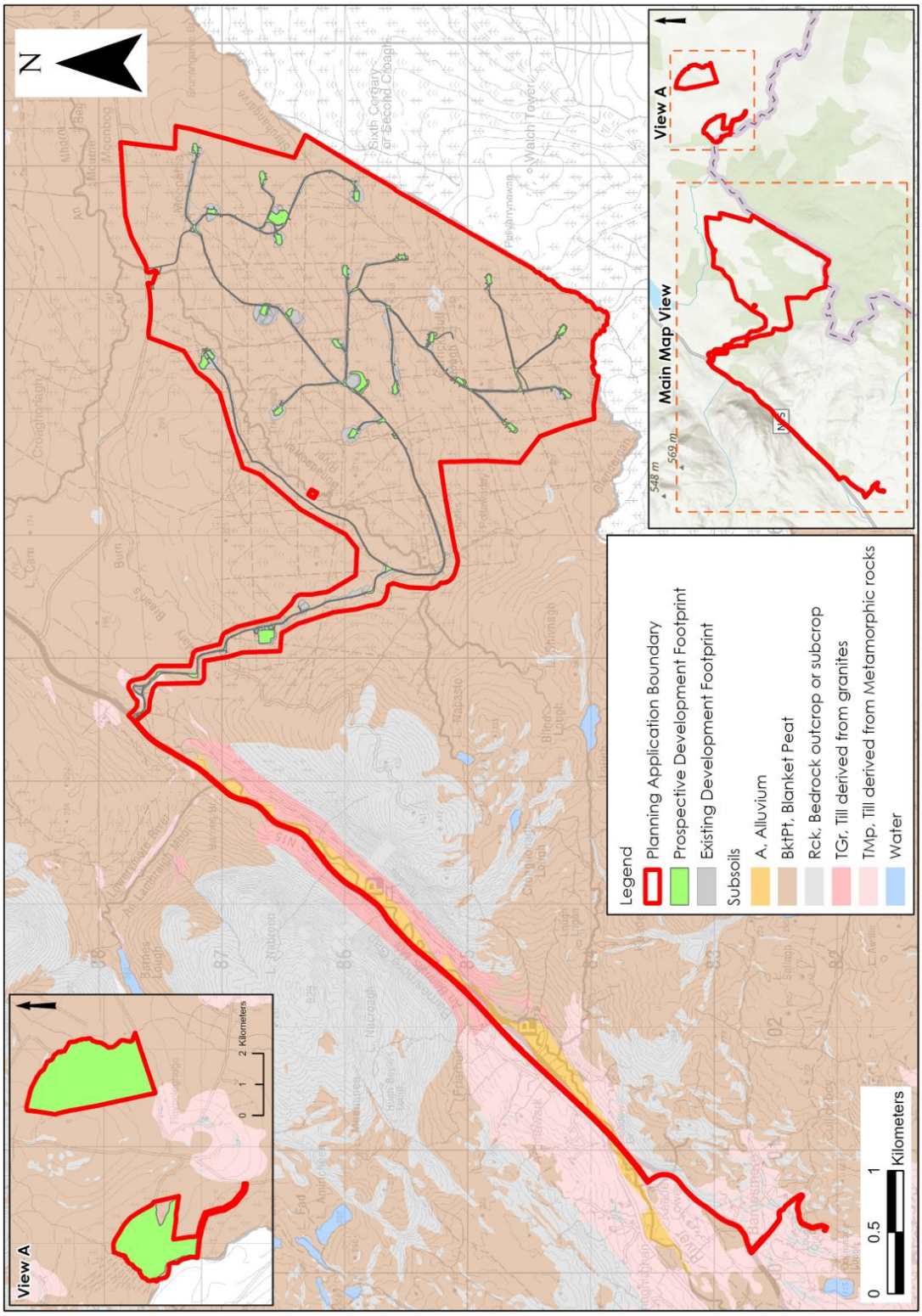

Figure 8-1: Local Subsoils Map (www.gsi.ie)

8.3.3.2 Site Investigations – Wind Farm Site

Extensive site investigations have been completed at the Wind Farm Site across multiple phases of investigations which have provided a comprehensive geological dataset.

8.3.3.2.1 *2017 EIAR: Site Investigations*

Peat Probing and Shear Vane Testing

A total of ~500 no. peat probes were completed by HES, AGEC Ltd and MKO at the Wind Farm Site as part of the baseline assessment for the 2017 EIAR. These previous site investigations showed that peat depths at the Wind Farm Site range from 0 to 5.8m with an average of 1.7m. The peat depth range distribution plot for the Wind Farm Site (Figure 8-2, reproduced from the 2017 EIAR) shows that the majority of peat depths (~73%) were between 0.5 and 2m. The areas identified as having the deeper peat deposits were located in the flatter areas of the Wind Farm Site.

The peat depths recorded at 17 of the 19 no. turbine locations varied from 0 to 2.7m with an average depth of 1.3m. At the remaining 2 no. turbines T3 and T5 maximum peat depths of between 4.5 and 4.7m were recorded. The turbines where deeper peat deposits are present have shallow slope angles typically 1 degree (1˚).

With respect to the Wind Farm Site access tracks, peat depths were typically less than 2.0m with localised depths of up to 3.5m recorded. Probing was also completed along the off-road section of the Grid Connection underground cable route were average peat depths ranged from 1 – 1.25m.

AGEC also completed in-situ peat strength testing to inform the 2017 PSRA. These tests were completed at selected locations across the Wind Farm Site and at turbine locations. The results indicated shear strengths in the range of 5 to about 50kPa, with an average of about 15kPa. The AGEC report was appended to the 2017 EIAR.

HES also completed 30 no. gouge cores as part of the baseline assessment for the 2017 EIAR. These investigations have shown that the peat at the Wind Farm Site is underlain by very thin mineral subsoil or lies directly on weathered or intact bedrock. This was also consistent with observations made at several existing borrow pits and during the construction of the Existing Development infrastructure. Further details were provided in the 2017 EIAR.

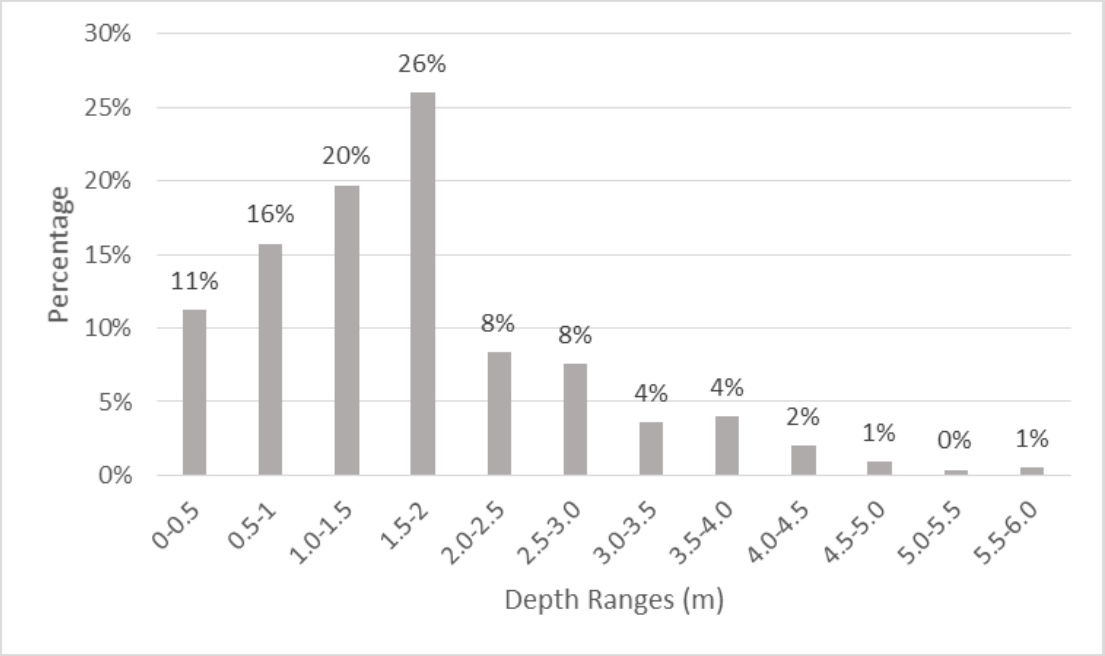

Figure 8-2: Peat Depth Distribution Plot (Combined HES, AGEC and MKO dataset) (reproduced from the 2017 EIAR)

8.3.3.2.2 Construction of the Existing Development: Site Investigations

During the construction of the Existing Development extensive ground investigations were completed in order to further characterise the nature, depth and strength of the peat at the Wind Farm Site. Additional site investigations were also completed by MKO, FT and HES. These site investigations are detailed in full in the PSA for the Prospective Development (FT, 2026), included as Appendix 8-1.

Peat Probing and Shear Vane Testing

To date approx. 3,400 no. peat depth readings were taken within the Wind Farm Site. This dataset recorded an average peat depth of 1.8m and peat depths ranging from 0 to 7.3m. 65% of probes recorded peat depths of less than 2m. A number of localised readings recorded peat depths from 3,0 to 7.3m. These peat depths are largely consistent with those recorded during the 2017 EIAR baseline assessments described above. The peat probes are shown in Figure 8-3.

In general, the depth of peat was found to relate to the topographic slope angles. The areas of deep peat up to 3-6 m deep, and locally >7.3m, correspond to the broad flat or gently sloping ground across the central and eastern sections of the Site. The slope angles in these areas are typically <2°. Peat depths <2m are generally confined to the areas of steeper slopes up to 5.0-7.5°, with shallow peat <1.0m on slopes typically up to 7.5-10.0°. Peat depths of 2-3 m typically occur on the intermediate slopes of 3-5° (FT, 2026).

Hand vane shear strength test results indicate undrained shear strengths in the range of 2 to 30kPa, with an average value of about 9kPa. This would equate to a description of extremely soft to soft, or extremely low to low strength. Note that these shear vane strength tests are lower than that which was recorded during the pre-construction site investigations, as these investigations included results which were concentrated on areas of potentially weak peat in the aftermath of the November 2020 Peat Slide. The shear vane strength test results for the upper scar of the November 2020 Peat Slide showed significantly lower results, ranging from 2 to 9kPa, with an average of slightly less than about 5kPa. There was also no notable strength gain with depth which would be typical of a saturated peat mass. These results suggest a body of very weak and saturated peat at the location of the peat scar which was not identified during the previous pre-construction site investigations. The 12th November 2020 peat slide is discussed in more detail in Section 8.3.8.2.4 below.

Borehole Drilling

IDL drilled a total of 9 no. rotary core boreholes at various locations across the Wind Farm Site (at the substation location and at 8 no. turbine location) between 18th and 28th May 2020. These boreholes revealed the depth of the subsoil profile across the Wind Farm Site which ranged from 1.1 to 5mbgl (metres below ground level). The boreholes typically encountered thin mineral subsoils over bedrock. The subsoils were generally described as stiff dark grey micaceous SILT or subrounded to subangular fine to coarse medium assorted metamorphic GRAVEL. The borehole logs are included as Appendix A of the PSA completed for the Existing Development (FT, 2026) (Appendix 8-1). The locations of all boreholes are shown on Figure 8-4.

Monitoring Well Drilling

An additional 5 no. wells were drilled at the Wind Farm Site by Peterson Drilling Ltd under the supervision of HES in February 2025. Subsoils extended to depths of 0.4 to 3.5mbgl. The subsoils were described as peat and clay whilst some fill was encountered close to the surface as a result of the construction works associated with the Existing Development. The locations of these monitoring wells are shown in Figure 8-4.

Trial Pitting

A total of 4 no. trial pits were excavated at the Wind Farm Site on 22nd April 2021 in order to investigate in more detail the variation in peat classification and peat strengths and to retrieve peat samples for laboratory analysis. These trial pits were excavated close to T4, T5, T7 and T18, with in-situ shear vane sampling being located at each location. A peat core was also obtained at each location using a Russian Peat Sampler (RPS) (the results of the sampling is presented below – Peat Cores) The trial pits extended to a maximum depth of 1.5m and typically encountered very wet, very soft, fibrous brown peat (acrotelm, upper poorly decomposed layer) over very soft fibrous to amorphous peat (catotelm, lower high decomposed layer (bulk of peat profile)). The RPS logs provided greater detail and classified the peat at 0.5m intervals in accordance with the Von Post humification scale. The results of the trial pit investigations and the associated shear vane testing are presented in Table 4.1 of the PSA (FT, 2026) whilst the TP and RPS logs are included as Appendix A of the PSA for the Existing Development (FT, 2026) (Appendix 8-1).

Peat Cores

Peat core samples were also retrieved at turbine locations across the Wind Farm Site by FT using an RPS (Russian Peat Sampler) between 23rd and 27th April 2021 and all samples were logged in accordance with the Von Post classification of the degree of peat humification. Shear vane test was also carried out at each RPS location to provide shear strength data for the peat descriptions. The RPS logs from the turbine locations are included in Appendix A of the PSA (FT, 2026) (Appendix 8-1).

8.3.3.2.3 A total of 18 no. samples were retrieved at turbine locations and the depth of the RPS sampling ranged from 1.6m at T1 to 3.5m at T3. The degree of humification as determined from the RPS ranged from no humification (H1) within about the upper 0.5m to H9 at depth. In general, there is an increase in humification with depth, which is to be expected, though the gradation in humification with depth will tend to vary at each location depending on the terrain, drainage, and the dominant peatland vegetation. The typical range of humification ranges from H3 to H7. Below about 1.5m depth the humification is dominantly H5 or greater, which would signify a considerable amount of amorphous material is present. About half the RPS results show humification of H8 to H9 at the lower depths. Complete decomposition (H10) is considered rare, as there is invariably some more resistant fibrous material present.

8.3.3.2.4 BMEP Site

A total of 221 no. peat probes have been completed at the BMEP Site. Peat depths ranged from 0.1 to >4.5m, with an average peat depth of 1.47m. Peat at the BMEP Site is relatively shallow with 83% of the completed peat probes recorded peat depths of <3m.

8.3.3.2.5 Summary

In summary, based on the comprehensive geological dataset which has been accrued for the Wind Farm Site, the baseline subsoil geological profile is summarised as follows:

- The Wind Farm Site is overlain by blanket peat, with depths typically ranging from 0.5 to 2m. Although the peat depth is locally variable with areas of shallow and deeper peat (the maximum measured peat depths of 7m are not located in the vicinity of any element of the Prospective Development);
- The deepest peat is located on the flatter areas of the Wind Farm Site which will be avoided by the Prospective Development footprint; and,
- The peat is underlain by a thin layer of mineral subsoil (which ranges in thickness from 0.1 to 0.45m) or weathered bedrock/bedrock.

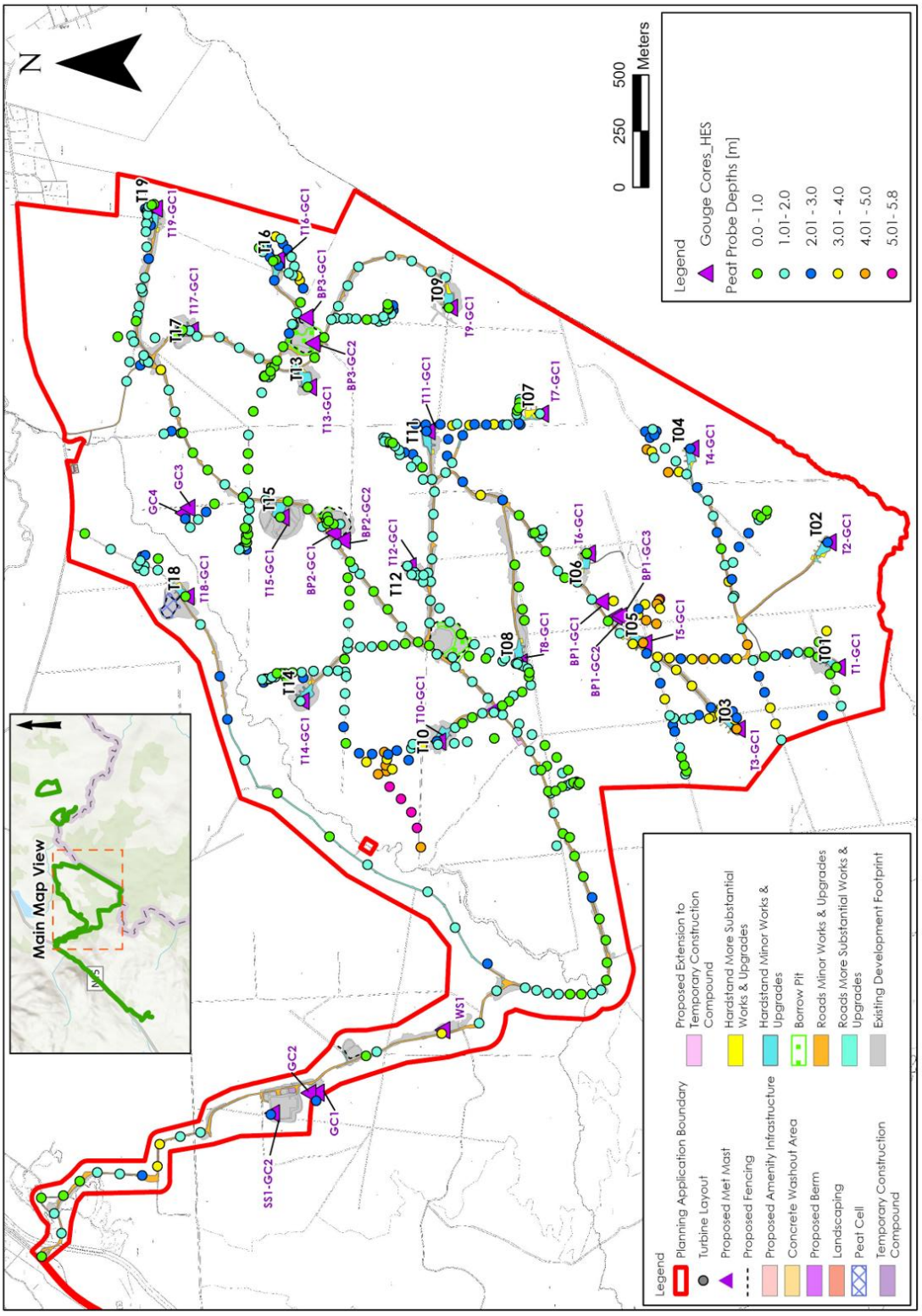

Figure 8-3: Peat Depths at the Wind Farm Site

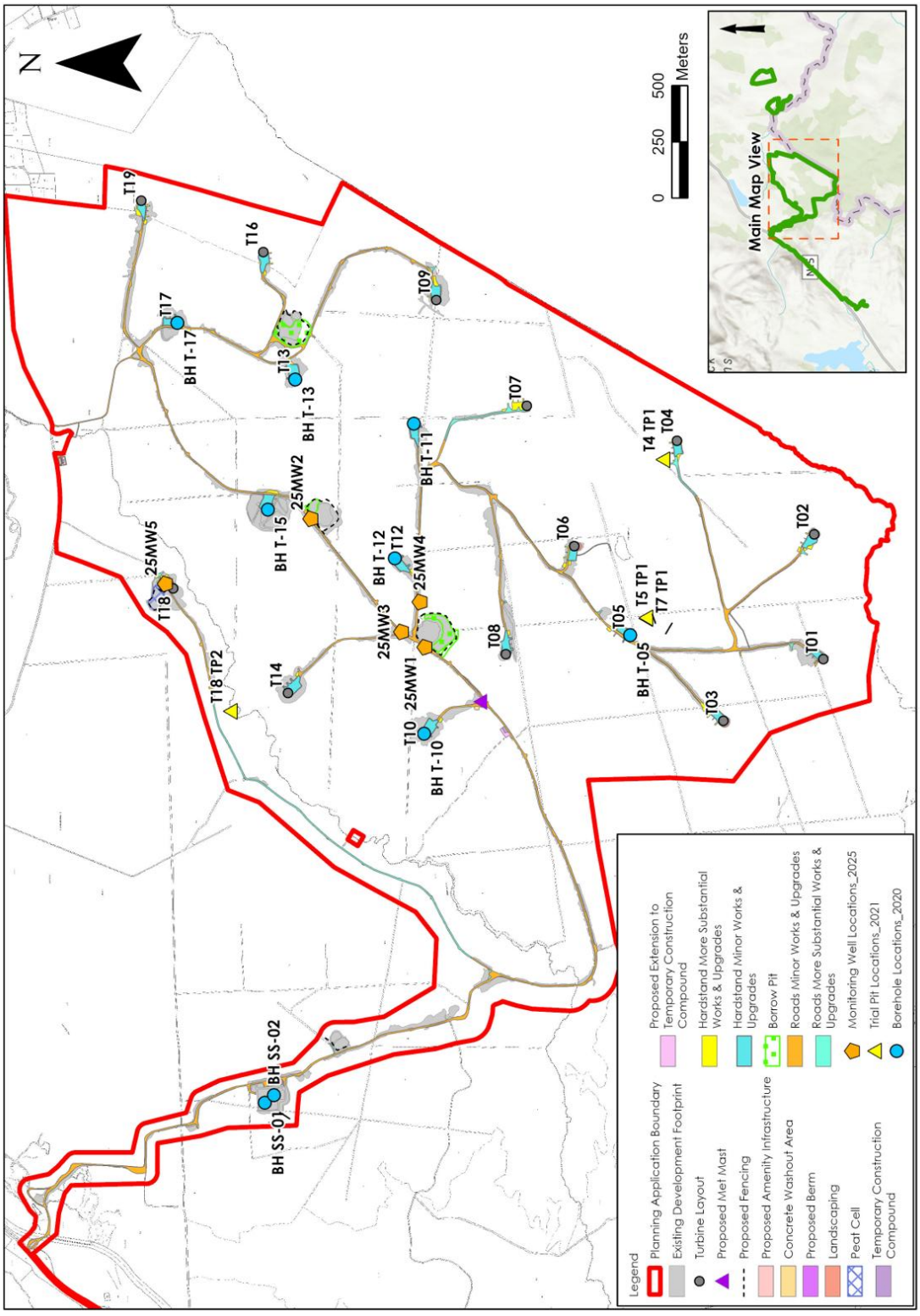

Figure 8-4: Site Investigation Locations

8.3.4 Bedrock Geology

8.3.4.1 Wind Farm Site

Based on the GSI bedrock mapping (www.gsi.ie) the Wind Farm Site is underlain by a total of 3 no. bedrock geological formations.

Much of the Wind Farm Site is underlain by Lough Eske Psammite Formation comprising of feldspathic psammite, quartzite and marble. The southern section is underlain by the Lough Mourne Formation which is noted to comprise coarse and feldspathic pale pink psephites in a pale green chloritic matrix. A small area in the west, at the existing Wind Farm Site entrance, is underlain by the Barnesmore Granite. The Wind Farm Site is underlain by 1 no. mapped structural geological feature. A northeast-southwest orientated fault, referred to as the Barnesmore Fault, is mapped in the vicinity of the Wind Farm Site entrance. A bedrock geology map is shown as Figure 8-5 below.

The GSI map several areas of bedrock outcrop within the Wind Farm Site. This is supported by the site investigations and field observations which revealed the occurrence of shallow bedrock across the Wind Farm Site.

Bedrock is currently exposed at a number of existing borrow pit and road cuttings across the Wind Farm Site, and these exposures generally confirm the mapped geology as outlined above. The bedrock in these exposures was typically noted to be massive and very competent with a thin upper weathered zone at some locations.

2 no. phases of borehole drilling have been completed at the Wind Farm Site.

A total of 9 no. boreholes rotary core boreholes were drilled by IDL at various locations across the Wind Farm Site (at the existing substation location and at 8 no. turbine location) between 18th and 28th May 2020. The depth to bedrock during these site investigations was noted to range from 1.1 to 5.0mbgl. The rock was typically described as very strong thinly foliated bluish to greenish grey fine to medium grained PHYLLITE. The logs associated with these boreholes are included as Appendix A of the PSA (FT, 2026) (Appendix 8-1).

An additional 5 no. wells were drilled at the Wind Farm Site by Peterson Drilling Ltd under the supervision of HES in February 2025. Bedrock was encountered at depths of 0.4 to 3.5mbgl. The bedrock was described as medium strong grey SCHIST underling weak weathered SCHIST. The borehole logs associated with these site investigations are included as Appendix 8-3.

It is noted that the varying descriptive terminology used in the borehole logs (i.e. phyllite and schist) is considered to reflect differences in geological logging interpretation and drilling methodology. Several boreholes were completed using downhole techniques, which yield limited intact material and consequently constrains detailed geological classification. Furthermore, the bedrock at the Wind Farm Site comprises of a metamorphic sequence in which gradational contacts may occur between phyllite and schist. The description of the bedrock encountered on-site correlates with the bedrock formations mapped at the Win Farm Site by the GSI.

8.3.4.2 Grid Connection Site

The northern section of the Grid Connection Site is mapped by the GSI to be underlain by the Lough Eske Psammite Formation. As it passes through the Barnesmore Gap the Grid Connection Site is mapped to be underlain by the Barnesmore Granite. Further to the south, the Grid Connection Site is mapped to be underlain by the Lough Mourne Formation which consists of quartz and feldspar pebbles in a green matrix.

A large northeast to southwest orientated fault, known as the Barnesmore Fault, is mapped to the east of the Grid Connection Site. The GSI also map a tertiary dolerite dyke in the vicinity of the Grid Connection Site in the townland of Barnesmore and ~400m to the north of Clogher 110kV substation.

8.3.4.3 BMEP Site

The BMEP Site is mapped by the GSI to be underlain by the Lough Eske Psammite Formation. The GSI also map areas of bedrock outcrop in the surrounding lands.

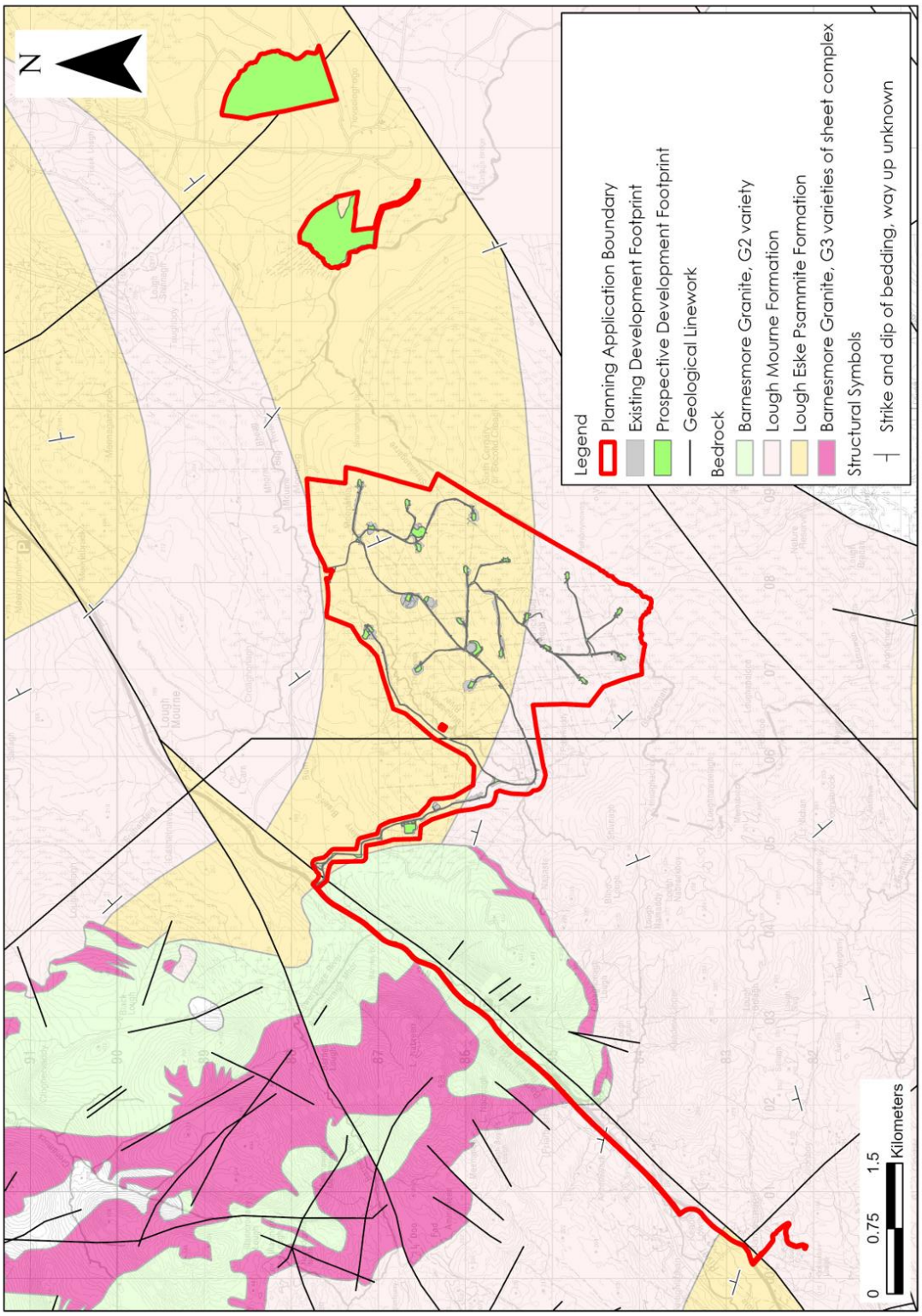

Figure 8-5: Bedrock Geology Map

8.3.5 Geological Resource Importance

8.3.5.1 Wind Farm Site

The GSI Online Database accessed via the Public Data Viewer (www.gsi.ie) does not record the presence of any active quarries or pits within the Wind Farm Site. The closest mapped active quarry is Kiltole Quarry, near Strabane, located ~18.5km to the northeast.

A historic sand and gravel pit is mapped within the Wind Farm Site, immediately to the northeast and southwest of the existing site entrance. This pit is recorded as being active between 1975 and 1995. An application for substitute consent for this quarry is currently with An Coimisiún Pleanála (Planning Reference 318022).

The GSI record several mineral localities to the west of the Wind Farm Site (www.gsi.ie). The presence of gravel is recorded near the Wind Farm Site entrance in the townland of Cashelnavean. The presence of sand and gravel is also recorded at several other localities in the vicinity of the N15 National Road along the Barnesmore Gap. Several occurrences of uranium have also been reported to the west of the N15 National Road, associated with the Barnesmore Granite.

The GSI online Aggregate Potential Mapping Database (www.gsi.ie) shows that the crushed rock aggregate potential of the Wind Farm Site ranges from Very Low to High. Much of the Wind Farm Site is mapped as having Low to Moderate potential with only localised areas of high potential. The bedrock at the Wind Farm Site could be used on a "sub-economic" local scale for construction purposes. The bedrock has been used previously to facilitate the construction of the Existing Development, with several borrow pits now present at the Wind Farm Site.

The vast majority of the Wind Farm Site is not located within an area mapped for granular aggregate potential (i.e., potential for gravel reserves). However, an area in the west is mapped as having Very High potential for gravel reserves in the vicinity of the Wind Farm Site entrance.

The peat and subsoil deposits at the Wind Farm Site can largely be considered to be of "Low" importance due to the largely thin occurrence, given the fact that peat is not designated in this area, and is significantly degraded in most places as a result of forestry plantations and associated drainage.

8.3.5.2 Grid Connection Site

There are no active quarries or active sand and gravel pits mapped in the vicinity of the Grid Connection Site (www.gsi.ie).

The GSI do map the occurrence of several mineral localities along and adjacent to the Grid Connection Site as it passes through Barnesmore Gap. These relate to gravel and sand and gravel deposits in the townland of Cashelnavean. These deposits are of fluvio-glacial origin.

The GSI online Aggregate Potential Mapping Database (www.gsi.ie) shows that the crushed rock aggregate potential at the Grid Connection Site ranges from Very Low to High. The vast majority of the Grid Connection Site is mapped in areas of Very Low or Low potential. The greatest potential is found in the south of the Grid Connection Site in the townlands of Keadew Lower, Keadew Upper and Cullionboy.

Areas of granular aggregate potential are mapped in the vicinity of the Grid Connection Site along the N15 National Road. The greatest potential (Very high) is found in the north, adjacent to the Wind Farm Site. Further to the southwest, Very Low to Low granular aggregate potential is mapped along the Lowerymore River adjacent to the Grid Connection Site.

8.3.5.3 BMEP Site

There are no active quarries, sand and gravel pits or GSI mapped mineral localities in the vicinity of the BMEP Site.

The GSI do map some historic pits to the northeast of the eastern parcel of land proposed for habitat enhancement. These pits date from the early to mid-20th century and are located on the local roads surrounding the local forestry plantations.

The GSI mapped crushed rock aggregate potential of the BMEP Site ranges from moderate to high. These lands are not mapped in an area of granular aggregate potential.

8.3.6 Geological Heritage Sites

8.3.6.1 Wind Farm Site

A small area in the west of the Wind Farm Site is located within the Barnesmore Gap County Geological Site (CGS) (Site Code: DL002). This CGS is recommended as a geological Natural Heritage Area (NHA) and is described as a deep mountain pass running northeast-southwest between Croaghconnellagh and Barnesmore mountains. It is of geological importance due to excellent exposures of glacial channels and moraines. Within the Wind Farm Site ~1.2km of Wind Farm Site access roads are located within or immediately adjacent to this CGS.

There are no other Geological Heritage sites within 5km of the Wind Farm Site.

A map of local geological heritage sites is included as Figure 8-6 below.

8.3.6.2 Grid Connection Site

Approximately ~3km of the Grid Connection Site along the N15 National Road is mapped in the Barnesmore Gap CGS.

Further to the south, approximately 1.2km of the Grid Connection Site and the Clogher 110kV substation are mapped in the Donegal and Inver Bays CGS which is also recommended for designation as a Geological NHA. This CGS is described as a large area of rolling countryside forming the hinterland around Donegal and Inver Bays. The GSI state that this is one of the finest fields of ribbed moraines and drumlins in the country.

Other Geological Heritage sites are mapped within 5km of the Grid Connection Site include:

- Edergole CGS (Site Code: DL014) is located ~4km to the northwest of the Grid Connection Site. This CGS is recommended for designation as a Geological NHA and comprises of a Moorland site to the north of Lough Eske with outcrop along the Corabber River; and,
- Clady River CGS (Site Code: DL007) is located ~4km to the west of the Grid Connection Site and to the west of Lough Eske. This CGS comprises of outcrops in the bed and banks of the Clady River.

8.3.6.3 BMEP Site

There are no geological heritage areas in the vicinity of the BMEP Site.

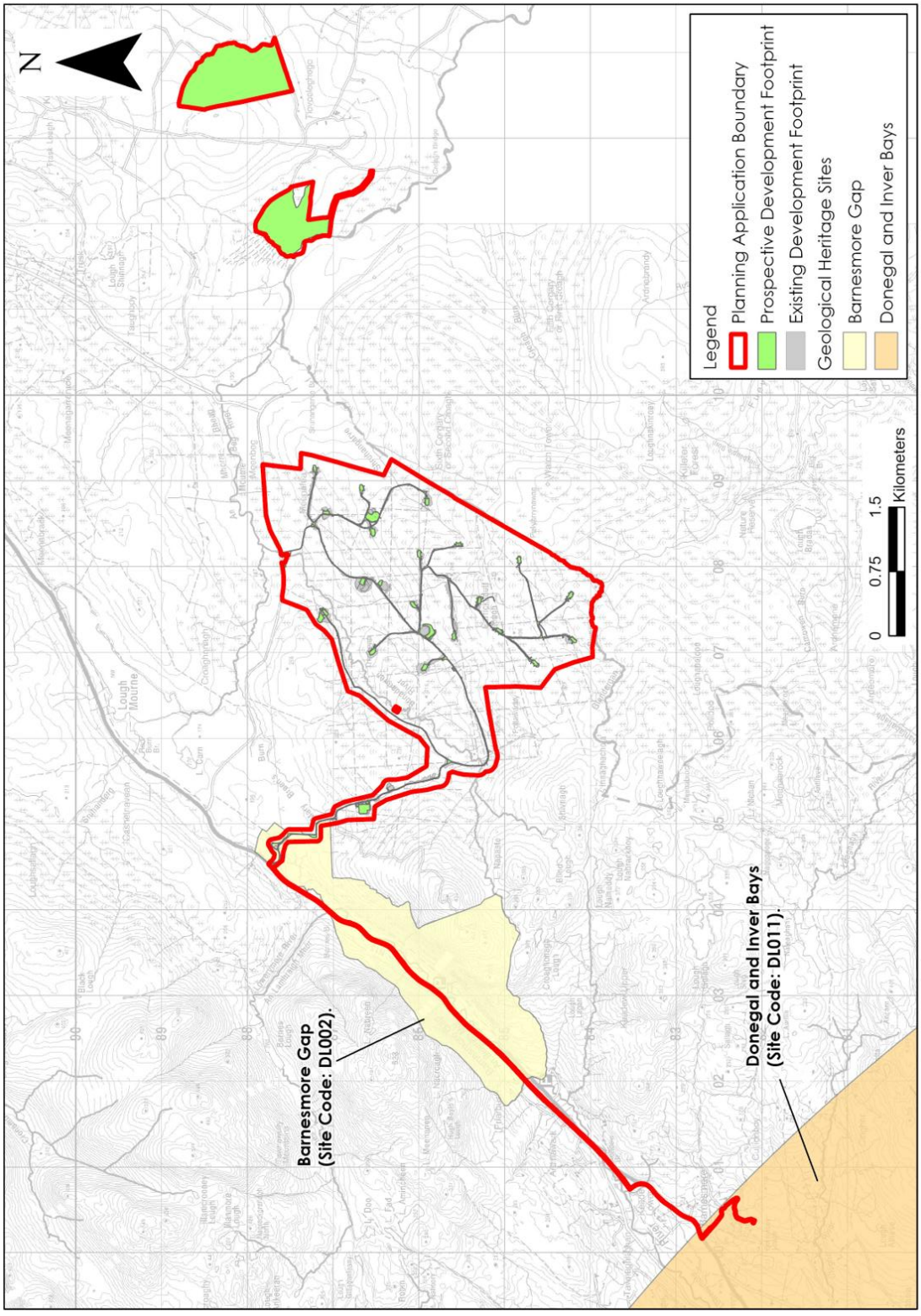

Figure 8-6: Geological Heritage Sites

8.3.7 Soil Contamination

There are no known areas of soil contamination within the Wind Farm Site, the Grid Connection Site or at the BMEP Site. During site walkovers and site investigations, no areas of contamination concern were identified within the Site. Several borrow pits associated with the Existing Development are located within the Wind Farm Site however no contaminated tailings were recorded during the site walkover surveys.

According to the EPA online mapping (www.epa.ie), there are no licensed waste facilities or dump sites located within or in the vicinity of the Wind Farm Site, the Grid Connection Site or at the BMEP Site.

There are no historic mines at or in the immediate vicinity of the Site that could potentially have contaminated tailings.

8.3.8 Peat Stability

8.3.8.1 Desk Study

Wind Farm Site

The GSI record the occurrence of 1 no. landslide within the Wind Farm Site (www.gsi.ie). This event dates from 12th November 2020 and occurred during the construction phase of the Existing Development. This peat slide and the subsequent site inspections are discussed in Section 8.3.8.2.4 below.

The GSI also record an additional historic landslide event to the west of the Wind Farm Site. This event dates from 1963 with the GSI stating that a road cutting was a contributing factor to this historic landslide event (www.gsi.ie).

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring based on the soil type and the slope. The landslide susceptibility of the Wind Farm Site is classified by the GSI (2023) as ranging from "low" to "high" susceptibility, with the higher risk areas corresponding to steeper slopes within the Wind Farm Site.

In terms of the Existing Development, the majority of the infrastructure is mapped in areas of low to moderately low susceptibility. This map is to the scale of 1:50,000 and is therefore superseded by site-specific stability assessments.

Grid Connection Site

The GSI record the presence of an historic landslide event that is mapped ~400m to the southeast of the Grid Connection Site as it passes through Barnesmore Gap.

The GSI Landslide Susceptibility Map (www.gsi.ie) shows that the Grid Connection Site is predominantly mapped in areas low landslide susceptibility. Some areas of moderately high susceptibility are mapped near Clogher 110kV substation and near the Wind Farm Site entrance. The onsite 110kV substation is mapped in an area of moderately low susceptibility. Meanwhile, some areas of high susceptibility are mapped in the surrounding lands as the Grid Connection underground cable route travels along the N15 National Road through the Barnesmore Gap.

BMEP Site

The GSI do not record the presence of any historic landslides within the BMEP Site. The GSI Landslide Susceptibility Map (www.gsi.ie) shows that the BMEP Site is located in areas of low to moderately low landslide susceptibility

8.3.8.2 Prospective Development Peat Stability Risk Assessment

8.3.8.2.1 *Introduction*

A Peat Stability Risk Assessment (PSA) was completed for the Prospective Development by FT (2026). This report is attached as Appendix 8-1.

This PSA was completed following the principles in Peat Landslide Hazard and Risk Assessments (PHLRA): Best Practice Guide for Proposed Electricity Generation Developments (Scottish Executive, 2007).

The following sources of information were used by FT to assess the peat stability at the Wind Farm Site:

- Published records (for example GSI and GSNI landslide databases);
- Historical aerial photography;
- Observations from site inspections in November and December 2020, January 2021, December 2024, and April 2025;
- Ground investigation data (peat strength and depth) at selected locations;
- Detailed site inspections of the 12th November 2020 peat failure;
- Planning and design reports; and,
- Construction records.

8.3.8.2.2 *Walkover Surveys and Site Investigations*

The PSA is informed by the extensive and comprehensive site-specific geological dataset which has been accrued over several phases of site investigations. To date, over 3,400 no. peat depth readings have been taken within the Site. In addition, a series of trial pits and Russian peat samples were taken at various locations across the Site. The data accrued during these site investigations is described in Section 8.3.3.2 above.

8.3.8.2.3 *Minor Peat Failures During the Construction Phase*

In addition to the 12th November 2020 peat slide, there were a number of peat smaller, more localised peat failures at the Wind Farm Site which occurred during the construction of the Existing Development. These failures were generally small and remained with the boundary of the Wind Farm Site.

It is considered that a key contributory factor to these failures was excavated arisings being placed on to the insitu peat surface, particularly on the downslope side of access roads on peat (FT, 2026). The likely cause of failure was excessive loading causing undrained shear failure of the underlying peat leading to progressive downslope failure (FT, 2026). Particular mitigation measures were implemented to ensure that these working practices were prevented from re-occurring.

The effects of these failures were significantly less than that associated with the 12th November 2020 peat slide which is discussed below.

Table 8-4: Summary of Likely Causes of Peat Failures During the Construction Phase (adapted from FT, 2026 – Table 5-1)

Peat Failure Reference No.	Location	Ground Conditions	Likely Cause
1	At BP between T5 and T6	Peat depth of 3m with some exposed mineral soil and shallow rock	Excessive excavated peat being placed on in situ peat resulting in an undrained loading failure of in situ peat. Failure travelled only a short distance.
2	Borrow pit between T5 and T6	Peat depth varied from 0.2 to 1.9m. Shear strength varied from 3kPa to 20kPa, with an average of 6kPa.	Excessive loading due to surcharging of failed debris (1) from previous failure. Downslope run-out distance controlled by forestry furrows.
3	Borrow pit between T5 and T6	Peat depth varied from 0.2 to 1.9m. Shear strength varied from 3kPa to 20kPa, with an average of 6kPa.	Excessive loading of arisings on the downslope side of access road causing undrained shear failure. Downslope run-out distance controlled by forestry furrows.
4	T12	Peat depth varied from 1.5 to 2m. Peat strength varied from 8kPa to 15kPa.	Excessive loading of arisings on the downslope side of access road. Downslope run-out distance controlled by forestry furrows.
5	T5	Peat depth varied from 2.6 to 3.7m. Peat strength varied from 4kPa to 7kPa.	Inappropriate support for T5 excavations which initiated a translation slide within adjacent peat upslope with the onset of tension cracks. Construction of the turbine bae and infilling of excavation stabilised the peat.
6	T16	Peat depth of 1.4m. Peat strength <4kPa.	Loading of the excavated peat onto the peat surface combined with undercutting of slope.
7	S-bends roadworks	Not known	Excessive loading of placed material on peat causing undrained shear failure.

8.3.8.2.4 November 2020 Peat Slide

On 12th November 2020, during the construction of a permitted access road to T7, a significant peat failure occurred at the Wind Farm Site. The works that were underway at the time in the area where the peat slide occurred, were fully permitted and were being undertaken in line with the project design

that had been subject to both Environmental Impact Assessment (EIA) and Appropriate Assessment (AA). A detailed description of the peat failure and the likely mechanism of the failure is provided in the FT report "Meenbog Wind Farm – Assessment of Site with respect to Peat Stability" (FT, 2021) (Appendix 8-2).

Following the November 2020 Peat Slide, the Environmental Protection Agency (EPA) took the lead to ensure that the necessary follow-up investigations were completed and that any required remediation measures were implemented. The EPA engaged the services of ARUP Consulting Engineers, to advise and represent the EPA on the geotechnical and peat stability aspects of the follow-up investigations.

Fehily Timoney and Company (FT) completed a Peat Stability Assessment of the Meenbog Wind Farm Site in August 2021 (Appendix 8-2). The assessment was prepared for the purpose of complying with the EPA's Direction under Regulation 8(1)(b) of the European Communities (Environmental Liability) Regulations 2008. The assessment was completed in accordance with the guidance in the Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Development (PLHRA, 2017). Prior to completion this report was revised to address all issues which arose following several consultations with the EPA. The FT report comprised a site-wide stability assessment, including an overview of the ground conditions at the Site, site investigations, an assessment of the constructed works, a review of the November 2020 peat slide and a qualitative assessment of peat stability. The FT 2021 report is attached as (Appendix 8-2) and is summarised below.

The failure site comprises of upper and lower peat scars. The upper scar, the primary source of the failed material, is located on a flat plateau and has an area of ~2.4ha. The lower scar is rectilinear, ~260m long and ~43m wide, and follows the slope gradient. The head of the lower scar started at the downslope mouth of the upper scar, with the lateral boundaries of the lower scar following pre-existing forestry furrows. The lower scar has an area of ~1.18ha. The total volume of the failure is estimated to be 86,240m^3 (FT, 2021; FT, 2026).

The ground conditions at the failure site have been summarised by FT (2021 and 2025) as follows:

- Blanket peat ranging in depth from 1.5 to >3.5m, with the upper scar having notably deeper peat (average of 2.7m) than the lower scar (average of 1.8m);
- Peat strength in the upper scar ranged from 2 to 19kPa, with an average of 6kPa. The higher vane results in the upper scar are typically at the interface of the base of the peat with the underlying mineral soil, or where roots have caught the vane. If these higher results are ignored, then the undrained shear strength ranges from 2 to 9kPa, with average reducing to slightly less than about 5kPa (note that these results are significantly lower than the site-wide results and would represent a body of very weak peat);
- Peat is underlain by mineral soil (glacial till) or weathered rock; and,
- Bedrock was observed in the floor of the lower scar. In situ testing indicate that around the upper scar bedrock may directly underlie the peat.

The FT (2021) (Appendix 8-2) report provides a number of key contributory factors, and state that for the failure to occur all or at least most of these factors were required to be present. These are notably different from the contributory factors described for the earlier failures at the Wind Farm Site described in the preceding section. The factors are summarized as follows:

- Construction of a floating road;
- Body of very weak, saturated peat upslope of the floating road. This body of weak peat relied for lateral stability on the peat slope upon which the floating road was being constructed;
- Preceding heavy rainfall since June 2020 which was itself preceded by a dry spell in April and May which would have caused shrinking and cracking of the surface acrotelm peat layer. These cracks would have provided a pathway for subsequent rainfall to ingress into the peat body at depth;

- Drainage and surface water ingress into the peat. Drainage ditches in the forestry plantations directed surface water runoff towards the area of very weak peat;
- Topography – the failure initiated at a convex slope (at the location of the floating road) which is commonly cited as the location for peat failures; and,
- Downslope felled forestry on peat comprised of furrows and drains and the failure exploited the existing furrows which are lined of weakness as they have a severed acrotelm layer.

8.3.8.2.5 *Inspection of Existing Development Works*

AFRY Site Inspection (2023)

AFRY Ireland Ltd completed a site inspection of the Site on 19th October 2023 to assess the overall stability of the wind farm from a geotechnical perspective and to assess whether there has been any instability since the 2021 stability assessments.

The Technical Note arising from this site inspection found no evidence of movement at rubine locations or along access roads. Inspections of the borrow pit berms walls indicated that these were in good condition with no visible signs of distress. The Technical Note concluded that:

> "*the overall site is currently stable based upon our assessment of the roads, hardstanding's, borrow pits, peat storage areas and peat stabilisation areas*".

FT Visual Assessments

FT completed detailed inspections in January 2021 and in December 2024 at all construction works areas. Based on visual observations the floating roads showed no evidence of instability with no apparent signs of incipient peat failure. Furthermore, FT note that the floating roads show signs of ongoing settlement which will improve stability over time due to the consolidation of the underlying peat over time (FT, 2026).

With respect to the turbine hardstands, no evidence of instability was recorded. The earlier 2021 site visit noted some small slips/slumps near T16, T5 and T19 but works have been completed at each of these locations to ensure that there is no risk of instability (FT, 2026).

8.3.8.2.6 *Quantitative Peat Stability Analysis and Results*

The peat stability assessment analysed the stability of the natural peat slopes for individual areas of the Wind Farm Site, including at turbine locations and along access roads.

The purpose of the analysis was to determine the 'Overdesign' factor (ODF) of the peat slopes using infinite slope analysis. The analysis was carried out at the turbine locations, along the access roads and at various locations across the site. The 'Overdesign' factor is a measure of the stability of a particular slope, with higher values indicating greater stability; a minimum value of 1.0 is required to confirm stability, in accordance with Eurocode 7, allowing for the in-built partial material and load factors.

For the stability analysis 3 no. load conditions were examined:

- Condition (1): no surcharge loading.
- Condition (2): surcharge of 10kPa, equivalent to 1m of stockpiled peat.
- Condition (3/3a): surcharge of 26kPam equivalent to a 1.3m thick floating access road (1.15m existing plus 0.15m additional surfacing) plus an additional live load of 10kPa (construction traffic). This condition applies to the roads between T01 and T04. Within the BMEP Site this load is reduced to 16kPa (0.8m floating road) with a 10kP

live load. Condition 3a applies to the drained load, where the dead load form the road is applied but no live load is included in the analysis.

Undrained Analysis

An undrained analysis was carried out, which applies in the short-term during construction. The undrained analysis for load condition 2 is considered the most critical load case across the majority of the Site as most peat failures occur in the short term upon loading of the peat surface. Load condition 3 is considered to be the worst case for the sections of floating road within the Site. Analyses were also undertaken for the proposed BMEP Site, where load condition 1 and 2 were assessed, along with a reduced load version of load condition 3. All of these results had an ODF of >1.0 for both load conditions analysed (1 and 2). The results are summarised below.

The calculated ODF for load condition 1 is in excess of 1.0 at all of the 259 no. locations analysed with a range of ODF of 1.03 to 327.41, indicating a low risk of peat instability.

The calculated ODF for load condition 2 is in excess of 1.0 for 258 of the 259 no. locations analysed with a range of ODFs of 0.8 to 135.57, again indicating a generally low risk of peat instability. One location recorded a value of 0.8 to the southwest of T07, in an area of deep peat where no development is proposed.

For the areas of existing floating road where an additional surfacing layer is required, an additional specific stability analysis has been undertaken (load condition 3). This takes the assumption that the existing floating road has a thickness of 1.15m, equating to a static load of 23kPa, and that an additional 0.15m of material will be placed on top, increasing the static load on the peat from 23kPa to 26kPa. A worst-case live load for a 750 tonne crane has been added to this, equating to an additional 10.3kPa load. For this case, only data points directly below the road have been considered. However, the original shear strength values have been used, which were taken before the road was constructed. For the locations directly below the road an increase in the shear strength of the peat can be expected over time due to the effect of the static load of the road compressing the peat.

A small number of results are <1.0 for these areas (9 results from a total of 68 within the Wind Farm Site), located mainly along the floating road to T04. All of the results from the BMEP Site were >1.0.

All sections of floating roads will be proof tested prior to any turbine deliveries to site to check the stability of floating roads under a live load. For the locations around the section of floating road at the T01 and T02/T04 junction, a stabilising berm will be constructed downslope of the road to act as a mitigation measure to provide additional resistance to peat movement. No peat instability is anticipated in this area as a result of the Prospective Development works following these mitigation measures.

Drained Analysis

The drained loading condition examines the effect of in particular, rainfall on the existing stability of the natural peat slopes and represents the peat stability in the post construction phase of the development.

The calculated ODF for load condition 1 is in excess of 1.0 for all of the 259 locations analysed with a range of ODF of 1.35 to 141.73, indicating a relatively low risk of peat instability in the long term.

The calculated ODF for load condition 2 is in excess of 1.0 for 255 of the 259 locations analysed with a range of ODF of 0.82 to 94.49, indicating a low risk of peat instability. One of the low ODF results was recorded along the main spine road, two close to T06 and one close to T17. No side casting is proposed as part of the Prospective Development at any of these areas, and as such this condition should not arise.

For the areas of existing floating road where an additional surfacing layer is required, an additional specific stability analysis has been undertaken. This takes the assumption that the existing floating road has a thickness of 1.15m, equating to a static load of 23kPa, and that an additional 0.15m of material will be placed on top, increasing the static load on the peat from 23kPa to 26kPa. As this is a drained (long term) assessment, no live loading was included in the assessment. This stability assessment assumes that the peat is fully saturated (groundwater is at ground level). A significant number of results (14 of 66) recorded an ODF <1.0, with a range of 0.63 to 3.16. The ODF results of <1.0 were along the roads to T02 and T04. A separate slope stability analysis was undertaken for each of these access roads and is reported below. It should be noted that each of these floating roads has already been used in the construction of the Existing Development without failures occurring.

Table 8-5: Factor of Safety Limits for Slopes.

Factor of Safety	Degree of Stability
Less than 1	Unstable
1.0 or greater	Acceptable

Floating Road Stability Analysis

A slope stability assessment using SlopeW software was undertaken at each location where a low ODF (<1.0) has been calculated. For this stability analysis, the live load from the crane is taken at the top of the road, which is the equivalent of a 21kPa load acting over a 3m wide section of the road. This is applied to the undrained case only, as the load is transient and as such does not apply to the drained (long-term) case.

For the undrained condition, this additional analysis reported an ODF >1 was recorded at all locations.

8.3.8.2.7 *Summary of PSA*

The findings of the peat assessment showed that the Prospective Development will have a low risk of peat failure. The findings include mitigation and monitoring measures (refer to Section 8.5.2.9) for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.

8.3.9 Receptor Importance and Sensitivity

This section discusses the sensitivity of the receiving land, soils and geological environment in terms of the Prospective Development and identifies those sensitive receptors which will be carried forward into the impact assessment.

Based on the criteria set out in Table 8-2 above, the soils and peat at the Wind Farm Site, the Grid Connection Site and at the BMEP Site can be classed as being of low importance as the overlying peat deposits are not designated in this area. Furthermore, the soils at the Wind Farm Site and at the BMEP Site are significantly degraded as a result of the commercial forestry operations.

The bedrock geology underlying the Wind Farm Site, the Grid Connection Site and the BMEP Site can be classed as being of medium importance where the bedrock could be used on a sub-economic scale.

The Barnesmore Gap CGS in the west of the Wind Farm Site and the Donegal and Inver Bays CGS along the Grid Connection can be considered as being of high importance due to their designations as county geological heritage sites.

Based on the preceding desk study, site investigations and characterisation of the baseline environment, the following receptors will be included in the impact assessment:

- The land at the location of the Prospective Development;
- The peat, soils and subsoils at the location of the Prospective Development;
- The underlying bedrock geology;
- Peat stability at the Wind Farm Site and the BMEP Site, and;
- The Barnesmore Gap CGS.

Note that the Prospective Development does not include any works at the Grid Connection Site. Therefore, the land, soils and geological environment at the Grid Connection Site has been screened out of the impact assessment. Similarly, the Donegal and Inver Bays CGS was screened out of the impact assessment. The Prospective Development has no potential to impact this CGS due to the lack of works at the Grid Connection Site.

8.4 Characteristics of the Prospective Development

The Prospective Development comprises of the permission to complete the construction, operation and decommissioning of the Meenbog Wind Farm.

The Prospective Development is described in full in Chapter 4 of this EIAR. It is worth noting that the works are relatively minor in nature and do not require extensive groundworks, as the majority of the wind farm civil works have been completed under the Existing Development.

The main characteristics of the Prospective Development that could affect the land, soils and geological environment are:

- The completion of upgraded access junctions, tracks and roads, and new site access roads;
- The completion of wind turbine and meteorological mast foundations and hardstand areas;
- Erection of 19 no. wind turbines;
- Completion of internal wind farm underground ducting and cabling;
- Expansion of existing temporary construction compound;
- Expansion of existing borrow pits,
- Peat management areas and landscaping;
- Forestry felling;
- Site drainage and sediment control measures;
- Biodiversity management and enhancement measures (including peatland restoration and hen harrier enhancement areas);
- Public amenity area;
- Operational stage site signage; and
- All associated site development and ancillary works.

8.4.1 Peat and Spoil Management

A Peat and Spoil Management Plan (PSMP) has been prepared by FT (FT, 2026) for the Prospective Development (refer to Appendix 4-2). The information below is a summary of the information presented in the PSMP.

The quantity of peat and spoil generated and requiring management on the site of the Prospective Development has been calculated, as presented in Table 8-6 below.

All excavated peat and soil will be transported immediately on excavation to the designated peat management areas. No material will be side cast or stored on the in-situ peat on either side of the access roads/hardstands. Some of the peat will be used for landscaping purposes around turbine bases, hardstands and underground cabling. Sufficient space has been identified across the Wind Farm Site for the volume of pet and spoil to be excavated. The locations of the proposed peat and spoil management areas are detailed in Table 8-7.

Table 8-6: Peat, spoil and Stone Volumes

Infrastructure Element	Peat Volume (m^3)	Spoil Volume (m^3)
19 no. Turbines and Hardstands	29,100	500
Access Roads	27,300	-
Borrow Pits	14,700	1,500
Berm at T01/T02	3,900	500
Temporary Compounds	1,350	
Amenity Area	250	-
Total	76,600	**2,500**

Table 8-7: Peat and Spoil Management Areas on Site

Location	Peat and Spoil Volume (m^3)
Peat Cell at T18	8,700
Existing Borrow Pit (BP1)	31,700
Existing Borrow Pit (BP2)	5,500
Existing Borrow Pit (BP3)	99,500
Landscaping	4,600
Total	150,000

8.4.2 Stone Volume Requirements

The construction of the Prospective Development will require the removal and excavation of bedrock. The estimated amount of bedrock required is 74,180m^3. Table 8 8 below presents the stone volume requirements for the Prospective Development, excluding the final binding layer to be imported of approximately 8,000m^3.

Table 8-8: Stone Volume Requirements

Infrastructure Element	Stone Volume (m^3) [1]
19 no. Turbines and Hardstands	25,950
Access Roads (including cabling)	33,350
Met Mast	280
Berm at road T01/T02	5,500
T04 floating road replacement	5,000
T7 Access Road	1,700
Forestry access tracks at BMEP Site	2,400
Total	74,180

8.5 Assessment of Significant Effects and Mitigation Measures

8.5.1 Do-Nothing Scenario

The 'Do-Nothing' alternative is an alternative scenario to retaining and regularising the Existing Development. In this scenario, the Existing Development will remain in-situ as an unauthorised and partially completed wind farm, which is, in effect, the "Do-Nothing" alternative insofar as it represents the current situation as at the date of the application for substitute consent.

There would be no direct negative environmental effects as a result of implementing the "Do-Nothing" alternative. However, by implementing this 'Do-Nothing' alternative, the opportunity to capture a significant part of the country's renewable energy resource by completing the Meenbog Wind Farm (subject to appropriate planning consents) would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would also be lost. Furthermore, the opportunity to implement the proposed biodiversity enhancement measures would be lost. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan for details. Under the "Do-Nothing" alternative the opportunity to put in place the community benefit scheme proposed as part of the Prospective Development would also be lost.

8.5.2 Construction Phase – Assessment of Effects and Mitigation Measures

The likely significant effects of the construction phase of the Prospective Development and mitigation measures that will be put in place to eliminate or reduce them are shown in this section. It should be noted that the main potential effects on the land, soils and geological environment will occur during the construction phase.

[1] *Note: A contingency factor of 10% has been applied and is included to the excavated spoil volumes above to allow for expected increase in volume upon excavation and to allow for a variation in ground conditions across the Prospective Development site.*

It is also worth noting that the works associated with the Prospective Development are relatively minor in terms of renewable energy developments. Given the nature of the construction phase of the Prospective Development (which comprises of the works required for the completion of the construction of Meenbog Wind Farm, of which the majority of the significant earthworks have already been completed), the potential for effects on the land, soils and geological environment is reduced due to the small scale of the proposed earthworks and the limited construction time in comparison to larger projects. Many of the site roads and tracks, hardstand areas, turbine foundations required for the Meenbog Wind Farm have already been completed as part of the Existing Development.

The impact assessment presented below relates to the works which will be completed at the Wind Farm Site and the BMEP Site (Section 8.5.2.11). Note that the construction of Grid Connection and the onsite 110kV substation have already been completed as part of the Existing Development. The Prospective Development does not include any construction works along the Grid Connection Site.

8.5.2.1 Potential Effects on Land (Land-Take)

The Prospective Development includes the completion of 5 no. turbine foundations, the completion and upgrade of all existing hardstands, completion of the internal road network (including road widening, road upgrades, turning heads, passing bays and construction of new roads), construction of a met mast, expansion of the existing borrow pits and peat storage areas and the expansion of the temporary construction compound southeast of T10. The footprint of the Prospective Development infrastructure to be constructed is 22.9ha.

These works will result in a change in the land environment within the Wind Farm Site whereby forestry and peatland will be replaced by hardstand and access roads. For example, permanent tree felling (~8.273ha) is required for the construction of the Prospective Development.

The Prospective Development construction works will also result in local topographic changes with the removal of overburden at the Prospective Development works locations.

There will be no effects on the lands adjoining the Wind Farm Site. Note that the effects associated with the BMEP Site are assessed separately in Section 8.5.2.11.

The excavation of the internal underground cabling within the Wind Farm Site will result in the excavation of a narrow trench to accommodate the cabling. This trench will be reinstated once the cabling is emplaced with a comparable ground surface (gravel or subsoil/topsoil). Therefore, no significant effects on land or landuse will occur in these areas.

The works at the onsite 110kV substation have already been completed. In addition, the works at the Grid Connection Site have also been completed. There will therefore be no potential for effects on land associated with the Grid Connection.

Pathways: Excavation and infrastructure construction.

Receptors: Land (i.e. land upon which the Prospective Development will occur).

Pre-Mitigation Potential Effect: Negative, slight, direct, permanent, likely effect on land (land-take) within the Wind Farm Site. In the absence of mitigation measures, there will be no potential for significant effects on land at the Wind Farm Site.

Mitigation Measures / Impact Assessment:

Following the construction phase, areas of the Wind Farm Site will be replaced by hardstand areas with a permanent development footprint of 22.9ha. This represents a change in landcover of ~2.2% across the entire Site (1,018ha).

The loss of coniferous forestry (8.273ha) and peatland (19.03ha) will not have a significant effect on land at the Wind Farm Site due to the small footprint of the Prospective Development. The loss of this land is minimal on a local and regional scale and therefore, the effects of land loss is negligible. The loss will be offset by the works proposed as part of the proposed BMEP Site (refer to Section 8.5.2.11 and the Biodiversity Management and Enhancement Plan included as Appendix 6-4 of this EIAR).

All felling operations will be completed in line with the Forest Service's published policy and will be subject of a Limited Felling Licence (LFL). The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the footprint of the infrastructure developments. Therefore, while the loss of coniferous forestry will be a permanent change to the land at these locations, all forestry lost will be replaced elsewhere within Ireland as per the Forest Service felling policy.

Given the undulating nature of the local topography resulting from the quaternary deposits, any change in topography is likely to be minimal in the overall landscape.

The change in the land environment will be consistent with baseline trends i.e. a significant amount of the works for Meenbog Wind Farm have already been completed and the footprint of the Existing Development at the Wind Farm Site is 32.6ha.

Post-Mitigation Residual Effect: The residual effect will be a negative, direct, slight, likely, permanent effect on land and landuse.

Significance of Effects: For the reasons outlined above (small development footprint), no significant effects on land (land-take) will occur.

8.5.2.2 Potential Effects from the Excavation and Disturbance of Peat and Subsoil

The peat and subsoils at the Wind Farm Site can be classified as of "Low" importance. The effect is the disturbance and relocation of 79,100m^3 of material (76,600m^3 of pat and 2,500m^3 of spoil). Estimated volumes of peat and spoil to be relocated are summarised above in Table 8-6 above. It is noted that the construction of the Existing Development has resulted in the removal and excavation of 450,900m^3 peat and spoil at the Wind Farm Site to date. The excavation of material for the Prospective Development would therefore be consistent with the baseline trends.

There will be no loss of peat or spoil from the Site, as it will be accommodated within the identified designated peat and spoil management areas (refer to Table 8-7). Peat and spoil will also be used for landscaping at the proposed turbines and along access roads where appropriate.

No excavation of soils/subsoils will be required at the Grid Connection Site as works associated with the Grid Connection have already been completed.

Pathway: Extraction/excavation.

Receptor: Peat, subsoil and bedrock within the Wind Farm Site.

Pre-Mitigation Potential Effect: Negative, slight/moderate, direct, likely, permanent effect on peat and subsoils due to relocation within the Wind Farm Site. In the absence of mitigation measures, there will be no potential for significant effects on peat and subsoils at the Wind Farm Site.

Proposed Mitigation Measures by Design:

All work will be in accordance with the Peat and Spoil Management Plan detailed in Appendix 4-2 of the EIAR. The site layout design has been iteratively developed using comprehensive site-specific site investigation dataset, which includes peat probes, gouge cores and trial pits.

Wind Farm Site

It is proposed to manage any excess overburden generated through construction activities locally within the Site, in identified peat spoil management areas (peat cell at T18, used to reinstate the 3 no. existing borrow pits), and landscaping in the vicinity of turbine hardstand areas and along access roads where appropriate.

The total capacity of the identified spoil management areas and landscaping within the Site is approx. 150,000m^3 and therefore, there is more than enough capacity to manage the total volume of peat and spoil requiring management for the Prospective Development.

The following recommendations and best practice guidelines for the placement of peat and spoil in identified spoil management areas and in landscaping will be adhered to during the construction of the Prospective Development (note that the backfilling and reinstatement of the borrow pits is addressed separately in Section 8.5.2.7 :

- The placement of peat within the peat cell will require the use of long reach excavators;
- The surface of the placed peat will be shaped to allow efficient run-off of surface water. Shaping of the surface of the peat/spoil will be carried out as placement of peat within the peat cell progresses. This will reduce the likelihood of debris run-off and reduce the risk of instability of the placed peat;
- The acrotelm will be placed on the finished surface with the vegetation part of the sod facing the right way up (where practicable) to encourage growth of plants and vegetation at the surface of the placed peat and spoil within the placement areas.
- Supervision by the Project Geotechnical Engineer is required for the development of the peat cell.

Post Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be negative, slight to moderate, direct, likely, permanent effect on soils and subsoils due to disturbance and relocation within the Wind Farm Site.

Significance of Effects: For the reasons outlined above, no significant effects on soils, subsoils or bedrock will occur.

8.5.2.3 Potential Effects from the Contamination of Soil and Bedrock by Leakages and Spillages of Hydrocarbons

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a pollution risk at the Wind Farm Site. The accumulation of small spills of fuels and lubricants during routine plant use can also be a significant pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects (i.e. contamination of soils, subsoils and pollution of the underlying aquifer) on the geological and water environment, depending on where a spill may occur. Additionally, waste tar, removed from the roads has the potential to affect soil/subsoil geochemistry.

Pathway: Subsoil and underlying bedrock pore space.

Receptor: Soils, Subsoil and bedrock.

Pre-Mitigation Potential Effect: Negative, slight, direct, short-term, unlikely effect on soils, subsoils and bedrock. In the absence of mitigation measures, there will be no potential for significant effects on soils, subsoils and bedrock at the Wind Farm Site.

Proposed Mitigation Measures:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station;
- On-site re-fuelling will be carried out at designated refuelling areas at various locations throughout the Wind Farm Site. Heavey plant and machinery will be refuelled by a fuel truck that will come to the Wind Farm Site as required. Other refuelling will be carried out using a mobile double skinned bowser which will be parked on a level area on-site when not in use;
- Only designated trained operatives will be authorised to refuel plant on-site;
- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- The temporary construction compound will include a bunded refuelling and containment area for the storage of oil, lubricants and site generators etc, and full retention oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency response plan for the construction phase to deal with accidental spillages is contained within the Construction and Environmental Management Plan (which is contained in Appendix 4-3).

Post Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be a negative, imperceptible, direct, short-term, low unlikely effect on soils, subsoils and bedrock.

Significance of Effects: For the reasons outlined above, and with the implementation of the listed mitigation, no significant effects on soils, subsoils and bedrock will occur.

8.5.2.4 Potential Effects from Wastewater Disposal

Release of effluent from on-site temporary wastewater treatment systems has the potential to contaminate soils, subsoils and bedrock. The potential for effects are limited due to the small volumes of wastewater to be held on site during the construction phase, the temporary nature of the welfare facilities and the low to medium importance of receiving soils and geological environment.

Pathway: Subsoil and underlying bedrock pore space.

Receptor: Soils, Subsoil and bedrock.

Pre-Mitigation Potential Effect: Negative, slight, direct, short-term, unlikely effect on soils, subsoils and bedrock. In the absence of mitigation measures, there will be no potential for significant effects on soils, subsoils and bedrock at the Wind Farm Site.

Mitigation Measures:

- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the Wind Farm Site construction compounds, maintained by the providing contractor, and removed from site on completion of the construction works;
- Welfare facilities are also present at the existing onsite substation (constructed as part of the Existing Development). Wastewater is stored in an underground tank and is removed by a licenced contractor. These facilities will also be used during the construction of the Prospective Development;

- Water supply for the Wind Farm Site offices and other sanitation will be brought to Wind Farm Site and removed after use, to be discharged at a suitable off-site treatment location; and,
- No water or wastewater will be sourced on the Wind Farm Site, nor discharged to the Wind Farm Site.

Post Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be a negative, imperceptible, direct, short-term, low unlikely effect on soils, subsoils and bedrock.

Significance of Effects: For the reasons outlined above, and with the implementation of the listed mitigation, no significant effects on soils, subsoils and bedrock will occur.

8.5.2.5 Potential Effects from the Erosion of Exposed Peat and Subsoils During Civil Works

Erosion of soil/subsoil by the pathways listed below, can have the effect of reducing the overall volume of soil/subsoil at the Wind Farm Site, with the potential for some eroded subsoils to reach watercourses, leading to water quality issues such as high turbidity. Erosion of soils/subsoils may occur at any works area where excavation is ongoing, i.e. hardstand areas, access roads and felling areas within the Wind Farm Site.

The main impacts associated with this aspect is to the water environment, and therefore this aspect is further assessed in detail in Chapter 9 of this EIAR. The potential for significant effects on the land, soils and geological environment is significantly reduced due to the low importance of soils/subsoils at the Wind Farm Site which are already degraded and due to the fact that the majority of the civil works required for the construction of the Wind Farm were completed under the Existing Development.

Pathway: Vehicle movement, surface water and wind action.

Receptor: Soils and subsoils.

Pre-Mitigation Potential Effect: Negative, slight, direct, short-term, likely effect on soils and subsoils by erosion and wind action. In the absence of mitigation measures, there will be no potential for significant effects on soils and subsoils at the Wind Farm site.

Proposed Mitigation Measures:

- Soil/subsoil removed from the excavation locations will be used for landscaping, placed/spread locally alongside the excavation or will be stored in the designated peat and spoil management areas.
- Temporary drainage systems will be required to limit runoff impacts during the construction phase (refer to Chapter 9 Section 9.4.1).
- In forestry areas, brash mats will be used to support vehicles on soft ground, reducing soil erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting.

Post Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be a negative, slight, direct, short-term, likely effect on subsoils by erosion and wind action.

Significance of Effects: For the reasons outlined above, no significant effects on soils or subsoils will occur.

8.5.2.6 Erosion of Exposed Peat, Soils and Subsoils During Felling

Tree felling is a component of the Prospective Development, with ~8.6ha of permanent felling of within the Wind Farm Site, with an additional ~3.5ha of temporary felling.

During felling operations there is a high likelihood of erosion due to the distance of soils and subsoils associated with vehicle and plant movements. This also has associated potential effects on the water environment; and therefore as a result, this aspect is assessed in further detail in Chapter 9 of this EIAR. The potential for effects is limited given the small area proposed to be felled and the degraded nature of the existing soils/subsoils at the Wind Farm Site.

Pathway: Vehicle movement, surface water and wind action.

Receptor: Soils, subsoil and weathered bedrock.

Pre-Mitigation Potential Effect: Negative, slight, direct, permanent, likely effect on soils, subsoils and weathered bedrock due to felling operations. In the absence of mitigation measures, there will be no potential for significant effects on soils, subsoils and weathered bedrock at the Wind Farm Site.

Proposed Mitigation Measures:

All proposed felling works will be completed in accordance with the best practice Forest Service regulation, policies and strategic guidance documents as well as Coillte and DAFM guidance documents to ensure that felling results in minimal potential negative effects on the local soil and subsoil environment.

In addition, the following mitigation measures will be implemented during felling operations:

- Before any works are completed silt fences will be installed to limit the movement of entrained sediment in surface water runoff;
- The harvester and the forwarder are designed specifically for the forest environment and are low ground pressure machines;
- All machinery will be operated by suitably qualified personnel;
- These machines will traverse the Site along specified off-road routes (referred to as racks);
- Brash mats will be placed on the racks to support the vehicles on soft ground, reducing mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur;
- As felling progresses, the harvester will collect brash produced by the felling and place it in front of the machine before it advances forward along the rack;
- The condition of the racks will be continually monitored and fresh brash will be applied when the brash mat becomes heavily used and worn, ensuring that the mat remains effective throughout the operational phase; and,
- The location of racks will be chosen to avoid wet and potentially sensitive areas.

Post Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be a negative, imperceptible, direct, permanent, unlikely effect on soils, subsoils and weathered bedrock.

Significance of Effects: For the reasons outlined above, and with the implementation of the proposed mitigation measures, no significant effects on soils, subsoils or bedrock will occur.

8.5.2.7 Potential Effects from the Extension and Reinstatement of the Borrow Pits

It is estimated that ~74,180m^3 of stone will be required for the construction of the Prospective Development. Continued use and/or extension of excavation works at these locations are proposed as part of the Prospective Development.

Rock will be extracted from the borrow pits by blasting and will be stockpiled or used as required.

Upon removal of the required volumes of rock from the borrow pits, they will be reinstated using excavated peat and spoil.

Pathway: Extraction.

Receptor: Bedrock.

Potential Pre-mitigation Effect: Negative, irreversible, direct, moderate, likely, permanent effect on bedrock.

Mitigation Measures / Impact Assessment:

Bedrock extraction will result in a direct impact on the local geological environment.

The bedrock in the local area is of medium importance with the potential to be used on a sub-economic scale. The rock for the Prospective Development will be sourced from the existing footprint of 2 no. borrow pits (BP1 and BP2) or from the lateral expansion of BP3. These borrow pits have already been used in the construction of the Existing Development, demonstrating the suitability and viability of the rock for extraction.

The proposed bedrock extraction is considered to be an acceptable and unavoidable part of the Prospective Development. The volume to be extracted is minor in comparison to the total volume of rock extracted to date for the construction of the Existing Development.

All effects will be localised within the proposed extraction areas (BP1, BP2 and BP3). The borrow pits have a combined area of 5.12ha which represents a very small area (0.57%) of the overall Wind Farm Site (901.91ha).

Therefore, no specific mitigation measures in relation to excavation of bedrock are required.

The rock to be quarried is not notable from a geological heritage point of view.

The following mitigation measures are prescribed in relation to the excavation and reinstatement of the borrow pits:

- Peat and overburden will be removed and stored within the void at the existing borrow pits;
- Slopes within the excavated rock formed around the perimeter of the borrow pits will be formed at stable inclinations to suit local in-situ rock conditions. Exposed sections of the rock slopes will be left with irregular faces and declivities to promote re-vegetation and provide a naturalistic appearance;
- The stability of the rock faces within the borrow pits will be inspected by the Project Geotechnical Engineer upon excavation to ensure stability during construction works and in the long term;
- Rock buttresses will be constructed within BP3, founded on in-situ rock to create individual cells. The cells will be opened in sequence and filled as needed;

- A rock buttress to form cells within the borrow pit will be required to ensure access for trucks and excavators. This will be formed by leaving in place an upstand of intact rock as the borrow pit excavation is progressed;
- Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress. The contractor excavating the rock will be required to develop the borrow pit in a way which will allow the excavated peat and spoil to be reinstated safely;
- The surface of the placed peat and spoil will be shaped to allow efficient run-off of surface water from the placed arisings towards the perimeter of the borrow pit.;
- Surface water and groundwater drainage controls will be implemented at the borrow pits as detailed in Chapter 9 of this EIAR; and,
- The development of the borrow pit will be supervised by the Project Geotechnical.

Post Mitigation Residual Effects: While the bedrock which will be removed is considered to be of medium importance, these bedrock formations are also present outside of the Wind Farm Site within the local area. The residual effect is considered to be negative, irreversible, slight, direct, likely, permanent effect on bedrock.

Significance of Effects: For the reasons outlined above, no significant effects on the local bedrock will occur.

8.5.2.8 Potential Effects on Geological Heritage Sites

As detailed in Section 8.3.6, the Barnesmore Gap County Geological Site (CGS) (Site Code: DL002) overlaps with the northwest of the Wind Farm Site. The only existing wind farm infrastructure which overlaps with this CGS is ~1.2km of existing wind farm access roads. The works associated with the Prospective Development which overlap with the CGS comprise of minor roadworks and road upgrades comprising of road widening and the application of a surface dressing to the existing road surface.

All Grid Connection works have already been completed and therefore there is no potential for effects on the Barnesmore Gap CGS or the Donegal and Inver Bays CGS.

Pathway: Excavation/removal of overburden.

Receptor: Geological Heritage Sites -Barnesmore Gap CGS.

Pre-Mitigation Potential Effect: There is no potential for significant effects on the Barnesmore Gap CGS.

Mitigation Measures / Impact Assessment:

No specific mitigation measures are required with respect to the CGS. The Wind Farm Site is located at the northern periphery of this large CGS which has a total area of 577ha. The works associated with the Prospective Development which overlap with the CGS are minor and will be completed in a short time period (road widening and road surfacing works). Nevertheless, standard mitigation measures with respect to earthworks (Section 8.5.2.2), erosion (Section 8.5.2.5), hydrocarbons (Section 8.5.2.3) and wastewater (Section 8.5.2.4) will be implemented.

Post Mitigation Residual Effects: Given the scale and nature of the works which overlap with the mapped extent of the CGS, the residual effect will be a negative, imperceptible, direct, long-term effect on the Barnesmore Gap CGS.

Significance of Effects For the reasons outlined above, there is no potential for significant effects on the Barnesmore Gap CGS or the Donegal and Inver Bays CGS.

8.5.2.9 Potential Effects of Peat Instability and Failure

Peat instability and failure are risks at the Wind Farm Site during the construction phase and are assessed herein.

Peat instability is not considered to be a risk along the Grid Connection as all works have already been completed. Peat stability analysis was completed for the BMEP Site with all analyses having an acceptable standard of safety.

A Peat Stability Risk Assessment was carried out for the main infrastructure elements at the Wind Farm Site. This approach takes into account guidelines for geotechnical/peat stability risk assessments as given in PLHRAG (2017) and MacCulloch (2005).

Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse impact on the Proposed Wind Farm and the surrounding environment. The potential significant effects of peat failure at the Site may result in:

- Death or injury to site personnel;
- Damage to machinery;
- Damage or loss of infrastructure;
- Drainage disruption by blockage of drainage pathway by relocated peat and spoil;
- Site works damaged or unstable;
- Contamination of watercourses, water supplies by particulates; and,
- Degradation of the peat environment by relocation of peat and spoil.

However, the findings of the PSA (FT, 2026) showed that all of the Prospective Development infrastructure elements are located in areas of low risk as discussed in Section 8.3.8.2.6 above.

Notwithstanding the above, the management of peat stability and appropriate construction practices will be inherent in the construction phase of the Prospective Development to ensure peat failures do not occur on site.

Pathway: Vehicle movement and excavations.

Receptor: Peat and subsoils.

Pre-Mitigation Potential Effect: The findings of the peat assessment showed that the Prospective Development will have a low risk of peat failure. In the absence of mitigation measures the potential effect is considered to be a negative, slight, direct, permanent, unlikely effect on peat and subsoils.

Proposed Mitigation Measures:

Firstly, it is important to note that the Prospective Development works are relatively minor in nature and do not require extensive excavations, groundworks or disturbance, except for the works at T07 and the upgrade of the access roads to T18. The minor nature of the works limits the potential for peat instability.

Secondly, the key mitigation with regard peat stability risk was the completion of robust, multidisciplinary site investigations which informed a comprehensive peat stability risk assessment. The peat stability analysis completed by FT was undertaken following the principles in the Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, 2nd Edition, Scottish Government, 2017).

The findings of the peat stability assessment showed that the Prospective Development areas have an acceptable margin of safety and that the Wind Farm Site is suitable for the Prospective Development.

The PSA (FT, 2026) provides a number of mitigation/control measures to reduce the potential risk of peat failure. These mitigation measures are based on the findings of the stability assessment and the lessons learned from the examination of the cause of the 12th November 2020 Peat Slide and other instabilities identified on the Wind Farm Site. A summary of the lessons learned and accompanying mitigation measures are detailed in Table 8-7 below.

Table 8-9: Lessons Learned and Accompanying Mitigation Measures (adapted from FT, 2026)

Peat Stability – Lessons Learned	Mitigation Measures
Excessive loading of in-situ peat	No construction of new floating roads is to be carried out at the Wind Farm Site, although some of the existing floating roads will be used for the completion of the Prospective Development following proof load testing of the roads. No loading of in-situ peat. The instability recorded on site in all cases can be contributed to various degrees to excessive placed construction loading onto the in-situ peat surface.
Identifying body of weak peat in proximity to proposed works	Confirmatory re-testing and assessment in zone of influence in advance of construction works. Further confirmatory re-testing to be completed immediately prior to works recommencing in each area of site to ensure no change in ground conditions.
Accidental excessive loading of in-situ peat during construction	Site supervision and permit to work with respect to peat stability. All construction on site shall be managed and controlled by the construction management team to ensure that all activities have been appropriately assessed with respect to peat stability and related health and safety.
Identifying areas of potential weak peat in advance of works completion of works	Monitoring of ground movement and constructed works. In order to monitor the performance of the constructed works within the peat areas, and any further construction works to be carried out, a series of monitoring points shall be established throughout the site. Proof testing of floating roads. Full-scale proof load tests to be carried out on existing floating roads to verify their capacity under the design loads for the construction traffic and for largest loading to be experienced by the road.
Degradation of work due to inclement weather	Restrictions on work during or after periods of heavy or sustained rainfall. Heavy intense rainfall can result in degradation of the works resulting in localised instability, and in extreme cases can trigger large-scale peat failure.
Construction of stabilising berm downslope	Downslope of the junction between the spur road to T01 and T02/04 a berm will be constructed downslope of the existing floating road, due to the relatively low ODF values recorded when a crane load is applied. Berm designed in accordance with Eurocode 7 design requirements.

Other mitigation measures prescribed in the PSA are listed below and full details are provided in Appendix 8-1:

- Remaining construction works. The remaining construction works are summarised in Chapter 4 of this EIAR. The remaining works are generally minor in nature and do not require extensive groundworks, except for the works at T07 and the upgrade of the access road to T18.

- No construction of new floating roads is to be carried out, although some of the existing floating roads will be used to complete the Prospective Development works. Given the potential risk associated with floating road construction alternative methods of construction will be adopted and are detailed in the PSA.
- No loading of in-situ peat.
- Spoil Management – All excavated peat and spoil will be stored in designated locations such as the existing borrow pits (BP1 and BP2) and the proposed extension to BP3 or in the peat cell at T18. No material will be side cast on peat slopes for either temporary or permanent storage.
- Monitoring of ground movement and constructed works.
- Confirmatory testing and assessment in zone of influence in advance of construction works is to be completed.
- Site supervision and permit to work with respect to peat stability. All construction on site will be managed and controlled by the construction management team to ensure that all activities have been appropriately assessed with respect to peat stability and related health and safety. Procedures will be put in place to clearly demonstrate how this has been achieved which are detailed in the PSA.
- Proof testing of floating roads. Full-scale proof load tests to be carried out on floating roads to verify their capacity under the design loads for the construction traffic and for largest loading to be experienced by the road.
- A berm will be constructed downslope of the T01/T01 junction which will involve the excavation of peat and the placement of rockfill.
- Construction and weather conditions. Restrictions on work during or after periods of heavy or sustained rainfall as recorded from weather station located on site, or from Met Eireann weather forecasts.
- Following periods of heavy intense rainfall, the Site will be inspected prior to resumption of construction works by a competent person to ensure that all drainage is working, and critical areas with respect to stability are stable with no signs of ground movement.

Post Mitigation Residual Effect: The PSA (Appendix 8-1) includes mitigation and monitoring measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety. With the implementation of these control/mitigation measures outlined above the residual effect will be a negative, imperceptible, direct, permanent, unlikely effect on peat and subsoils.

Significance of Effects: For the reasons outlined above, and with the application of the mitigation measures outlined above, no significant effects on people, land and infrastructure will occur.

8.5.2.10 Potential Effects Associated with the Proposed Amenity

As part of the Prospective Development, an on-site amenity is proposed in the form of a community garden, picnic area and play park (930m^2) which will be constructed along the northern boundary of the Wind Farm Site. In addition, it is proposed that the wind farm access roads are open for public use. There will marked trails with a newly constructed footbridge and bog lake viewing area with a new timber boardwalk to the south of T6.

Pathway: Extraction/excavation of peat and soil/subsoils (spoil).

Receptor: Peat and underlying subsoil.

Potential Pre-Mitigation Effect: Negative, slight, direct, likely, permanent effect on peat and subsoil.

Proposed Mitigation Measures:

- Mitigation measures in respect of peat and subsoil excavation are detailed in Section 8.5.2.2.
- Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in Section 8.5.2.3; and,
- Mitigation measures dealing with soil erosion are dealt with in Section 8.5.2.5.

No additional specific mitigation measures are required. The effects are limited due to the shallow, non-invasive and minor nature of the proposed works.

Post Mitigation Residual Effect: The residual effects of these works are considered to be a negative, imperceptible, direct, likely, permanent effect on peat and subsoils.

Significance of Effects: Fo the reasons detailed above, along with the implementation of the prescribed mitigation measures, no significant effects on soils and subsoils will occur.

8.5.2.11 Potential Effects from Proposed Works at the BMEP Site

The proposed BMEP Site includes the permanent felling of ~109ha of coniferous forestry to create wet heath, scrub and bog habitats for Hen Harrier. It is also proposed to further enhance ~6.2ha of this area forestry for peatland habitat enhancement.

The works also include minor access track works and upgrades (~340m in length) and the construction of a new forestry access track (~470m in length).

This will have a direct effect on the land environment at the BMEP Site, with the replacement of coniferous forestry with wet heath, scrub and peatland habitats.

The works will also have the potential to impact peat and soils through the erosion of exposed soils during the felling activities and through contamination from potential spillages of hydrocarbons or wastewater. However, the potential for effects is limited due to the minor nature of the works proposed which will be completed over a short time period and the small volumes of hydrocarbons to be used at the BMEP Site. Furthermore, the peat/soils at the BMEP Site can be considered to be of low importance and have been degraded due to the previous forestry activities.

Pathway: Biodiversity enhancement land-take.

Receptor: Land and Land-use (*i.e.* the land upon which the habitat enhancement measures will occur) and peat/subsoils within the BMEP Site.

Potential Pre-mitigation Effect: Positive, moderate, direct, likely, long-term effect on land and land-use at the BMEP Site and a negative, slight, direct, likely, permanent effect on peat and subsoils due to disturbance. There is no potential for significant effects on land and soils.

Proposed Mitigation Measures:

The proposed habitat enhancement will have a positive effect on the land environment and no specific mitigation measures are required. During the works the following mitigation measures will be implemented for the protection of the land, soils and geological environment:

- Mitigation measures in respect of peat and subsoil excavation are detailed in Section 8.5.2.2.
- Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in Section 8.5.2.3;
- Mitigation measures to prevent the accidental release of wastewater are detailed in Section 8.5.2.4; and,

- Mitigation measures dealing with soil erosion during felling are dealt with in Section 8.5.2.6.

No additional specific mitigation measures are required.

Residual Effect Assessment: It is proposed to complete biodiversity enhancement works at the BMEP Site. The residual effect is considered to be a positive, moderate, direct, likely, long-term effect on land, peat and subsoils at the BMEP Site.

Significance of Effects: For the reasons detailed above, along with the implementation of the prescribed mitigation measures, no significant effects will occur.

8.5.3 Operation Phase – Likely Significant Effects and Mitigation Measures

There are very few potential direct impacts envisaged during the operational phase of the Prospective Development. The potential impacts may include:

- Some construction vehicles or plant may be necessary for maintenance at the Wind Farm Site which could result in minor accidental leaks or spills of fuel/oil;
- The transformer in the substation and transformers in each turbine are oil cooled. There is potential for spills / leaks of oils from this equipment resulting in contamination of soils and groundwater; and,
- In relation to indirect impacts a small amount of granular material may be required to maintain access tracks during operation which will place intermittent minor demand on local quarries.

8.5.3.1 Potential Effects from Site Road Maintenance

In relation to indirect effects a small amount of granular material will be required to maintain access tracks/site roads during operation which will place intermittent minor demand on local quarries.

Pathway: Peat, subsoil and bedrock pore space.

Receptor: Peat, subsoil and bedrock.

Potential Pre-Mitigation Effect: Negative, indirect, imperceptible, short term, likely effect on peat, subsoil and bedrock. In the absence of mitigation measures, there will be no potential for significant effects on peat, soils, subsoils and bedrock at the Wind Farm Site and the BMEP Site.

Proposed Mitigation Measures:

- Use of aggregate from authorised quarries for use in road and hardstand maintenance.

Post-Mitigation Residual Effect: The residual effect will be a negative, imperceptible, indirect, short-term, unlikely effect on bedrock.

Significance of Effects: For the reasons outlined above, no significant effects on land, soils or geology will occur.

8.5.3.2 Potential Effects from Site Vehicle/Plant Use

Plant and vehicles used on Site for maintenance will be run on fuels and use hydraulic oils. Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to land, soils and associated ecosystems. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, and is persistent in the environment.

Pathway: Peat, subsoil and bedrock pore space.

Receptor: Peat, subsoil and bedrock.

Potential Pre-Mitigation Effect: Negative, direct, slight, short term, unlikely effect on peat, subsoil and bedrock. In the absence of mitigation measures, there will be no potential for significant effects on peat, subsoils and bedrock at the Wind Farm Site and the BMEP Site.

Proposed Mitigation Measures:

- Vehicles used during the operational phase will be refuelled off site (where possible) before entering the Site;
- No fuels will be stored on-site during the operational phase;
- Any on-site refuelling will be completed as per the measures prescribed in Section 8.5.2.3;
- Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and,
- An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the CEMP (Appendix 4-3).

Post-Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be a negative, imperceptible, direct, short-term, unlikely effect on peat, subsoils, and bedrock.

Significance of Effects: For the reasons outlined above, no likely significant effects on land, soils, subsoils or bedrock will occur.

8.5.3.3 Potential Effects from the Use of Oil In Transformers

The transformer in the substation and transformers in each turbine are oil cooled. There is potential for spills / leaks of oils from this equipment resulting in contamination of soils and groundwater. Hydrocarbon has a high toxicity to humans, and all flora and fauna, and is persistent in the environment.

No oils will be stored at the BMEP Site.

Pathway: Peat, subsoil and bedrock pore space.

Receptor: Peat, subsoil and bedrock.

Potential Pre-Mitigation Effect: Negative, direct, slight, short term, unlikely effect on peat, subsoil and bedrock. In the absence of mitigation measures, there will be no potential for significant effects on peat, subsoils and bedrock at the Wind Farm Site.

Proposed Mitigation Measures:

- All transformers in the turbines and substation areas will be bunded to 110% of the volume of oil used in each transformer/substation; and,
- An emergency plan for the operational phase to deal with accidental spillages will be contained in the CEMP (Appendix 4-3).

Post-Mitigation Residual Effect: With the implementation of the prescribed mitigation measures the residual effect will be a negative, imperceptible, direct, short-term, unlikely effect on peat, subsoils, and bedrock.

Significance of Effects: For the reasons outlined above, no likely significant effects on land, soils, subsoils or bedrock will occur.

8.5.4 Decommissioning Phase – Likely Significant Effects and Mitigation Measures

The potential effects associated with decommissioning of the Prospective Development will be similar to those associated with construction but of reduced magnitude (i.e., soil/subsoil/bedrock excavation; contamination by leakage/spillages).

The wind turbines proposed as part of the Prospective Development are expected to and operate for a period of 25 years. At the end of this period, the operation of the wind farm may be extended or the equipment may be replaced with a new technology, subject to planning permission being obtained, or the turbines and associated above ground components of the wind farm may be decommissioned. Upon decommissioning of the Prospective Development, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine components will be separated and removed offsite. The turbine materials will be transferred to a suitable recycling or recovery facility. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environment emissions such as noise, dust and/or vibration.

The underground electrical cabling connecting the turbines to the onsite 110kV substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

Site roadways will be in use for purposes other than the operation of the Prospective Development by the decommissioning phase of the Prospective Development, and therefore it will be more appropriate to leave the Wind Farm Site roads in situ for future use. It is envisaged that the roads will serve as agricultural roads or forestry access tracks for local landowners.

The underground electrical cabling route and the existing onsite 110kV substation will remain in place as it will be under the ownership and control of the ESB and EirGrid.

A Decommissioning Plan has been prepared (Appendix 4-6) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the Existing Development has been fully assessed in the rEIAR.

During decommissioning, it may be possible to reverse or at least reduce some of the potential effects caused during construction by rehabilitating construction areas such as turbine bases. This will be done

by covering with soils/subsoils and vegetation to encourage vegetation growth and reduce run-off and sedimentation. Other effects such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude. However, as noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

> *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".*

No significant effects on the soils and geology environment are envisaged during the decommissioning stage of the Prospective Development.

8.5.5 Assessment of Human Health Effects

Potential human health effects arise mainly through the potential for soil and ground contamination. A wind farm or grid connection route is not a recognized source of pollution and so the potential for effects during the operational phase are negligible.

Hydrocarbons will be used onsite during construction and decommissioning however the volumes will be small in the context of the scale of the Prospective Development and will be handled and stored in accordance with best practice mitigation measures. The potential residual effects associated with soil or ground contamination and subsequent health effects are negligible.

Peat failure has also the potential to affect human health, but this would likely require a catastrophic failure to occur. The residual risk of significant peat slide/failure occurring is determined to be negligible to low following the implementation of the proposed control (mitigation) measures (refer to Section 8.5.2.9 and the PSA included as Appendix 8-1).

8.5.6 Risk of Major Accidents and Disasters

The main risk of Major Accidents and Disasters at peatlands sites is related to peat instability.

A comprehensive PSA (FT, 2026) (Appendix 8-1) has been undertaken for all Prospective Development infrastructure locations. The findings of the peat assessment showed that the Prospective Development will have a low risk of peat failure. The findings include mitigation and monitoring measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety. Refer to Appendix 8-1 for the detailed PSA (FT, 2026) and Chapter 16: Major Accidents and Natural Disasters of this EIAR for a full assessment on risks relating to the Prospective Development.

8.5.7 Cumulative Effects – Prospective Development

Due to the localised nature of the proposed construction works which will be kept within the Site, there is no potential for significant cumulative effects in-combination with other local developments on the land, soils and geology environment as all effects are direct within the Site. Other proposed or permitted projects outside the Site do not have the potential to reduce or increase the magnitude of effects of the Prospective Development on Land, Soils and Geology.

The only way the Prospective Development can have cumulative effects with other off-site projects and plans is via the drainage and off-site surface water network, and this hydrological pathway is assessed in Chapter 9 of this EIAR.

8.5.8 Assessment of Potential In-Cumulation Effects

This section addresses the potential cumulative effects of the Prospective Development combined with the Existing Development and assesses the effects of the Subject Development on the land, soils and geological environment. An assessment of the In-Cumulation effects of the Subject Development are presented in Table 8-8 below.

As detailed in this chapter, with the implementation of the prescribed mitigation measures the Prospective Development will not result in any significant effects on the land, soils and geological environment. Similarly, the rEIAR concluded that the Existing Development did not have any significant effects on the receiving land, soils and geological environment. Therefore, there is no potential for significant In-Cumulation effects from the Subject Development.

Table 8-10 Assessment of Potential In-Cumulation Effects of the Subject Development

Assessment Heading	Existing Development	Prospective Development	Subject Development
Land (Land-Take)	This rEIAR concluded that the residual effect was a negative, direct, slight to moderate, permanent, likely effect on land (land-take). There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on land (land-take) will be a negative, direct, slight, likely, permanent effect. There will be no significant effects.	The effects on land (land-take) from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects on land from the Subject Development are Imperceptible.
Excavation of Peat/Soils/Subsoils	This rEIAR concluded that the residual effect was a negative, slight to moderate, direct, permanent effect on peat/soils/subsoils. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils will be a negative, slight to moderate, direct, likely, permanent effect. There will be no significant effects.	The effects on peat/soils/subsoils from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects on peat/soils/subsoils from the Subject Development are Imperceptible.
Contamination due to Hydrocarbons	This rEIAR concluded that the residual effect was, at worst, negative, imperceptible, indirect, short-term effect on peat, subsoils and bedrock. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils and bedrock will be a negative, imperceptible, direct, short-term, low unlikely effect. There will be no significant effects.	The effects on peat/soils/subsoils and bedrock from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects of hydrocarbon contamination from the Subject Development are Imperceptible.
Contamination due to Wastewater	This rEIAR concluded that the residual effect was, at worst, negative, imperceptible, indirect, short-term effect on peat, subsoils and bedrock. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils and bedrock will be a negative, imperceptible, direct, short-term, low unlikely effect. There will be no significant effects.	The effects on peat/soils/subsoils and bedrock from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects of wastewater contamination from the Subject Development are Imperceptible.

Assessment Heading	Existing Development	Prospective Development	Subject Development
Erosion of Peat/Soils/Subsoils During Construction	This rEIAR concluded that the residual effect was, at worst, a negative, slight, direct, short-term effect on peat/soils/subsoils. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils will be a negative, slight, direct, short-term, likely effect. There will be no significant effects.	The effects on peat/soils/subsoils from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects of erosion during construction from the Subject Development are Imperceptible.
Erosion of Peat/Soils/Subsoils During Felling Works	This rEIAR concluded that the residual effect was, at worst, a negative, imperceptible, direct, permanent, likely effect on peat/soils/subsoils. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils will be a residual effect will be a negative, imperceptible, direct, permanent, unlikely effect. There will be no significant effects.	The effects on peat/soils/subsoils from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects of erosion during felling from the Subject Development are Imperceptible.
Peat Instability	This rEIAR concluded that the residual effect was, was a negative, moderate, direct, permanent effect on peat and land associated with the November 2020 peat slide. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils will be a negative, imperceptible, direct, permanent, unlikely effect. There will be no significant effects.	The effects on peat/soils/subsoils from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects of peat instability from the Subject Development are Imperceptible.
Effects on Geological Heritage Sites	This rEIAR concluded that the residual effect was, was a negative, imperceptible, direct, long-term effect on the Barnesmore Gap CGS and the Donegal and Inver Bays CGS. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on geological heritage sites will be negative, imperceptible, direct, long-term effect. There will be no significant effects.	The effects on geological heritage sites from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects on geological heritage from the Subject Development are Imperceptible.

Assessment Heading	Existing Development	Prospective Development	Subject Development
Excavation and Reinstatement of Borrow Pits	The rEIAR concluded that the residual effect was, was a at worst, a negative, slight, direct, permanent effect on peat, subsoils and bedrock. There were no significant effects.	With the implementation of the prescribed mitigation measures, the residual effect on peat/soils/subsoils and bedrock will be a negative, irreversible, slight, direct, likely, permanent effect. There will be no significant effects.	The effects on peat/soils/subsoils and bedrock from both the Prospective Development and the Existing Development are considered to be not significant. The In-Cumulation effects from excavation and reinstatement of borrow pits from the Subject Development are Imperceptible.

8.5.9 Assessment of Potential Transboundary Effects

This section addresses the potential transboundary effects of the Prospective Development on the land, soils and geological environment. An assessment of the potential transboundary effects are presented in Table 8-9 below.

Due to the localised nature of the proposed construction works which will be kept within the Site, within the Republic of Ireland. There is no potential for transboundary effects with other developments in Northern Ireland.

The only way the Prospective Development can have transboundary effects with other off-site projects and plans is via the drainage and off-site surface water network, and this hydrological pathway is assessed in Chapter 9 of this EIAR.

Table 8-11: Assessment of Potential Transboundary Effects of the Prospective Development

Assessment Heading	Prospective Development	Transboundary Effects
Effects on Land (Land-Take)	The impact assessment presented in Section 8.5.2.1 above concludes that the residual effect will be a negative, direct, slight, likely, permanent effect on land and landuse.	There will be no potential for Transboundary Effects in terms of land (land-take) as a result of the Prospective Development.
Effects from the Excavation of Peat/Soils/Subsoils	The effects will be localised to the footprint of the Prospective Development within the Site, and will not extend outside of the Site boundaries.	There will be no potential for Transboundary Effects from the excavation of peat/soils/subsoils as a result of the Prospective Development.
Effects from Contamination due to Hydrocarbons	The impact assessment presented in Section 8.5.2.2 concluded that the residual effect will be negative, slight to moderate, direct, likely, permanent effect on soils and subsoils due to disturbance and relocation within the Wind Farm Site.	There will be no potential for Transboundary Effects from the contamination of soils/subsoils and bedrock as a result of the Prospective Development.
Effects from Contamination due to Wastewater	The effects will be localised within the Site, and will not extend outside of the Site boundaries.	There will be no potential for Transboundary Effects from the contamination of soils/subsoils and bedrock as a result of the Prospective Development.
Effects from the Erosion of Peat/Soils/Subsoils During Construction	The impact assessment presented in Section 8.5.2.3 concluded that the residual effect will be a negative, imperceptible, direct, short-term, low unlikely effect on soils, subsoils and bedrock.	There will be no potential for Transboundary Effects from the erosion of peat/soils/subsoils during construction works as a result of the Prospective Development.
Effects from the Erosion of Peat/Soils/Subsoils During Felling Works	The effects will be localised within the Site, and will not extend outside of the Site boundaries.	There will be no potential for Transboundary Effects from the erosion of peat/soils/subsoils during felling works as a result of the Prospective Development.

Assessment Heading	Prospective Development	Transboundary Effects
Effects from Peat Instability	The impact assessment presented in Section 8.5.2.4 concluded that the residual effect will be a negative, imperceptible, direct, short-term, low unlikely effect on soils, subsoils and bedrock.	There will be no potential for Transboundary Effects from peat instability as a result of the Prospective Development.
Effects on Geological Heritage Sites	The effects will be localised within the Site, and do not extend outside of the Site boundaries.	There will be no potential for Transboundary Effects on geological heritage sites as a result of the Prospective Development.
Effects from the Excavation and Reinstatement of Borrow Pits	The impact assessment presented in Section 8.5.2.5 concluded that the residual effect will be a negative, slight, direct, short-term, likely effect on subsoils by erosion and wind action.	There will be no potential for Transboundary Effects from the excavation and reinstatement of the borrow pits as a result of the Prospective Development.

8.5.10 Cumulative Effects- Subject Development

The potential for cumulative impacts between the Subject Development and other wind energy developments, as well as other relevant non-wind projects and plans (existing, permitted, and proposed), has been assessed in order to determine the overall effect on land, soils and geology. Due to the localised nature of the construction works associated with the Subject Development, which were and will be kept within the Site boundary, there is no potential for cumulative effects with other projects and plans on the land, soils and geology environment.

8.5.11 Post Construction Monitoring

The monitoring of ground movement in relation to peat stability will be completed during the continued construction phase and the operation phase.

The monitoring plan is detailed in Section 10.1 of the PSA (FT, 2026) in Appendix 8-1 of this EIAR. The monitoring is proposed to provide advance warning of longer-term movements and shall be cited at critical locations. A total of 15 no. locations across the site have been identified for ground monitoring. This monitoring shall consist of a series of wooden posts inserted into the ground to create a straight line and any deviation of the posts would indicate potential movement of peat. The monitoring shall be read weekly or following heavy rainfall. The monitoring shall be completed until the completion of works.