8. LAND, SOILS AND GEOLOGY

8.1 Introduction

8.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO to carry out an assessment of the potential effects of the Proposed Curraglass Wind Farm (Proposed Development), Kealkill Co. Cork on the land, soil and geological environment.

As detailed in Section 1.1.1 in Chapter 1 (Introduction), for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Development', 'proposed turbines', the 'Site', the ' 2020 Application' and the 'Kealkill Wind Farm'. Please see Section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Development is provided in Chapter 4 (Description of the Proposed Development) of this EIAR.

This chapter provides a baseline assessment of the environmental setting of the Proposed Development, as described in Chapter 4 (Description of the Proposed Development), in terms of land, soils and geology and discusses the potential likely significant effects that the construction, operation and decommissioning of the Proposed Development will have on the receiving environment. Where required, appropriate mitigation measures to avoid any identified significant effects to land, soils and geology are recommended and the residual effects of the Proposed Development post-mitigation are assessed.

The Proposed Development Study Area, with regard to Land, Soils and Geology is defined by the EIAR Site Boundary ('the Site'). However, the desk study and scoping exercise extended more than 2km from the EIAR Site Boundary.

8.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist 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 includes 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 David Broderick.

David Broderick (P. Geo., BSc, H. Dip Env Eng, MSc) is a Hydrogeologist with over 19 years' experience in both the public and private sectors. Having spent two years working in the Geological Survey of Ireland working mainly on groundwater and source protection studies David moved into the private sector. David has a strong background in groundwater resource assessment, karst hydrology and hydrogeological/hydrological investigations in relation to developments such as quarries and wind farms. David has completed numerous geology and water sections for input into EIARs for a range of commercial developments. David has worked on the EIS/EIARs for Shehy More Wind Farm, Esk Wind Farm, and Cleanrath Wind Farm, and over 60 other wind farm related projects across the country. David worked on his first wind energy project in 2010, and he has continued to work on similar projects since then.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is a Civil/Environmental Engineer and Hydrogeologist with over 24 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, karst hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions. For example, Michael has worked on the EIS/EIARs for Slievecallan Wind Farm, Seven Hills Wind Farm, Carrownagowan Wind Farm, and over 100 other wind farm related projects across the country. Michael worked on his first wind energy project in 2003, and he has continued to work on similar projects since then.

8.1.3 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 Acts, 2000-2021;
- 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 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018;
- The Heritage Act 1995, as amended.

8.1.4 Relevant Guidance

The land, soils and geology chapter of this EIAR was prepared having regard, where relevant, to guidance contained in the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2009): 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); and,
- Scottish Government, 2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments.

8.2 Assessment Methodology

8.2.1 Desk Study

A desk study of the Site and the Study Area was completed in advance of undertaking the walkover survey and site investigation. This involved collecting all relevant geological data for the Site and surrounding area. This included consultation with the following data sources:

- EIAR and site investigation reports for the 2020 Application;

- Environmental Protection Agency database (www.epa.ie);
- 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 15 (Geology of Cork-Kerry). Geological Survey of Ireland (GSI, 2003);
- Geological Survey of Ireland – 1:25,000 Field Mapping Sheets;
- General Soil Map of Ireland 2nd edition (www.epa.ie); and,
- OSI Aerial photography, 1,5000 and 6 inch mapping.

8.2.2 Baseline Monitoring and Site Investigations

A walkover survey, including geological mapping and investigations, was undertaken by HES on 15th November 2024 and 20th February, 25th March 2025 and 3rd April 2025.

Geotechnical ground investigations and a Peat Stability Assessment were undertaken by Fehily Timoney & Company (FT) between January and March 2025.

Peat probing was previously undertaken by Gavin and Doherty Geosolutions Ltd (GDG) during January/February 2020.

Investigation drilling and trial pits were carried out at the Site by Irish Drilling Limited (IDL) under the supervision of FT during February and March 2025.

MKO have also completed peat depth probing at the Site on 29th of May 2019, 25th February and 7th August 2025. The combined geological dataset collated by HES, MKO, GDG and FT has been used in the preparation of this EIAR Chapter.

In summary, site investigations to address the land, soils and geology chapter of the EIAR included the following:

- A total of 354 no. peat probe depths/investigations points were carried out by GDG, HES, FT and MKO to determine the depth and geomorphology of the peat at the Site (this is an increase of 111 no. from the previous planning application);
- A Geotechnical and Peat Stability Assessment report by FT (August 2025);
- A Peat and Spoil Management Plan has been prepared by FT (August 2025);
- Rotary core drilling (1 no.) and trial pits (7 no.) by IDL;
- A total of 10 no. gouge core sample points were undertaken by HES across the Site to investigate peat and mineral soil lithology;
- Logging of subsoil exposures across the Site where mineral soils and peat profiles are exposed; and,
- Mineral subsoils and peat were logged according to BS: 5930 and Von Post Scale respectively.

The Geotechnical and Peat Stability Risk Assessment Report (herein referred to as the PSRA) prepared by FT is included as **Appendix 8-1** of this chapter. The IDL site investigation report is attached as an appendix to the PSRA.

8.2.3 Scope and Consultation

The scope for this chapter of the EIAR has also been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process and the list of Consultees is outlined in Chapter 2 (Background to the Proposed Development), Section 2.5 of this EIAR.

Matters raised by Consultees in their responses with respect to the land, soils, and geology environment are summarised in .

Table 8-1 Summary of Scoping Responses Relating to Land, Soils and Geology

Consultee	Matters Raised – As Referenced	Addressed in Sections
Geological Survey of Ireland	"*Our records show that there is a CGS EIAR Site Boundary. Pass of Keimaneigh, Co. Cork (GR 110403, 64071), under IGH theme: IGH 7 Quaternary. With the current plan, there are no envisaged impacts on the integrity of current CGS by the proposed development. We ask that any proposed access roads or road upgrades and ancillary works associated with the proposed development do not impact on the feature or wider county geological site as shown on our maps".*	Section 8.3.7
HSE	*"A detailed assessment of the current ground stability of the site for the proposed windfarm 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"* *"The NEHS recommends that a detailed Peat Stability/Geotechnical Assessment 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)".*	Section 8.3.8 Geotechnical and Peat Stability Risk Assessment (**Appendix 8-1**) Construction Environmental Management Plan (**Appendix 4-3**) Peat and Spoil Management Plan (**Appendix 4-2**)

below.

Table 8-1 Summary of Scoping Responses Relating to Land, Soils and Geology

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8.2.4 Impact Assessment Methodology

Using information from the desk study and data from the site investigations, an assessment of the importance of the soil and geological environment within the study area and Site is assessed using the criteria set out in

Table 8-2 (NRA, 2009).

Table 8-2 Estimation of Importance of Soil and Geology Criteria (NRA, 2009).

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.

Importance	Criteria	Typical Example
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 guideline criteria (EPA, 2022) for the assessment of likely significant effects require that likely effects are described with respect to their extent, magnitude, type (i.e. negative, positive or neutral) probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this environmental impact assessment report are those set out in the EPA (2022) Glossary of effects as shown in Chapter 1 (Introduction) of this EIAR. In addition, the two impact characteristics proximity and probability are described for each impact and these are defined in Table 8-3.

- 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 8-4.

Table 8-3: Additional Impact Characteristics.

Impact Characteristic	Degree/ Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Unlikely	A low likelihood of occurrence of the impact.
	Likely	A medium likelihood of occurrence of the impact.

Table 8-4: Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Hydrological Impacts
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.
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.

8.2.5 Limitations and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of the Land, Soils and Geology Chapter of this EIAR. The site investigations and follow up monitoring carried out were thorough and exhaustive.

8.3 Existing Environment

8.3.1 Site Description and Topography

The Site is located immediately west of the R584 at the Pass of Keimaneigh which is situated approximately 6.8km northeast of Kealkill and 3.8km southwest of the village of Ballingeary.

The Site is majority forested and also a former wind farm site with a total area of approximately 270ha. Access to the Site is from the Pass of Keimaneigh which runs along the northeastern boundary of the Site. There is a network of existing access roads and an existing onsite 38kV substation within the Site from the Kealkill Wind Farm. The topography is mountainous in setting with various peaks of the Shehy Mountains located to the east and west.

The Site topography is characterised by a central north/south trending ridge line which slope to the east and west. The Site ranges in elevation from 111 metres above ordnance datum (m OD), in the turbine component turning area of the Site, to 347m OD in the north of the Site. The majority of the Proposed Development infrastructure is located on the western slopes of the central trending ridge line. The majority of the Site is under forestry cover except on the eastern slopes of the central ridge which is dominated by shallow pockets of blanket bog and rocky outcrops.

The section of Site that covers the turbine component turning area for turbine delivery, is located in low lying lands along the R584 at the bottom of the northern slopes of the Doughill Mountain. This pocket of the Site contains an existing private gravel track, with a mix of agricultural grasslands on either side of the track, and the boundary with the R548 Regional Road includes gorse willow hedgerow.

8.3.2 Land and Land Use

The current land cover at the Site is mapped by Corine (2018) as coniferous forestry, mixed forestry and peat bogs. The Site also includes unutilised existing wind farm infrastructure.

In addition to forestry and wind energy, other land-uses in the surrounding area include agriculture, and residential/commercial activities.

8.3.3 Peat/Soils and Subsoils

The published soil and subsoil map (www.epa.ie) for the area shows that the Site is dominated by shallow peaty soils over shallow bedrock (the subsoils mapping shows subsoils are largely absent with bedrock close to surface).

Pockets of blanket peat are mapped along the summit of the central ridgeline. The vast majority of the Proposed Development infrastructure is mapped on 'bedrock outcrop or subcrop' including all the proposed turbine locations.

The section of Site that covers the turbine component turning area for turbine delivery has soils mapped as alluvium and AminDW. The GSI subsoil mapping shows turbine component turning area is mapped to be underlain by alluvium and sandstone till subsoils.

A map of the local subsoil cover is shown as **Figure 8-1** below.

Between January 2020 and August 2025, 354 no. peat depth readings were taken within the Site by GDG, MKO, HES and FT. The Site is typically covered in a thin layer of peaty topsoil and has an undulating terrain. Peat depths vary across the Site depending on mainly topography. Generally deeper peat was encountered in the flatter areas of the Site with thinner peat on the surrounding slopes.

Peat depths recorded during the site walkovers and from the ground investigation ranged from 0 to 5.5m with an average peat depth of 0.45m. 95% of the probes recorded peat depths of less than 1.5m. A number of localised readings recorded peat depths from 1.5 to 5.5m.

The peat depths recorded at the turbine locations varied from 0.1 to 0.8m with an average depth of 0.5m. With respect to the proposed new access roads, peat depths are typically less than 1.0m (average 0.45m) with localised depths of up to 5.5m recorded in one location (the overall average increased by 0.05m from the previous application due to additional probes been taken).

A summary peat depth map is shown as **Figure** 8-2 below.

Based on the trial pit investigation, the overburden profile at the Site can be summarized as follows:

- **Peat** – Typically described as spongy black pseudo fibrous PEAT;
- **Made Ground**: Described as brownish grey slightly sandy silty angular to subangular fine to coarse shale schist and siltstone GRAVEL with rare cobbles and rare boulders and rare large boulders (made ground is associated with the previous wind farm development);
- **Glacial Sands and Gravels** – Bluish grey slightly silty slightly sandy angular to subangular fine to coarse siltstone and shale GRAVEL.

Shown on **Table 8-5** below is a summary of the site investigations at key development locations. The site investigation locations are shown on **Figure** 8-3 below.

Table 8-5: Summary of Peat Depths and Mineral Subsoil Lithology at Proposed Development Locations

Infrastructure Location	Investigation ID	Depth to Bedrock (m)	Average Peat Depth (m)	Summary of Underlying Mineral Subsoil Lithology
T1	TP-T01	3.3	0.4	Made Ground over silty CLAY on silty sandy GRAVEL
T2	TP-T02	2.6	0.1	Made Ground over silty CLAY on silty sandy GRAVEL
T3	TP-T03	1.5	0.3	Silty sandy GRAVEL
Substation	GC1 – GC3	-	0.25	Sandy gravelly SILT/CLAY
Compound	TP01/RC01	0.2 - 0.7	0.2	Silty sandy GRAVEL
Borrow Pit	TP01/RC01	0.2 - 0.7	0	Silty sandy GRAVEL
Met Mast	GC4 – GC6	-	0.3	Sandy gravelly SILT/CLAY

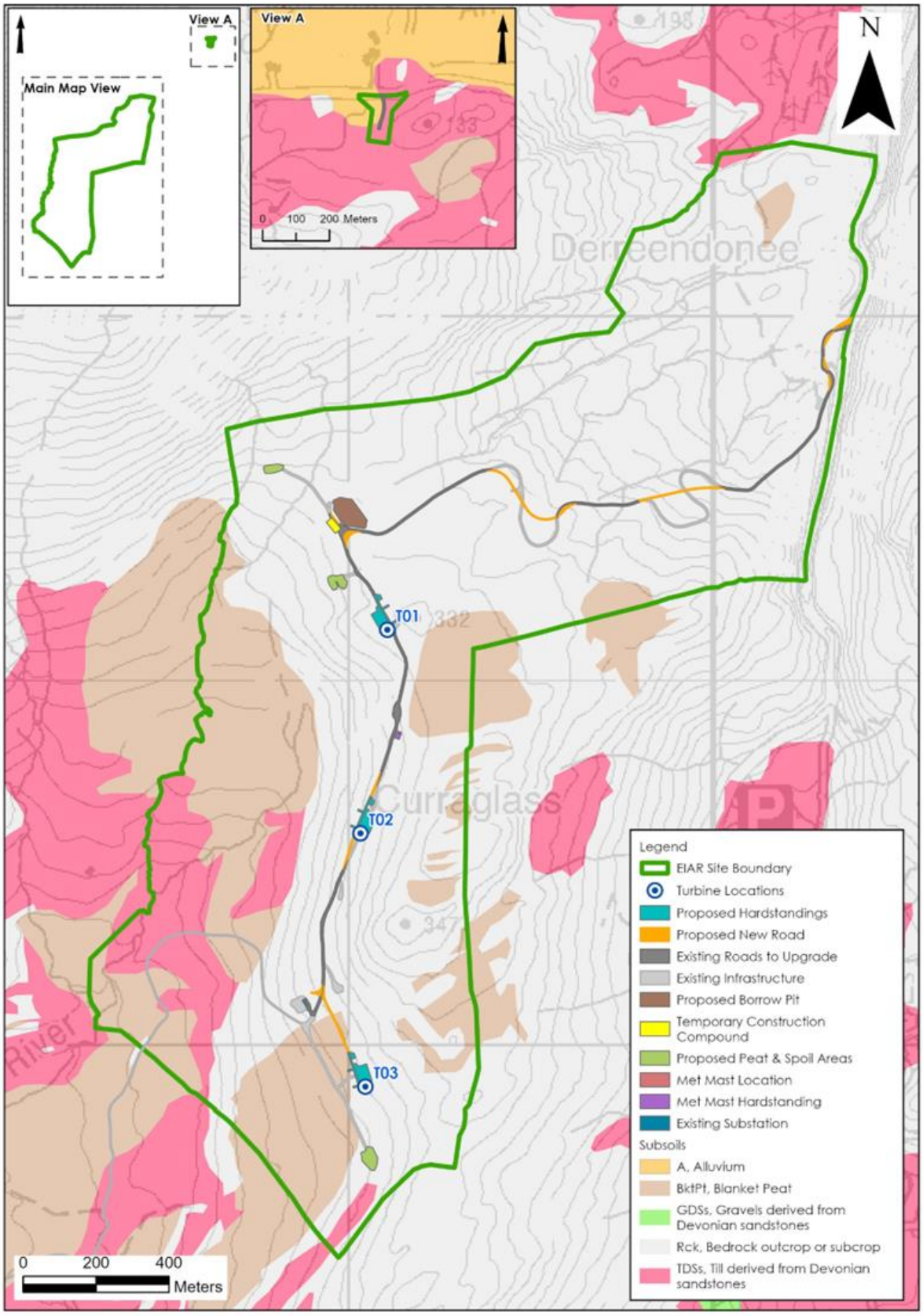

Figure 8-1 GSI Subsoil Mapping

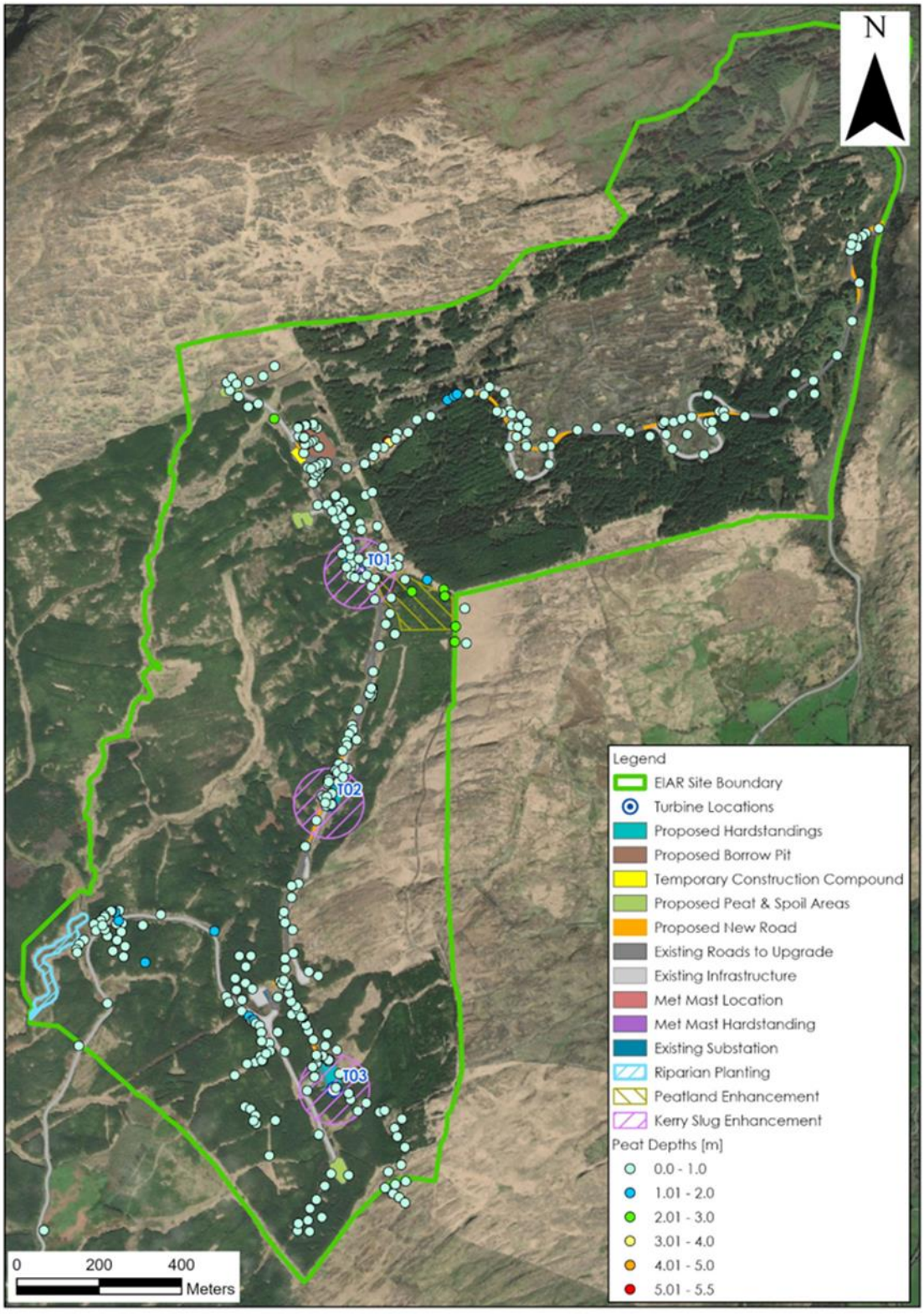

Figure 8-2 Summary Peat Depth Map

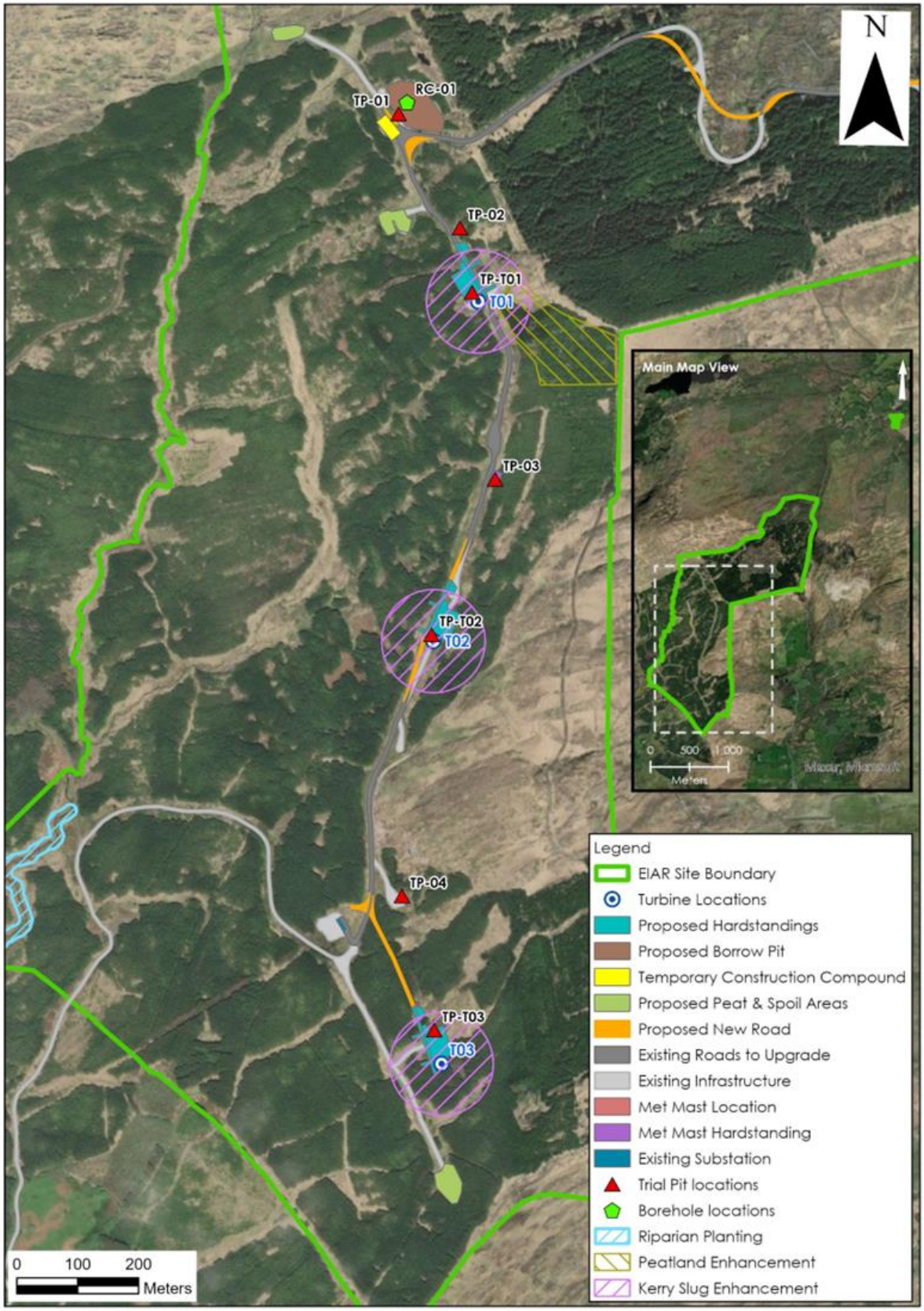

Figure 8-3 Site Investigation Map

8.3.4 Bedrock Geology

Based on the GSI bedrock mapping the bedrock units underlying the Site comprises Devonian Old Red Sandstones (DORS). This bedrock type was visible at the numerous outcrops.

Below the Site the Devonian Old Red Sandstones are mapped to comprise mainly of green-grey sandstone and purple siltstone associated with the Gun Point Formation and Caha Mountain Formation. There are several mapped bedrock faults in the area of the Site. These faults will have no consequence for the Proposed Development.

Investigation drilling carried out at the proposed borrow pit location (refer to IDL drilling log for RC-01 in **Appendix 8-1**) encountered very strong SILTSTONE bedrock throughout the full drilling depth (10.4m below ground level). Refer to **Figure** 8-3 above for site investigation locations.

The turbine component turning area is mapped to be underlain by the Slaheny Sandstone Formation which is described as Cross-bedded sandstone & siltstone.

A bedrock geology map of the area is shown below as **Figure 8-4.**

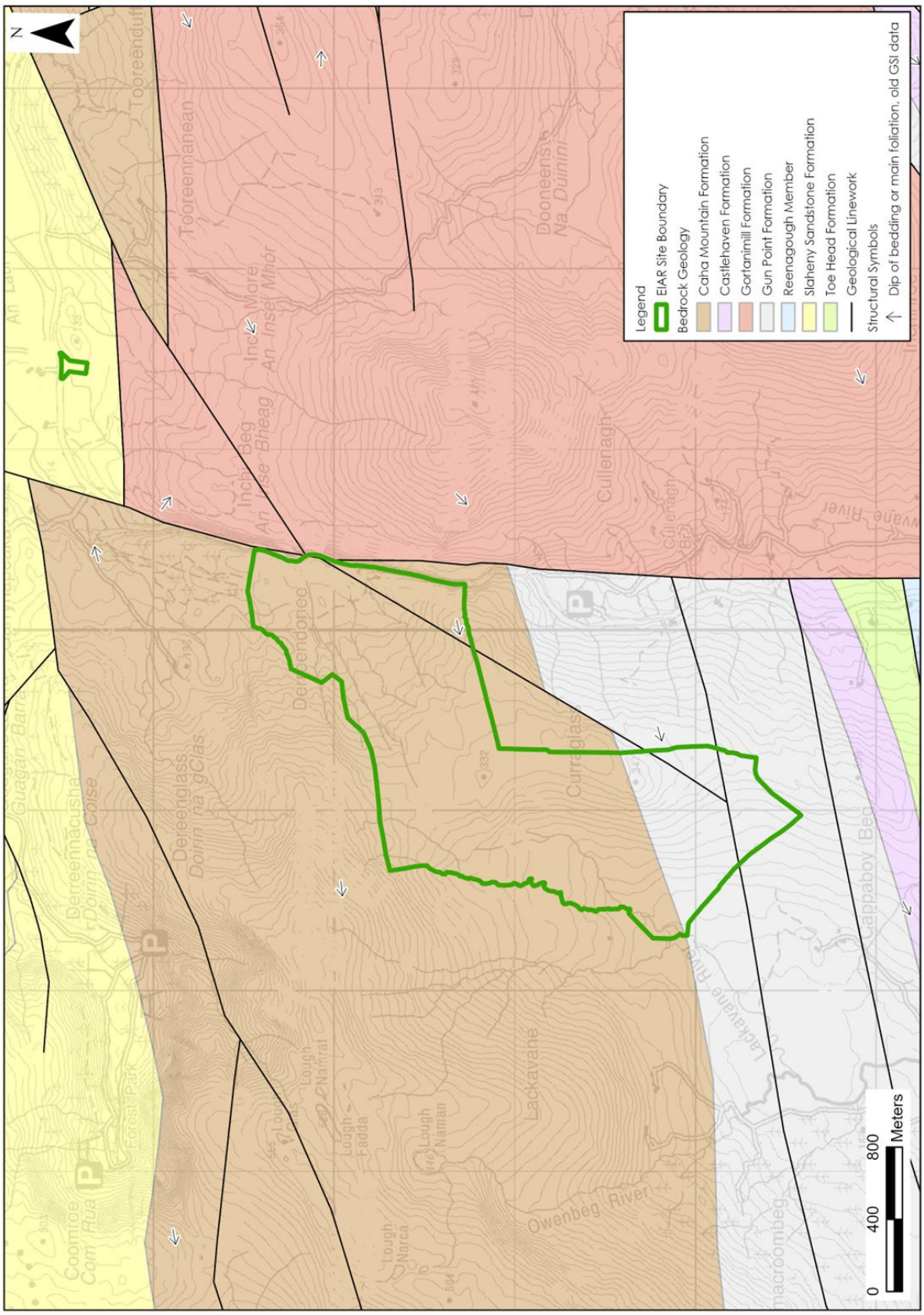

Figure 8-4 GSI Bedrock Mapping

8.3.5 Geological Resource Importance

The bedrock underlying the Site could be classified as "Medium" importance. The bedrock could be used on a "sub-economic" local scale for construction purposes.

The glacial subsoils could be classified as "Low" importance. The glacial subsoils could be used on a "sub-economic" local scale for construction purposes.

The overlying peat deposits at the Site could be classified as "Low" importance as the peat is not designated in this area and is significantly degraded in most places due to the forestry.

Refer to Section 8.1.2 for definition of these criteria.

8.3.6 Designated Sites

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), candidate Special Areas of Conservation (SAC) and Special Protection Areas (SPAs). Local designated sites are shown on **Figure 8-5** below.

Designated sites locally to the Site are listed below:

- Conigar Bog NHA (Site Code: 002386) is located approximately 0.8km to the west of the Site;
- Lough Allua pNHA (Site Code: 001065) is located approximately 4.2km to the northeast of the Site;
- Gouganebarra Lake pNHA (Site Code: 001057) is located approximately 2.2km to the north of the Site;
- Ballagh Bog pNHA (Site Code: 001886) is located approximately 2.3km to the northwest of the Site;
- Derryclogher (Knockboy) Bog SAC/pNHA (Site Code: 001873) is located approximately 3.8km to the west of the Site; and,
- The Gearagh SAC (Site Code: 000108) is located approximately 19.5km to the northeast of the Site.

Potential hydrological pathways (surface water connections) and potential hydrogeological pathways (groundwater connections) to designated sites are assessed in the Chapter 9 (Hydrology and Hydrogeology).

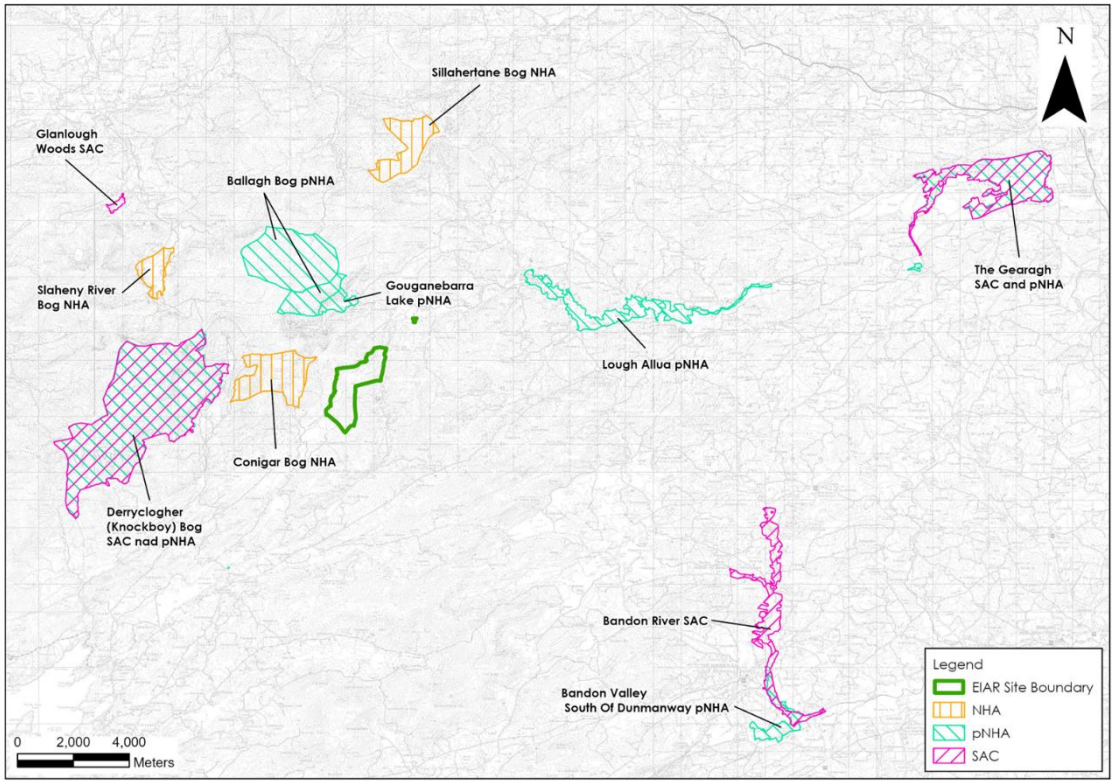

Figure 8-5 Local Designated Sites

8.3.7 Geological Heritage Sites

The nearest County Geological Heritage site to the Proposed Development is the Pass of Keimaneigh (CK071) which is referred to as a glacial spillway. The Pass of Keimaneigh is located adjacent to the north-eastern site boundary and site entrance. The existing site entrance is within the Pass of Keimaneigh. The Proposed Development will have no potential to impact on the Pass of Keimaneigh.

The next nearest Geological Heritage site is Bantry Drumlins (CK018), which is located approximately 3.5km to the southwest of the Site. The Proposed Development will have no potential to impact on the Bantry Drumlins. The Ballingeary Esker (CK001) Geological Heritage site is located approximately 6km to the northeast and remote from the Site.

The locations of these County Geological Heritage sites are shown on **Figure 8-6** relative to the Site layout.

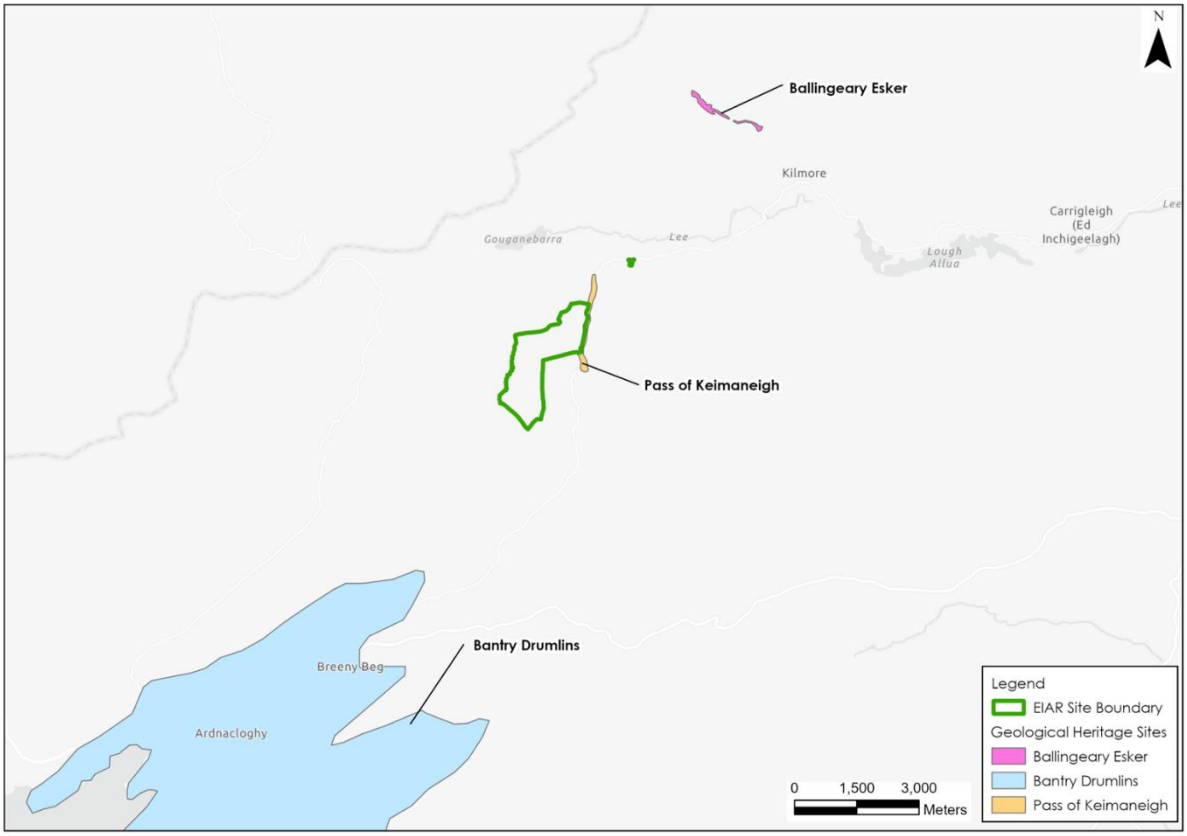

Figure 8-6 Geological Heritage Sites

8.3.8 Peat Stability Assessment

A Geotechnical and Peat Stability Assessment Report (FT, 2025) is attached in **Appendix 8-1**. Summary data and conclusions from that report are provided below.

8.3.8.1 Introduction

Fehily Timoney and Company (FT) was engaged to undertake a geotechnical and peat stability assessment of the Site.

Hydrological, hydrogeological and ecological factors were also assessed in the Geotechnical and Peat Stability Assessment Report, and interaction between FT, HES and MKO were undertaken throughout the iterative design process. The assessment was done in accordance with guidance contained in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, Scottish Government, 2017).

A constraints study was initially undertaken by the Environmental (MKO), Hydrological (HES) and Ecological (MKO) members of the project design team to determine the developable area on the Site, prior to the site reconnaissance by engineering geologists/geotechnical engineers from FT.

8.3.8.2 Hydrological Considerations

The hydrological factors with regard to peat stability were assessed using a combination of desk study data, aerial photography (historical and contemporary), topographic lidar data flow path drainage analysis, site walkovers, field drainage mapping and gouge coring. Detailed drainage maps were prepared along with hydrological constraints mapping for on-site drainage features and wet areas.

Many of the pre-conditions as described by (PLHRAG, Scottish Government, 2017) are hydrological in nature and are listed in the guidance as follows:

- Impeded drainage caused by a peat layer overlying an impervious clay or mineral base (hydrological discontinuity, especially an iron pan at the base of the peat deposit);
- A convex slope or a slope with a break of slope at its head (concentration of
- subsurface flow);
- Proximity to local drainage, either from flushes, pipes or streams (supply of
- water); and
- Connectivity between surface drainage and the peat/impervious interface (mechanism for generation of excess pore pressures).

Identifying any pre-conditions at the Site was a key part of the hydrological constraints assessment carried out in conjunction with project design team.

8.3.8.3 Peat Slides – Lessons Learned

This peat stability assessment has been undertaken taking into account peat failures that have occurred on peatland sites (such as recent failures at Shass Mountain 2020, Co. Leitrim and Meenbog 2020, Co. Donegal). The lessons learned from both peat slide events have been incorporated into the design of this project and the construction methodologies to be implemented. The Meenbog failure occurred during the construction of a section of floating road on sidelong ground in an area of weak peat. It is important that the existing site drainage is maintained during construction to avoid a similar failure to that on Shass Mountain, which occurred following heavy rainfall, and this is referenced in the Risk Assessments for the turbines/access roads.

8.3.8.4 Peat Stability - Desk Study

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring. The landslide susceptibility of the Site was classified by the GSI (2022) as ranging from “low” to “high” susceptibility, with the higher risk areas corresponding to steeper slopes present in the southern half of the Site. There are no recorded peat failures within 5km of the Site.

8.3.8.5 Peat Stability Analysis

An analysis of peat sliding was carried out at all the main infrastructure locations across the Site. The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes. The FoS provides a direct measure of the degree of stability of the slope. A FoS of less than 1.0 indicates that a slope is unstable, a FoS of greater than 1.0 indicates a stable slope.

The acceptable safe range for FoS typically ranges from 1.3 to 1.4. The previous code of practice for earthworks BS 6031:1981 (BSI, 1981), provided advice on design of earthworks slopes. It stated that for a first-time failure with a good standard of site investigation the design FoS should be greater than 1.3. For the purposes of this assessment, a design FoS of 1.4 has been adopted, as a conservative value.

The assigned probability of instability associated with a given FoS value is described in Table 8-6 below. Hydrological and hydrogeological factors were also assessed in the Geotechnical and Peat Stability Assessment Report, and interaction between FT and HES was undertaken throughout the iterative design process.

No peat failures/landslides are recorded on the Site which suggests that site conditions do not pre-dispose themselves to failures/landslides.

The hand vane results indicate undrained shear strengths in the range 10 to 40kPa, with an average value of about 16kPa. The strengths recorded would be typical of well-drained peat as is present at the Site.

Table 8-6: Probability Scale for Factor of Safety.

Scale	Factor of Safety	Stability
1	1.40 or greater	Acceptable
2	1.0 to 1.4	Marginally Stable
3	<1.0	Unstable

8.3.8.6 Peat Stability Assessment Results

Stability of a peat slope is dependent on several factors working in combination. The main factors that influence peat stability are slope angle, shear strength of peat, depth of peat, pore water pressure and loading conditions.

An adverse combination of factors could potentially result in peat sliding. An adverse condition of one of the above-mentioned factors alone is unlikely to result in peat failure. The infinite slope model (Skempton and DeLory, 1957) is used to combine these factors to determine a factor of safety for peat sliding. This model is based on a translational slide, which is a reasonable representation of the dominant mode of movement for peat failures.

To assess the factor of safety for a peat slide, an undrained[1] (short-term stability) and drained (long-term stability) analysis has been undertaken to determine the stability of the peat slopes on site.

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

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

As mentioned above, the PSRA is attached in **Appendix 8-1**.

8.3.8.6.1 *Undrained Analysis*

Undrained analysis results are presented in Table 8-7. As outlined above the undrained loading condition applies in the short-term during construction and until construction induced pore water pressures dissipate.

The calculated FoS for Condition 1 and Condition 2 are in excess of 1.40 for all Proposed Development locations assessed, indicating a low risk of peat instability.

[1] *For the stability analysis two load conditions were examined, namely*

Condition (1): *no surcharge loading*
Condition (2): *surcharge of 10 kPa, equivalent to 1 m of stockpiled peat assumed as a worst case.*

Table 8-7: Factor of Safety Results (undrained condition)

Turbine No./Waypoint	Factor of Safety for Load Condition	
	Condition (1)	Condition (2)
T1	7.26	3.22
T2	23.39	3.9
T3	15.39	5.13
Substation	9.83	2.81
Met Mast	6.68	2.75
Temporary Construction Compound	14.37	4.79
Peatland Enhancement Area	6.98	2.83
Main Access Road to TCC*	4.37	2.07
Main Access Road (Floating Section)	2.78	2.35
TCC – T01	12.77	6.05
T01 – T02	9.36	3.12
T02 – T03	38.48	6.41

*TCC – Temporary Construction Compound

8.3.8.6.2 *Drained Analysis*

Drained analysis results are presented in Table 8-8. As outlined above, the drained loading condition applies in the long-term. The condition examines the effect of in particular, the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes.

The calculated FoS for Condition 1 and Condition 2 are in excess of 1.40 for all Proposed Development locations assessed, indicating a low risk of peat instability.

Table 8-8 Factory of Safety Results (drained conditions)

Turbine No./Waypoint	Factor of Safety for Load Condition	
	Condition (1)	Condition (2)
T1	3.63	3.46
T2	11.70	4.15

Turbine No./Waypoint	Factor of Safety for Load Condition	
	Condition (1)	Condition (2)
T3	7.70	5.52
Substation	4.92	2.97
Met Mast	3.34	2.93
Temporary Construction Compound	11.50	8.28
Peatland Enhancement Area	9.93	6.16
Main Access Road to TCC	2.19	2.19
Main Access Road (Floating Section)	1.49	2.73
TCC – T01	6.39	6.54
T01 – T02	4.68	3.32
T02 – T03	19.24	6.9

8.3.8.7 Peat Stability Assessment Conclusions

The findings of the peat assessment showed that the Site has a low risk of peat failure and is suitable for the Proposed Development. The findings of the PSRA include recommendations and control measures for construction work in peatlands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.

The Site is typically covered in a shallow layer of blanket peat with undulating terrain of commercial forestry and open peatland. Peat thicknesses recorded during the site walkovers from 354 probes ranged from 0.0 to 5.5m with an average depth of 0.45m. 95% of the probes recorded peat depths of less than 1.5m. The average peat depth at any of the proposed turbine locations is 0.5m. Slope inclinations at the main infrastructure locations range from 6 to 10 degrees.

An analysis of peat sliding was carried out at the main infrastructure locations across the Site for both the undrained and drained conditions. The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes.

An undrained analysis was carried out, which applies in the short-term during construction. For the undrained condition, the calculated FoS for load conditions 1 and 2 for the locations analysed showed that all locations have an acceptable FoS of greater than 1.4, indicating a low risk of peat failure. The undrained analysis is considered the most critical condition for the peat slopes.

A drained analysis was also carried out, which examined the effect of in particular, rainfall on the existing stability of the natural peat slopes on site. For the drained condition, the calculated FoS for load

conditions (1) & (2) for the locations analysed, showed that all locations have an acceptable FoS of greater than 1.4.

The peat stability risk assessment at each infrastructure location, along access roads, in peat placement areas and at settlement pond locations identified a number of mitigation/control measures to reduce the potential risk of peat failure (included in Appendix B of the PSRA).

In summary, the findings of the peat assessment showed that the Proposed Development has a low risk of peat failure and is suitable for the Proposed Development.

8.4 Characteristics of the Proposed Development

The Proposed Development will typically involve removal of peat and subsoils for upgrade of existing and new access roads, internal access road networks, internal cable network, hardstanding emplacement, turbine foundations, crane hardstands, temporary construction compound, borrow pit, met mast installation, and turbine component turning area.

The construction grade granular fill and the higher quality surfacing granular fill will be sourced from 1 no. proposed on-site borrow pit. The estimated volume of extractable rock from the borrow pit is 30,000m^3.

Excavated peat and subsoil will be utilised to restore the on-site borrow pit and will also be used for reinstatement and landscaping works as close to the extraction point as possible. Storage capacity in the borrow pit is approximately 45,000m^3.

Estimated volumes of peat, subsoil and bedrock to be removed/relocated/reused are shown in Table 8-9 below.

Table 8-9 Estimated Peat, Mineral Soil and Bedrock Excavation Volumes

Infrastructure Item	Excavated volume – Peat (m^3)	Excavated volume – Spoil (m^3)	
3 no. Turbine foundations and crane hardstanding's	3,000	25,000	
Access Roads	4,000	16,500	
Construction Compound	500	-	
Met Mast	150	1,000	
Borrow Pit	3,000	4,000	
Total	**10,650**	**46,500**	*57,150*

Peat generated during construction can be reused or reinstated across the Site. Peat may be reused for landscaping on edges of constructed infrastructure (including, road verges, turbine foundations) and shall be placed as soon as reasonably practical after construction as detailed. Approximately a 0.5m depth of peat will be placed at the Biodiversity Enhancement Area.

This shall act as part of the landscaping restoration and tie-in with surrounding topography, reducing visual impacts and restore the existing habitat. Peat/spoil will also be placed in the borrow pit and

proposed peat/spoil deposition areas. Please refer to the Peat and Spoil Management Plan (**Appendix 4-2**).

Potential peat reuse/reinstatement volumes have been estimated and are also presented in Table 8-10.

Table 8-10 Summary of preliminary reinstatement volumes

Infrastructure Item	Peat reinstatement volume (m^3)	Comments
Borrow Pit	45,000	See Drawing P24-263-0600-0009 of the spoil and peat management plan for further details
Reuse of material from road, turbine and hardstand excavations	7,000	Estimated based on site investigations
Landscaping	10,900	It is estimated that 1,000m^3 of peat will be required for landscaping purposes and 500m^3 of spoil as ballast backfill to turbines at each of the 3 no. turbine locations. A further 6,400m^3 of material will be used to landscape the existing hardstand areas associated with the decommissioned windfarm on the site.
Total	62,900	

The summary of preliminary earthwork volumes indicates that the capacity of the development to accommodate excavated material, namely that provided once the Borrow Pit is reinstated, is greater than the volume of peat excavated for the various infrastructures. Temporary storage of peat will likely be required during construction.

It is recommended that the existing hardstand areas, that remain from the previous wind farm development on the Site, can be used for the temporary storage of peat. These are located at convenient locations along the main access road. Please refer to the Peat and Spoil Management Plan (**Appendix 4-2**)

8.5 Likely Significant Effects and Associated Mitigation Measures

8.5.1 Do Nothing Scenario

If the Proposed Development were not to proceed, the potential to effect on lands, soils and geology would be removed.

The opportunity to capture part of Cork's valuable renewable energy resource 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. An alternative land use option to developing a renewable energy project at the Site would be to leave the Site as it is, with no changes made to the current land use compromises of commercial forestry, agricultural land and unutilised existing wind farm infrastructure that remains at the Site from the Kealkill Wind Farm. The opportunity to generate local employment and investment and to diversify the local economy would be lost.

8.5.2 Construction Phase - Likely Significant Effects and Mitigation Measures

The likely effects of the Proposed Development and mitigation measures that will be put in place during the construction phase to eliminate or reduce them are outlined below.

8.5.2.1 Peat, Subsoil and Bedrock Excavation

Excavation of peat, subsoil and bedrock will be required for construction of works for the installation of access roads foundations for turbine bases, crane hardstands, temporary construction compound, met mast, internal cable network and borrow pit. This will result in a permanent removal and relocation of in-situ peat, subsoil and bedrock at most excavation locations. Estimated volumes of peat, subsoils and bedrock to be relocated are summarised in Section 8.4 above. No excavations are required for the extension of operation of the existing on-site 38kV substation.

There is no loss of peat, subsoil or bedrock, it will just be relocated within the Site. Bedrock will be sourced from infrastructure excavations and 1 no. on-site borrow pit.

Pathway: Extraction/excavation.

Receptor: Peat, subsoil and bedrock.

Pre-Mitigation Potential Impact: Negative, slight/moderate, direct, likely, permanent effect on peat, subsoil and bedrock due to relocation within the Site.

Proposed Mitigation Measures by Design:

- Placement of the proposed turbines, borrow pit and associated infrastructure in areas with shallower peat;
- The peat, subsoil and bedrock which will be removed during the construction phase will be localised to the wind farm infrastructure turbine location, and temporary compounds, access roads and borrow pit;
- The Proposed Development has been designed to avoid sensitive habitats within the application area;
- A minimal volume of peat, subsoil and bedrock will be removed to allow for infrastructural work to take place in comparison to the total volume present on the site due to optimisation of the layout by mitigation by design;
- Excavated peat will only be moved short distances from the point of excavation and will be used locally for landscaping;
- Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping;
- Peat and Spoil Management Plan; and,
- Peat Enhancement Plan.

Residual Effect Assessment: The granular soil and peat at the Site can be classified as of "Low" importance and the bedrock "Medium" Importance).

The overall Site is extensive while the permanent infrastructure footprint associated with the Proposed Development footprint is approximately 1.7% of the overall Site (270 ha). The impact is the disturbance and relocation of c 57,150m^3 of soil and subsoil (spoil) during construction. 30,000m^3 of rock will be excavated from the borrow pit for construction purposes.

The design measures incorporated into the project as described above in particular the avoidance of deeper peat areas combined with the 'low to medium' importance of the deposits means and bedrock

that the residual effect will be negative, slight, direct, likely, permanent effect on peat and subsoils due to disturbance and relocation within the Site.

Significance of Effects: No significant effects on soils, subsoils or bedrock are anticipated.

8.5.2.2 Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a pollution risk. 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 peat, subsoils and pollution of the underlying aquifer) on the geological and water environment.

Pathway: Peat and subsoil and underlying bedrock pore space.

Receptor: Peat and subsoil, bedrock.

Pre-Mitigation Potential Impact: Negative, slight, direct, short-term, unlikely effect on peat, subsoils and bedrock.

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 undertaken using a double skinned bowser with spill kits kept on site for accidental leakages or spillages;
- 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;
- Fuels stored on-site will be minimised. All storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate 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 will be contained within the Construction Environmental Management Plan (which is contained in **Appendix 4-3**).

Residual Effect Assessment: The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

Significance of Effects: No significant effects on peat, subsoils and bedrock are anticipated.

8.5.2.3 Erosion of Exposed Subsoils and Peat During Construction of Infrastructure

There is a high likelihood of erosion of peat and spoil during its excavation and during landscaping works. The main impacts associated with this aspect is to the water environment, and therefore this aspect is further assessed in detail in Chapter 9 (Hydrology and Hydrogeology).

Pathway: Vehicle movement, surface water and wind action.

Receptor: Peat and subsoil.

Pre-Mitigation Potential Impact: Negative, slight, direct, short-term, likely effect on peat and subsoils by erosion and wind action.

Proposed Mitigation Measures:

- Peat removed from turbine locations and access roads will be used for landscaping close to the extraction area;
- Where possible, the upper vegetative layer (where still present) will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored peat within the peat storage areas;
- Re-seeding and spreading/planting will also be carried out in these areas; and,
- A full Peat and Spoil Management Plan for the development is shown as **Appendix 4-2**.

Residual Effect Assessment: Peat soils and spoil can be eroded by vehicle movements, wind action and by water movement. To prevent this all-excavation works will be completed in accordance with a detailed Peat and Spoil Management Plan, material will be moved the least possible distance, and reseeding and planting will be completed to bind landscaped peat and spoil together. Following implementation of these measures the residual effected is negative, slight, direct, short-term, likely effect on peat and subsoils by erosion and wind action.

Significance of Effects: No significant effects on soils, subsoils or bedrock are anticipated.

8.5.2.4 Peat Instability and Failure

Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse impact on the Proposed Development and the surrounding environment. The potential significant effects of peat failure at the study area 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.

Pathway: Vehicle movement and excavations.

Receptor: Peat and subsoils.

Pre-Mitigation Potential Impact: Negative, slight, direct, unlikely permanent effect on peat and subsoils.

Impact Assessment:

The findings of the PSRA showed that the Site has an acceptable margin of safety, is suitable for the Proposed Development and is considered to be at low risk of peat failure. The findings include recommendations and control measures for construction work in peatlands to ensure that all works adhere to an acceptable standard of safety.

Proposed Mitigation Measures:

The following general control measures incorporated into the construction phase of the project will assist in the management of the risks for this site:

- Appointment of experienced and competent contractors;
- The site should be supervised by experienced and qualified personnel;
- Allocate sufficient time for the project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement);
- Prevent undercutting of slopes and unsupported excavations;
- Maintain a managed robust drainage system;
- Prevent placement of loads/overburden on marginal ground;
- Set up, maintain and report findings from monitoring systems (as outlined in the Geotechnical and Peat Stability Assessment);
- Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; and,
- Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction.

Please refer to **Appendix 8-1** for proposed turbine specific and road section design proposals.

Residual Effect Assessment: A detailed Geotechnical and Peat Stability Risk Assessment has been completed for the development proposal. The findings of that assessment have demonstrated that there is a low risk of peat failure (at the Site) as a result of the Proposed Development. With the implementation of the control measures outlined above the residual effect will be negative, imperceptible, direct, unlikely, permanent effect on peat and subsoils.

Significance of Effects: No significant effects on soils and subsoils are anticipated.

8.5.2.5 Proposed Turbine Delivery Route Junction Works

The proposed turbine delivery route options are detailed in Chapter 4 (Description of the Proposed Development), Section 4.5. Only areas which may require groundworks or road widening were considered in terms of direct effects on Land, Soils and Geology.

The turbine component turning area along the R584, will require removal of fencing and temporary placement of hardcore, so the area can be used during the delivery of large turbine components. Once the proposed turbines have been delivered, this area will be returned to its original state.

Pathway: Extraction/excavation of soil/subsoil.

Receptor: Soils and subsoils.

Pre-Mitigation Potential Impact: Negative, slight, direct, unlikely, permanent effect on soil and subsoil.

Proposed Mitigation Measures:

Mitigation measures in respect of peat and subsoil excavation are outlined at Section 8.5.2.1.

Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in Section 8.5.2.2 above and measures dealing with soil erosion are dealt with in Section 8.5.2.3. The residual

effects of soil / subsoil contamination from leaks / spills are assessed in Section 8.5.3.2, and the residual effects of soil erosion are assessed in Section 8.5.2.3.

Residual Effect Assessment: The proposed works footprint is small (750m^2), and there will be minimal disturbance to the local geology. As such the residual effects is negative, direct, imperceptible, likely, permanent effect on local subsoils.

Significance of Effects: No significant effects on soils and subsoils are anticipated.

8.5.2.6 Biodiversity Management and Enhancement Plan (BMEP)

The BMEP (Appendix 6-5) sets out the measures to be implemented to ensure that the Proposed Development will result in a net gain in biodiversity. Specifically, proposed peatland restoration will result in a net gain of approximately 1 ha of wet heath habitat, as well as a net gain of 0.7 ha of new riparian woodland.

Furthermore, given the known presence of Kerry slug within the site, it has been proposed to enhance 5.75 ha of suitable habitat for this species. This Plan has set out measures to be implemented during establishment and management phases to ensure that the measures are successful, as well as regularly monitoring by an ecologist to ensure the success of the measures outlined in the BMEP.

Pathway: Enhancement measures and targeted revegetation.

Receptor: Peatland, wet heath and riparian woodland.

Pre-Mitigation Potential Impact: Positive, slight, direct, permanent likely effect of BMEP.

Mitigation Measures:

A site-specific monitoring and evaluation programme will be implemented to ensure that the success of the proposed measures remains long-term. It will also assist in situations where the habitat establishment may not have been successful by providing evidence of shortcomings, allowing a revised management plan to be formulated. Monitoring results will be reported by the Project Ecologist within an Annual Environmental Report. Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared. The enhancement plan will be updated and amended where required to improve the efficacy of the enhancement work

Likely Residual Effect: The likely residual effect of the Proposed Development on peat following the implementation of the Peatland Enhancement is a moderate, positive, direct, permanent effect on peat as it will be wetter and closer to its natural condition with increases in vegetation cover across all bogs.

8.5.3 Operational Phase - Likely Significant Effects and Mitigation Measures

Very few potential direct impacts are envisaged during the operational phase of the Proposed Development. These will include:

- Some construction vehicles or plant may be necessary for maintenance of proposed turbines which could result in minor accidental leaks or spills of fuel/oil; and,
- The transformer in the existing onsite 38kV 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.

- 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.

None of these potential impacts are considered to be significant, as they are of such small scale and also of an intermittent nature.

Mitigation measures for soils and geology during the operational phase include the use of aggregate from authorised quarries for use in road and hardstand maintenance. Oil used in transformers (at the existing onsite 38kV substation and within each turbine) and storage of oils at the existing onsite 38kV substation could leak during the operational phase and impact on ground/peat and subsoils and groundwater or surface water quality. All transformers will be bunded with capacity capable of holding 110% of the stored oil volume.

These mitigation measures are considered sufficient to eliminate potential risks to ground/peat/soils and subsoils, and groundwater and surface water quality.

The residual effects will be negative, direct, imperceptible, unlikely, permanent effect on local peat and subsoils.

8.5.4 Decommissioning Phase - Likely Significant Effects and Mitigation Measures

The potential impacts associated with decommissioning of the Proposed Development will be similar to those associated with construction but of reduced magnitude.

During decommissioning, it may be possible to reverse or at least reduce some of the potential impacts caused during construction by rehabilitating construction areas such as turbine bases, hard standing areas. This will be done by covering with peatland vegetation/scraw or poorly humified peat to encourage vegetation growth and reduce run-off and sedimentation. Other impacts 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".*

Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant.

Some of the impacts will be avoided by leaving elements of the Proposed Development in place where appropriate. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. Internal roads will remain in situ. As per the original grant of permission (PL04.127297/ ABP Ref. 04.127297), the electrical control building and the existing onsite 38kV substation will be decommissioned. The existing onsite 38kV substation will be disconnected from the grid prior to decommissioning. All above ground components and electrical plant will be dismantled. The underground cabling associated with the substation will be cut at either end and pulled from the underground ducting onto a cable drum. The existing onsite 38kV substation and access footprint will be covered with soil and reseeded with appropriate seed mix. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.

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

The residual effects will be negative, direct, slight, likely, permanent effect on local peat and subsoils.

8.5.5 Cumulative Effects

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. The only way the Proposed Development can have in combination 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 (Hydrology and Hydrogeology).

The turbine delivery route and junction works will only require relatively localised excavation works outside the Site and therefore will not contribute to any significant cumulative effects.

8.5.6 Post Construction Monitoring

None required.

8.5.7 Risk of Major Accidents and Disasters

Due to the nature of the Proposed Development, *i.e.* soft peat deposits, there is a risk of peat movement occurring. However, due to the generally thin nature of peat at the Site, the risk is low.

A comprehensive Geotechnical and Peat Stability Risk Assessment (FT, 2025) has been undertaken for all Proposed Development infrastructure locations, and it concludes that with the implementation of the proposed control (mitigation) measures, the residual effect of a landslide occurring is determined to be imperceptible.

8.5.8 Conclusion

Excavation of peat, subsoil and bedrock will be required for site levelling and for the installation of wind farm infrastructure. This will result in a permanent removal of peat, subsoil and possibly bedrock at most excavation locations. Excavated peat will be utilized to re-instate the borrow pit location (1 no.) and will also be used for reinstatement and landscaping works around the site. The handling and management of peat will be undertaken in accordance with the Peat & Spoil Management Plan (Appendix 4-2). Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods.

Measures to prevent peat and subsoil erosion during excavation, reinstatement, and permanent placement in borrow pit will be undertaken to prevent water quality impacts.

A Geotechnical and Peat Stability Assessment undertaken for the site shows that there is a low risk of peat instability/failure at the Site and along the proposed construction access road.

No significant impacts on the land, soil, and geology of the Site will occur during construction, operation, or during decommissioning phases.

Our assessment also concludes that there will be no cumulative effects on land, soil and geology environment as a result of the Proposed Development.