

## 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 likely and any significant effects of the proposed Maughanaclea Renewable Energy Development (Proposed Project) on the Land, Soils and Geology aspects of the receiving environment. The Proposed Project is described in full in Chapter 4 of this EIAR.

The 'Proposed Wind Farm' refers to the 14 no. turbines and supporting infrastructure, including the proposed 110kV onsite substation (detailed description provided in Chapter 4 of this EIAR). The 'proposed turbines' refers to the 14 no. turbines associated with the Proposed Wind Farm.

The 'Proposed Grid Connection' refers to the 110kV underground cabling connection and all ancillary works and apparatus from the proposed 110kV onsite substation to the existing Dunmanway 110kV substation. The Proposed Grid Connection will facilitate the connection of the Proposed Wind Farm to the national electricity grid.

Where 'the Site' is referred to, this relates to the primary study area for the Proposed Project EIAR, as delineated by the EIAR Site Boundary in Figure 1-1 of the EIAR, and includes both the Proposed Wind Farm and Proposed Grid Connection.

The 'Proposed Wind Farm site' refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the Site surrounding the Proposed Grid Connection.

This report provides a baseline assessment of the environmental setting of the Proposed Project, as described in Chapter 4, in terms of Land, Soils and Geology and discusses the potential likely and significant effects that the construction, operation and decommissioning of the Proposed Project will have. Where required, appropriate mitigation measures to avoid any identified significant effects to Land, Soils and Geology (i.e. natural resources) are recommended and the residual effects of the Proposed Project post-mitigation are assessed. The proposed Turbine Delivery Route (TDR) from Ringaskiddy Port to the Proposed Wind Farm site has been screened out of this assessment, as it will not require any interventions outside of the existing national/regional road network.

#### 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 upland hydrology and windfarm drainage design. We routinely complete impact assessment reports for hydrological and hydrogeological aspects for a variety of project types.

This chapter of the EIAR was prepared by Michael Gill, David Broderick and Nitesh Dalal.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer/Hydrologist with over 24 years' environmental consultancy experience in Ireland.

Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. He has also managed EIAR assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland 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 Glenard Wind Farm, Cahermurphy Wind Farm, and Seven Hills Wind Farm, and over 100 other wind farm related projects across the country.

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 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 Carrigarierk Wind Farm, Curraglass Wind Farm, Esk Wind Farm and Shehymore Wind Farm, and over 60 other wind farm related projects across the country.

Nitesh Dalal (B.Tech, PG Dip., MSc) is an Environmental Scientist with HES. Nitesh holds a M.Sc. in Environmental Science from University College Dublin (2024), a PG Diploma in Health, Safety and Environment from Annamalai University, India (2021) and B.Tech. in Environmental Engineering (2016) from Guru Gobind Singh Indraprastha University, India (2016).

### 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. Regard has also been taken of the requirements of the following legislation:

- Planning and Development Acts, 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, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- S.I. No. 296 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018;
- European Communities (Environmental Impact Assessment) Regulations 1989 to 2017; and,
- S.I. No. 4/1995: The Heritage Act 1995, as amended.

### 8.1.4 Relevant Guidance

The Land, Soils and Geology chapter of this EIAR is carried out in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and 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; (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);
- The Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments; and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Commission 2017).

### 8.1.5 Study Area

The Proposed Project Study Area with regard Land, Soils and Geology is within at least 2km of the Site as per The Institute of Geologists of Ireland (2013) guidance. However, only direct effects on land, soils and geology within the Site are expected with regard the Proposed Project works (i.e. no indirect effects/off-site effects).

## 8.2 Assessment Methodology

### 8.2.1 Desk Study

A desk study of the Site and Study Area (refer to Section 8.1.5 above) was completed in advance of undertaking the walkover survey and site investigations. This involved collecting all relevant geological data and included consultation with the following data sources:

- Environmental Protection Agency database ([www.epa.ie](http://www.epa.ie));
- Geological Survey of Ireland - Groundwater and Geology Databases ([www.gsi.ie](http://www.gsi.ie));
- Geological Survey of Ireland – Geological Heritage site mapping;
- 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](http://www.epa.ie)); and,
- Aerial Photography, 1:5,000 and 6” base mapping.

### 8.2.2 Baseline Monitoring and Site Investigations

A walkover survey, including geological mapping and investigations of the Site, were undertaken by David Broderick of HES (refer to Section 8.1.2 above for qualifications and experience) on the 5<sup>th</sup> and 6<sup>th</sup> of September 2024 and 26<sup>th</sup> February, 13<sup>th</sup> March and 9<sup>th</sup> April 2025.

The following geotechnical reports were prepared by Fehily and Timoney (FT) in support of the application:

- Geotechnical and Peat Stability Assessment Report (**Appendix 8-1**)
- Peat and Spoil Management Plan (**Appendix 4-2**)

A total of no. 640 peat probes and shear vane testing were carried out at the Site by FT, MKO, HES and Enerco Energy Ltd. between July 2024 and September 2025.

A ground investigation was carried out at the Proposed Wind Farm site by Irish Drilling Limited (IDL) under the supervision of FT during January and March 2025. Ground investigation in the form of trial pits were carried out on 29<sup>th</sup> and 30<sup>th</sup> of January and 4<sup>th</sup> and 5<sup>th</sup> February 2025. Gouge coring was carried out by HES on 5<sup>th</sup> and 6<sup>th</sup> of September 2024 and on 13<sup>th</sup> March 2025.

The trial pits (16 no. in total) were carried out at various locations across the Proposed Wind Farm site to provide information on the ground conditions and depth to bedrock. In addition, rotary coring drilling was carried out at 3 no. of the 4 no. proposed borrow pit locations (BP1, BP2 & BP3) between 19<sup>th</sup> and 26<sup>th</sup> March 2025.

The objectives of the intrusive site investigations included mapping the distribution and depth of peat and mineral subsoils at the Proposed Wind Farm site along with assessing the mineral subsoil / bedrock conditions at key Proposed Project locations (i.e. proposed turbines, temporary construction compound, existing and proposed access roads, peat and peat/spoil repository areas, borrow pits and substation). This robust data set was used to inform the impact assessment and final layout design.

In summary, site investigations to address the Land, Soil and Geology section of the EIAR included the following:

- Walkover surveys and geological mapping of the Site area were undertaken to assess general ground conditions and topography;
- A total of 640 no. peat probes were undertaken by HES, MKO, FT and Enerco Energy Ltd. to determine the thickness and geomorphology of the blanket peat overlying parts of the Site;
- Shear vane strength testing was carried out in-situ using a Geonor H-60 Hand-Field Vane Tester;
- Trial pitting (16 no.) by FT and gouge cores (15 no.) by HES to investigate soil, peat and mineral subsoil lithology as well as depth to bedrock;
- Investigation drilling by IDL (3 no. boreholes under supervision of FT) to determine the full geological profile of the Proposed Wind Farm site (i.e. peat, mineral subsoil and bedrock profile) and borrow pit design;
- Laboratory testing (classification testing for overburden material rock strength testing); and,
- Mineral subsoils and peat were logged according to BS: 5930 and Von Post Scale respectively.

The above site investigations were also used to inform the Geotechnical and Peat Stability Assessment Report (GPSAR, FTC, March 2026) which includes the IDL trial pit and borehole logs, and the Peat and Spoil Management Plan (PSMP, FTC, March 2026) which are included as **Appendix 8-1** and **Appendix 4-2** of this EIAR respectively.

### 8.2.3 Scoping and Consultation

The scope for this EIAR has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process is outlined in Section 2.8 of this EIAR. Relevant Land, Soils and Geology responses are summarised in

**Table 8-1** below.

*Table 8-1: Summary Land, Soils and Geology Related Scoping Responses.*

| Consultee  | Matters Raised - Description   | Addressed in Sections   |
|--|--|---|
| Department of Housing, Local Government and Heritage | <i>“Detailed consideration should be given to the potential amount of peat /soil excavated, stored, and disposed/recovered. A detailed plan for the safe storage, disposal and rehabilitation of excavated or disturbed peat /soil would have to form part of the EIAR”.</i> | Sections 8.5 and 8.6.2.2<br><b>Appendix 8-1</b><br>Geotechnical and Peat Stability Assessment Report (GPSAR, FTC, 2026) |

|                                    |  |   |
|------------------------------------|--|---|
|                                    | <p><i>“The associated impacts of quarrying or extraction should be included among the considerations at the earliest stages of project planning and design, and should be assessed fully in the EIAR. Reinstatement or restoration plans would be required for any quarries or borrow pits on-site and should be included in the EIAR. As with any other part of the development, all borrow pits (existing or proposed) to be used in construction would have to be included within the application area for the proposed development”.</i></p> <p><i>“Assessment should include an assessment of the loss of underlying peat within the development site as a cumulative loss of peat overall and should be assessed in terms of a carbon benefit analysis versus restoration to peatland habitats”.</i></p> | <p><b>Appendix 4-2</b> Peat and Spoil Management Plan (PSMP, FTC, 2026).</p>  |
| Geological Survey of Ireland (GSI) | The Geological Survey of Ireland response was informative in nature with regard sources of online data for baseline assessment purposes. No concerns or matters were put forward.  | All relevant GSI online resources have been used in this assessment.  |
| Health Service Executive (HSE)     | <p><i>“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.</i></p> <p><i>Information should be provided on the make and model of the turbines and on construction details for the turbine foundations, including the depth and volume of concrete required. An accurate assessment of the potential impacts of the foundations on water quality and peat stability cannot be undertaken without this information”.</i></p>                                      | <p>Sections 8.2.9.1, 8.2.9.2, 8.2.9.2.1, 8.2.10.2, 8.2.15, 8.3 &amp; 8.6.2.5</p> <p><b>Appendix 8-1</b><br/>Geotechnical and Peat Stability Assessment Report (GPSAR, FTC, 2026)</p> <p><b>Appendix 4-2</b> Peat and Spoil Management Plan (PSMP, FTC, 2026).</p> |

## 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 land, soil and geological environment of the Site and Study Area 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  | <p>Attribute has a high quality, significance or value on a regional or national scale.</p> <p>Degree or extent of soil contamination is significant on a national or regional scale.</p> | <p>Geological feature rare on a regional or national scale (NHA).</p> <p>Large existing quarry or pit.</p> <p>Proven economically extractable mineral resource.</p> |

|        |  |   |
|--------|--|---|
|        | Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.   |   |
| High   | Attribute has a high quality, significance or value on a local scale.<br>Degree or extent of soil contamination is significant on a local scale.<br>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).<br>Well drained and/or highly fertility soils.<br>Moderately sized existing quarry or pit Marginally economic extractable mineral resource. |
| Medium | Attribute has a medium quality, significance or value on a local scale.<br>Degree or extent of soil contamination is moderate on a local scale.<br>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.<br>Moderately drained and/or moderate fertility soils. Small existing quarry or pit.<br>Sub-economic extractable mineral Resource.   |
| Low    | Attribute has a low quality, significance or value on a local scale.<br>Degree or extent of soil contamination is minor on a local scale.<br>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.<br>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 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      | <p>Widespread permanent impact on:</p> <ul style="list-style-type: none"> <li>➤ The extent or morphology of a cSAC.</li> <li>➤ Regionally important aquifers.</li> <li>➤ Extents of floodplains.</li> </ul> <p>Mitigation measures are unlikely to remove such impacts.</p>   |
| Positive or Negative          | Significant   | <p>Local or widespread time-dependent impacts on:</p> <ul style="list-style-type: none"> <li>➤ The extent or morphology of a cSAC / ecologically important area.</li> <li>➤ A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features).</li> <li>➤ Extent of floodplains.</li> </ul> <p>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.</p> |
| Positive or Negative          | Moderate      | <p>Local time-dependent impacts on:</p> <ul style="list-style-type: none"> <li>➤ The extent or morphology of a cSAC / NHA / ecologically important area.</li> <li>➤ A minor hydrogeological feature.</li> <li>➤ Extent of floodplains.</li> </ul> <p>Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends</p>   |
| 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.

## 8.2.6 Existing Environment

## 8.2.7 Site Description and Topography

The Proposed Wind Farm is located approximately 2.8km to the east of Kealkill village from the nearest turbine (T14) within the Maughanaclea Hills, which is an upland area characterised by rocky outcrops, upland peat and forestry plantations. At lower elevations on these hills there is typically a transition into improved grassland and wet heathland.

The Proposed Wind Farm site comprises two clusters of turbines which are separated by the Owngar River Valley which drains westerly towards Kealkill village.

The northern turbine cluster, which has 6 no. proposed turbines (T1 – T6), is dominated by coniferous forestry, open upland peat and improved grassland. The proposed turbines are distributed across a southwest-northeast trending topographic ridgeline where the ground slopes steadily both to the north and south of the ridgeline.

Ground elevations within the northern turbine cluster of Proposed Wind Farm site range between approximately 212m OD to 348m OD (metres above Ordnance Datum) at the proposed turbine cluster. Two turbines (T1 & T2) are located in coniferous forestry while the other four are located in upland peat/heathland/improved grassland. A new watercourse crossing will be constructed on the Site on access road to the northern turbine cluster over the Owngar River.

The southern turbine cluster of the Proposed Wind Farm site, which has 8 no. proposed turbines (T7 – T14), is dominated forestry and open upland peat with a smaller section of improved grassland. The proposed turbine locations straddle a topographic ridgeline extending to the west of the Maughanaclea Hills where ground elevations at the proposed turbine locations in the southern turbine cluster ranging between 212m and 376m OD, which slopes away to the north and south of the ridgeline.

Five turbines are located in coniferous forestry (T7 – T11), two in improved grassland (T12 & T13) and one in upland peat (T14).

Underground electrical (33kV) and communications cabling will connect the wind turbines and meteorological mast to the proposed 110kV onsite substation.

A Biodiversity Management and Enhancement Plan (BMEP) is proposed for the Proposed Wind Farm site. It is proposed to fell an area of young conifer plantation in the northern turbine cluster of the Proposed Wind Farm site. Replanting native woodland in an area of conifer forestry adjacent to the 110kV substation is proposed in the southern turbine cluster.

The Proposed Grid Connection connects the proposed 110kV onsite substation located in the Proposed Wind Farm site's southern cluster to the existing 110kV substation at Dunmanway, located approximately 13km to the southeast of the Proposed Wind Farm site ('as the bird flies'). The Proposed Grid Connection, which is 20.5km in length, follows public roads R585, L4609, L4909, L4615, R587, and the R586.

Current land-use on the Proposed Wind Farm site is predominantly commercial forestry, with agricultural pastures and rough grazing also present. Current land-use along the Proposed Grid

Connection comprises of the public road corridor, public open space, pastures, and private land principally used by agriculture.

Land-use on the wider landscape comprises a mix of pastoral agriculture, low-density residential, and small-scale commercial properties.

## 8.2.8 Land and Landuse

Based on the Corine 2018 land cover mapping, the majority of the northern turbine cluster of the Proposed Wind Farm comprises peat bogs with some areas in the centre comprising Coniferous forests. The southern turbine cluster of the Proposed Wind Farm comprises peat bogs and coniferous forests with areas of moors and heathlands mapped on the western side. Land cover mapping along the Proposed Grid Connection is mainly agricultural with some peat bogs.

Current land-use on the Proposed Wind Farm site comprises coniferous forestry, peat bog and agriculture.

Current land-use along the Proposed Grid Connection comprises primarily of public road corridor, as well as some instances of private land.

Land-use in the wider landscape comprises a mix of agriculture, low density residential, renewable energy generation and commercial forestry.

## 8.2.9 Soils and Subsoils

### 8.2.9.1 GSI Mapping

The published Teagasc soil maps ([www.gsi.ie](http://www.gsi.ie)) for the local area shows that the majority of the Proposed Wind Farm site is overlain by shallow, rocky, peaty/non-peaty mineral complexes (Mainly acidic) (AminSRPT) with small patches of deep well drained mineral (Mainly acidic) (AminDW), peaty poorly drained mineral (Mainly acidic) (AminPDPT), blanket peat (BktPt) and shallow well drained mineral (Mainly acidic) (AminSW).

The Teagasc soil maps shows that the majority of lands adjacent to the Proposed Grid Connection is mapped as peaty poorly drained mineral (Mainly acidic) (AminPDPT), deep well drained mineral (Mainly acidic) (AminDW) and mineral poorly drained (Mainly acidic) (AminPD) with small patches overlain by shallow, rocky, peaty/non-peaty mineral complexes (Mainly acidic) (AminSRPT), blanket peat (BktPt), made ground (Made) and alluvial (mineral) (AlluvMIN).

The published GSI subsoil maps ([www.gsi.ie](http://www.gsi.ie)) shows that the majority of the Proposed Wind Farm site is mapped as bedrock outcrop or subcrop (Rck) with pockets of blanket peat (BktPt). Lower down on the slopes there is a transition into glacial tills derived from Devonian and Carboniferous sandstones and shales (TDCSsS). Alluvium is mapped along the course of the Owngar River.

Based on the GSI mapping, the majority of the Proposed Wind Farm infrastructure, including 11 no. of the proposed 14 no. turbines, is located in areas mapped as outcrop or subcrop (i.e. shallow bedrock) with 3 no. turbines mapped on or immediately adjacent to blanket peat (T1, T2 and T12). The 4 no. proposed borrow pit locations are also located in areas mapped as outcrop or subcrop. The proposed 110kV onsite substation location is mapped as glacial tills.

The GSI subsoil maps ([www.gsi.ie](http://www.gsi.ie)) shows that the majority of the Proposed Grid Connection is underlain by till derived from Devonian sandstones (TDSs) with small patches underlain by till derived from Devonian and Carboniferous sandstones and shales (TDCSsS), Bedrock outcrop



or subcrop (Rck), Alluvium (A) and Blanket Peat (BktPt). The GSI subsoils maps is shown as **Figure 8-1** below.

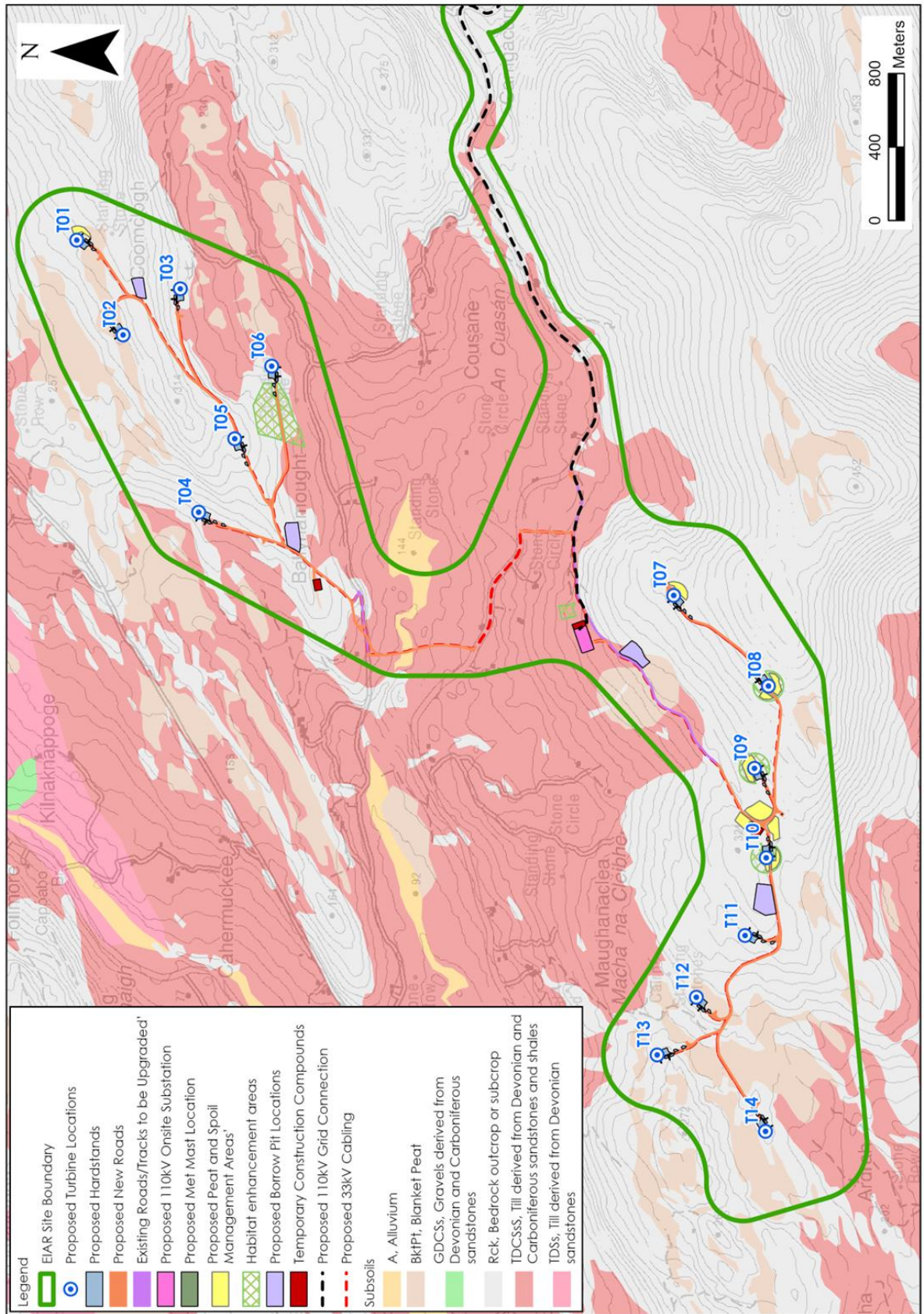


Figure 8-1: GSI Subsoils Map.

### 8.2.9.2 Peat Depth Probing

A total of 640 no. peat depth probes were carried out at the Proposed Wind Farm site by FT, MKO, Enerco and HES since July 2024. Peat depths recorded across the Proposed Wind Farm site ranged from 0 to 4.5m with an average depth of 0.65m. This would be considered shallow for upland blanket bog.

Approximately 78% of recorded peat depth were less than 1m and with 95% of less than 2.0m. A number of localised readings (around 1%) were recorded where peat depths were between 2m and 4.5m. A peat depth distribution plot for all 640 no. data points is shown as **Figure 8-2** below.

The peat depths recorded at the proposed 14 no. turbine locations varied from 0.1 to 2.1m with an average depth of 0.8m.

Please refer to **Table 8-5** below for peat depths at turbine locations.

With respect to the new proposed access roads, peat depths are typically less than 1.0m (average 0.6m) with localised depths of up to 3.0m. At the 4 no. proposed borrow pit locations, peat depths are shallow (0.1 - 1.5m) due to the prevalence of shallow subcrop bedrock.

Peat strengths recorded across the Site vary from 10 to 55kPa with an average of 25kPa. The lowest shear strength was recorded in the southwest of the Proposed Wind Farm site, in the deepest area of peat.

A summary peat depth map for the Proposed Wind Farm is shown as **Figure 8-3** below.

Peat probing was carried out at three locations along the Proposed Grid Connection where blanket peat was indicated by the GSI mapping. Minimal peat was recorded at these locations with depths ranging from 0m to 0.2m.

Please note that the cable will be placed within the road carriageway along the Proposed Grid Connection and not on virgin ground.

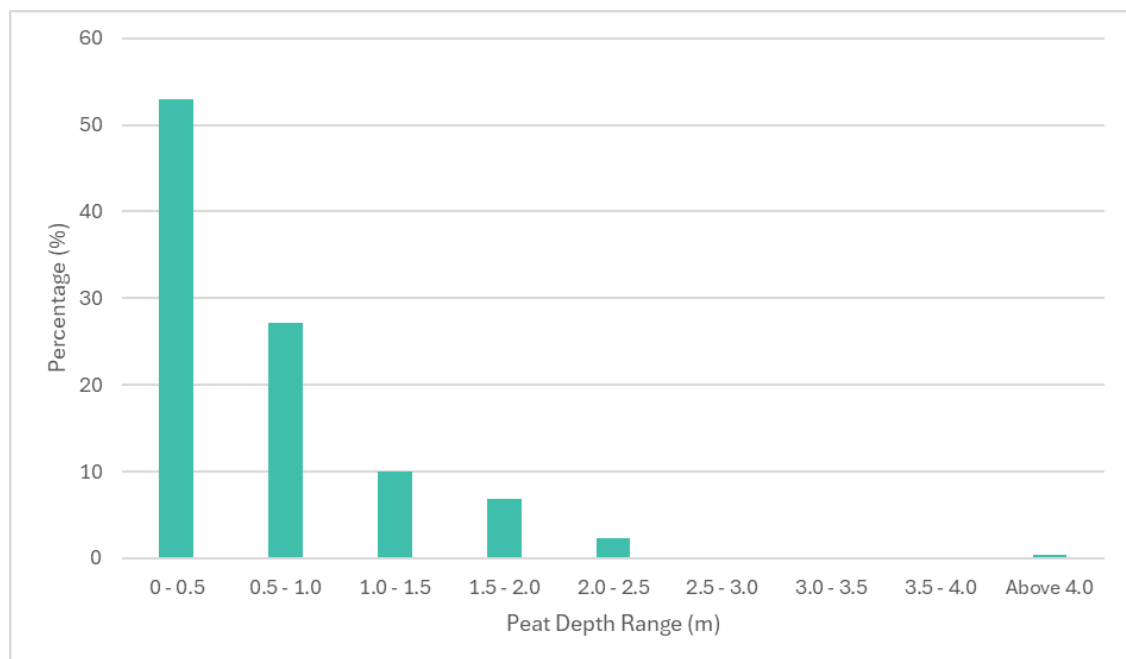


Figure 8-2: Peat Thickness Distribution.

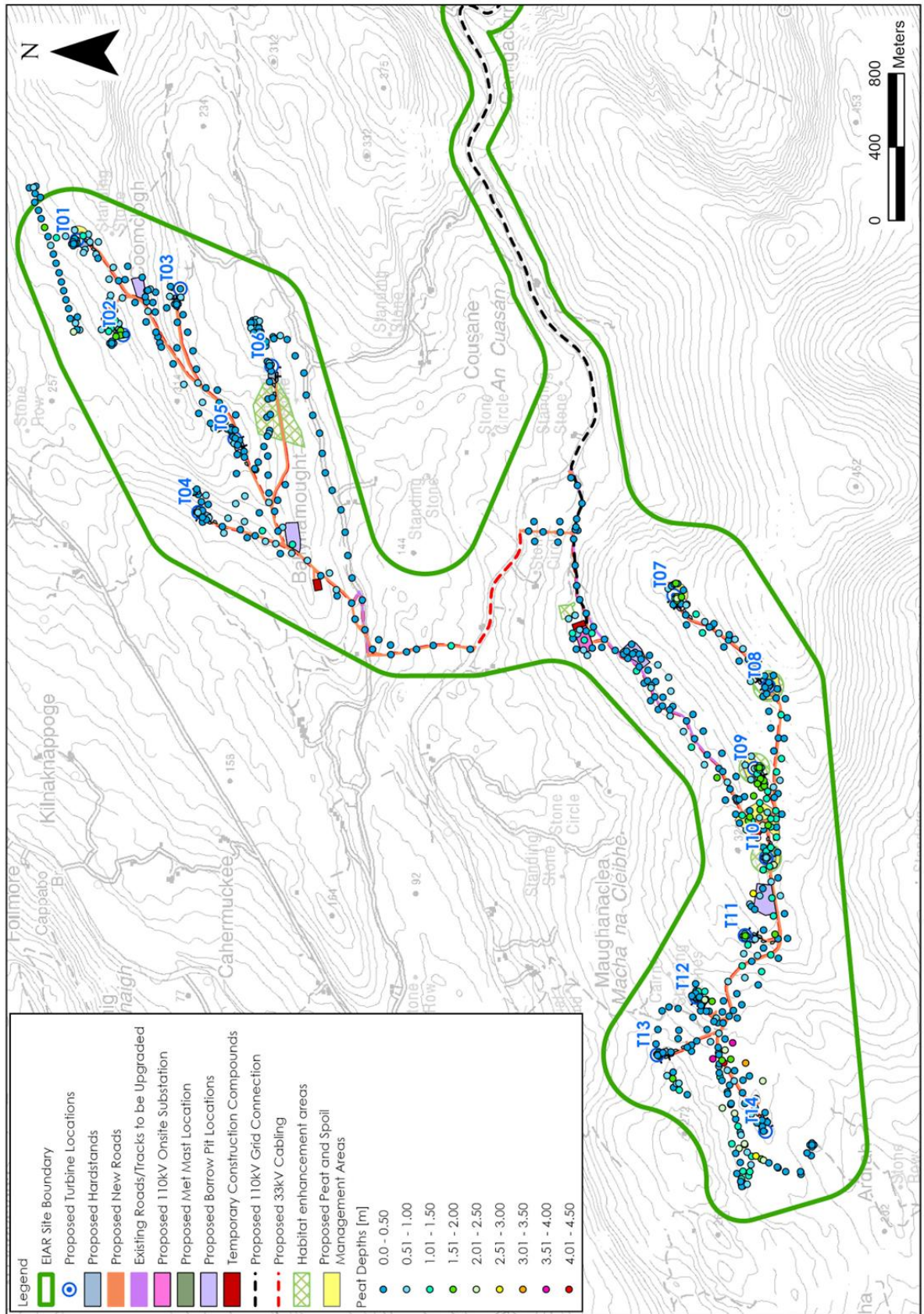


Figure 8-3: Summary Peat Depth Map.

### 8.2.9.2.1 Trial Pitting

A total of 16 no. trial pits were carried out by IDL at the Proposed Wind Farm site during January and February 2025. Refer to **Figure 8-4** for trial pit locations.

The dominant subsoil encountered was silty, sandy GRAVEL with occasional SILT and SAND dominated subsoil. The GRAVEL in particular is likely to have originated from weathering of the underlying shallow bedrock.

Refusal on bedrock (presumed) was recorded in all 16 no. trial pits. Depth to bedrock is shallow at the Proposed Wind Farm site and ranged between 0.2m and 3.5m with an average of 1.5m. This is consistent with the GSI subsoil mapping which shows bedrock outcrop or subcrop mapped at the Proposed Wind Farm site.

Trial pits were carried out at 6 no. proposed turbine locations (T3 – T6, T12 & T13) as these were the only turbines that could be accessed by an excavator. The other turbine locations were not accessible for trial pitting and gouge cores were carried out as an alternative. Shallow bedrock is also expected at the turbines where no trial pit was carried out.

Depth to bedrock at turbine locations where trial pits were carried out ranged between 0.6 (T12) and 3.5m (T4) with an average of 1.5m. A summary of investigations taken at key proposed infrastructural locations is shown in **Table 8-5** below.

Trial pit logs are attached to the Geotechnical and Peat Stability Assessment Report (**Appendix 8-1**).

*Table 8.5: Summary of Overburden Site Investigations.*

| Location ID | Site Investigation ID | Probe Average Peat Depth (m) | Presumed Depth to Bedrock (mbgl) | Summary of Primary Mineral Subsoil Lithology               |
|-------------|-----------------------|------------------------------|----------------------------------|--|
| T1          | GC-T1                 | 0.3                          | ND                               | Gravelly, sandy SILT                                       |
| T2          | GC-T2                 | 0.2                          | ND                               | Gravelly, sandy SILT                                       |
| T3          | TPT03                 | 0.3                          | 1.5                              | GRAVEL with rare cobbles                                   |
| T4          | TPT04                 | 0.75                         | 3.5                              | SILT with rare cobbles over GRAVEL with occasional cobbles |
| T5          | TPT05                 | 0.5                          | 1.2                              | GRAVEL with occasional cobbles                             |
| T6          | TPT06                 | 0.25                         | 1.3                              | SAND with rare cobbles and boulders                        |
| T7          | GC-T7                 | 1.9                          | ND                               | Gravelly, sandy SILT/CLAY                                  |
| T8          | GC-T8                 | 0.7                          | ND                               | Gravelly, sandy SILT                                       |
| T9          | GC-T9                 | 1.5                          | ND                               | Gravelly, sandy SILT                                       |
| T10         | GC-T10                | 0.5                          | ND                               | Gravelly, sandy SILT/CLAY                                  |
| T11         | GC-T11                | 1.5                          | ND                               | Gravelly, sandy SILT/CLAY                                  |
| T12         | TPT12                 | 0.15                         | 0.6                              | GRAVEL with occasional cobbles                             |

| Location ID             | Site Investigation ID | Probe Average Peat Depth (m) | Presumed Depth to Bedrock (mbgl) | Summary of Primary Mineral Subsoil Lithology     |
|-------------------------|-----------------------|------------------------------|----------------------------------|--|
| T13                     | TPT13                 | 0.15                         | 1.1                              | GRAVEL with occasional cobbles                   |
| T14                     | GC-T14                | 0.1                          | ND                               | Gravelly SILT                                    |
| Substation              | TPSS01                | 1.0                          | 2.5                              | GRAVEL with occasional cobbles and rare boulders |
| Construction Compound N | GC-CCN                | 0.5                          | ND                               | Gravelly, sandy SILT/CLAY                        |
| Construction Compound S | GC-CCS                | 1.9                          | ND                               | Gravelly, sandy SILT/CLAY                        |
| Borrow Pit 1            | RC-03                 | 0.3                          | 1.5                              | GRAVEL with occasional cobbles                   |
| Borrow Pit 2            | RC-02                 | 0.6                          | 1.3                              | GRAVEL   |
| Borrow Pit 3            | RC-01/TP01            | 0                            | 0.2                              | GRAVEL   |
| Borrow Pit 4            | GC-BP4                | 0.9                          | ND                               | Gravelly SILT                                    |

\*ND – Not Determined

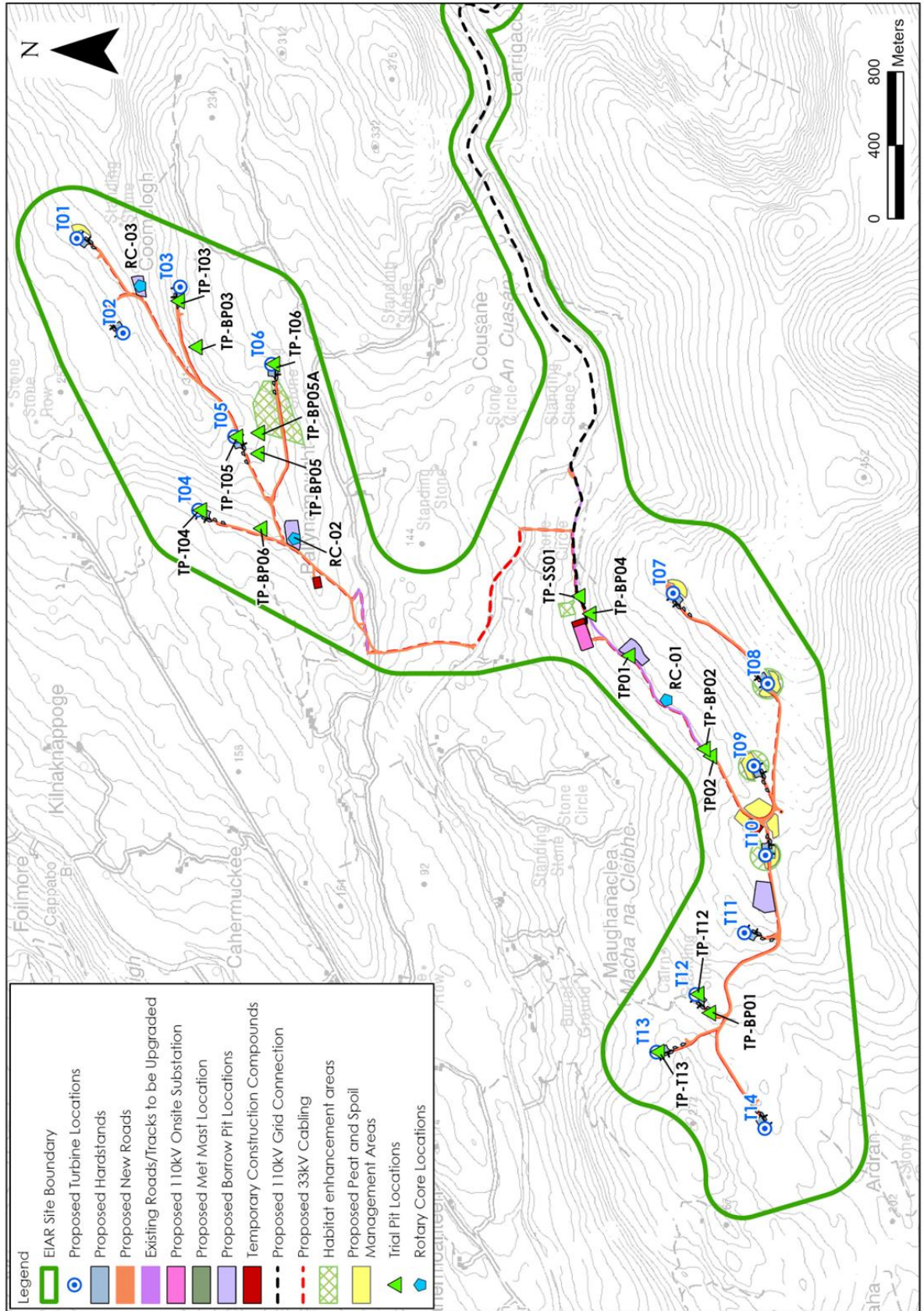


Figure 8-4: Site Investigation Map.

## 8.2.10 Bedrock Geology

### 8.2.10.1 GSI Mapping

According to the GSI 100k Bedrock map ([www.gsi.ie](http://www.gsi.ie), GSI (2003)), the majority of the northern turbine cluster of the Proposed Wind Farm site is underlain by the Reenagough Member described as Massive & flaser-bedded sandstone while the eastern and southeastern side is underlain by the Ardaturrish Member described as black mudstone & silt-lensed mudstone. A very small portion on the north side is underlain by the Toe Head Formation described as Cross-bedded sandstone & minor mudstone.

The majority of the southern turbine cluster of the Proposed Wind Farm site is underlain by the Ardaturrish Member, while the western side is underlain by the Reenagough Member, the eastern side by the Old Head Sandstone Formation and southeastern by the Toe Head Formation.

There are 3 no. GSI mapped faults intercepting the northern section of the Proposed Wind Farm site and 5 no. mapped faults intercepting the southern section of the Proposed Wind Farm site. These mapped faults have no consequence for the Proposed Project in terms of stability or geohazards.

According to the GSI 100k Bedrock map ([www.gsi.ie](http://www.gsi.ie)), the central part of the Proposed Grid Connection is underlain by the Caha Mountain Formation described as purple & green sandstone & siltstone which is surrounded on both side by Gun Point Formation described as green-grey sandstone & purple siltstone.

The Gun Point Formation is surrounded on both sides by Castlehaven Formation described as purple mudstone and siltstone. The Castlehaven Formation is surrounded on both sides by Toe Head Formation. The far western and eastern portion of the Proposed Grid Connection is underlain by Old Head Sandstone Formation described as Flaser-bedded sandstone & minor mudstone.

GSI bedrock mapping is shown as **Figure 8-5** below.

### 8.2.10.2 Investigation Drilling

A rotary cored borehole was undertaken at 3 no. of the 4 no. proposed borrow pit locations (BP1, BP2 and BP3) on the 3<sup>rd</sup> and 4<sup>th</sup> January 2024 to confirm the suitability of the rock as a base layer for hardstand and access road construction. The drilling also confirmed the competency of the underlying bedrock for the purpose of permanent peat storage at the borrow pits post construction.

Drilling was carried out at Borrow Pit No. 1 (RC-03), Borrow Pit No. 2 (RC-02) and Borrow Pit No. 3 (RC-01). A summary of the drilling logs is shown in **Table 8-6** below. Refer to **Appendix 8-1** for the complete IDL drilling logs. Refer to **Figure 8-4** above for BH locations.

RC-01 was drilled to a depth of 6m (278m OD) and no bedrock was encountered. However, a trial pit (TP01) carried out within the footprint of borrow pit 3 (BP3) met shallow bedrock at 0.2mbgl.

RC-02 encountered weathered SANDSTONE between 1.3 and 5.1mbgl. Very strong SANDSTONE was encountered between 5.1mbgl and the remainder of the hole down to 10.4mbgl (219m OD).

RC-03 encountered weathered SILTSTONE between 1.5 and 5.4mbgl. Very strong SILTSTONE was encountered between 5.4mbgl and the remainder of the hole down to 10.3mbgl (307m OD).

No fractures, faults or jointing (i.e. potential groundwater flowpaths) were encountered in RC-02 or RC-03. Total Core Recovery (TCR) was 100% in both boreholes, while Solid Core Recovery (SCR) was 94%.

Table 8-6: Summary of Borrow Pit Drilling Investigations.

| BH ID          | Depth Range<br>(m bgl) | Summary Description   |
|----------------|------------------------|---|
| RC-01<br>(BP3) | 0 – 1.5                | Overburden (No recovery)  |
|                | 1.5 to 6               | Overburden – GRAVEL with cobbles and silt (no bedrock encountered)                      |
| RC-02<br>(BP2) | 0 – 1.3                | Overburden – GRAVEL   |
|                | 1.3 to 5.1             | Weathered SANDSTONE   |
|                | 5.1 to 10.4            | Very strong locally strong thinly laminated brownish green silty fine-grained SANDSTONE |
| RC-03<br>(BP1) | 0 – 1.5                | Overburden (No recovery)  |
|                | 1.5 to 5.4             | Weathered SILTSTONE   |
|                | 5.4 to 10.3            | Very strong locally strong thinly laminated grey slightly sandy fine-grained SILTSTONE  |

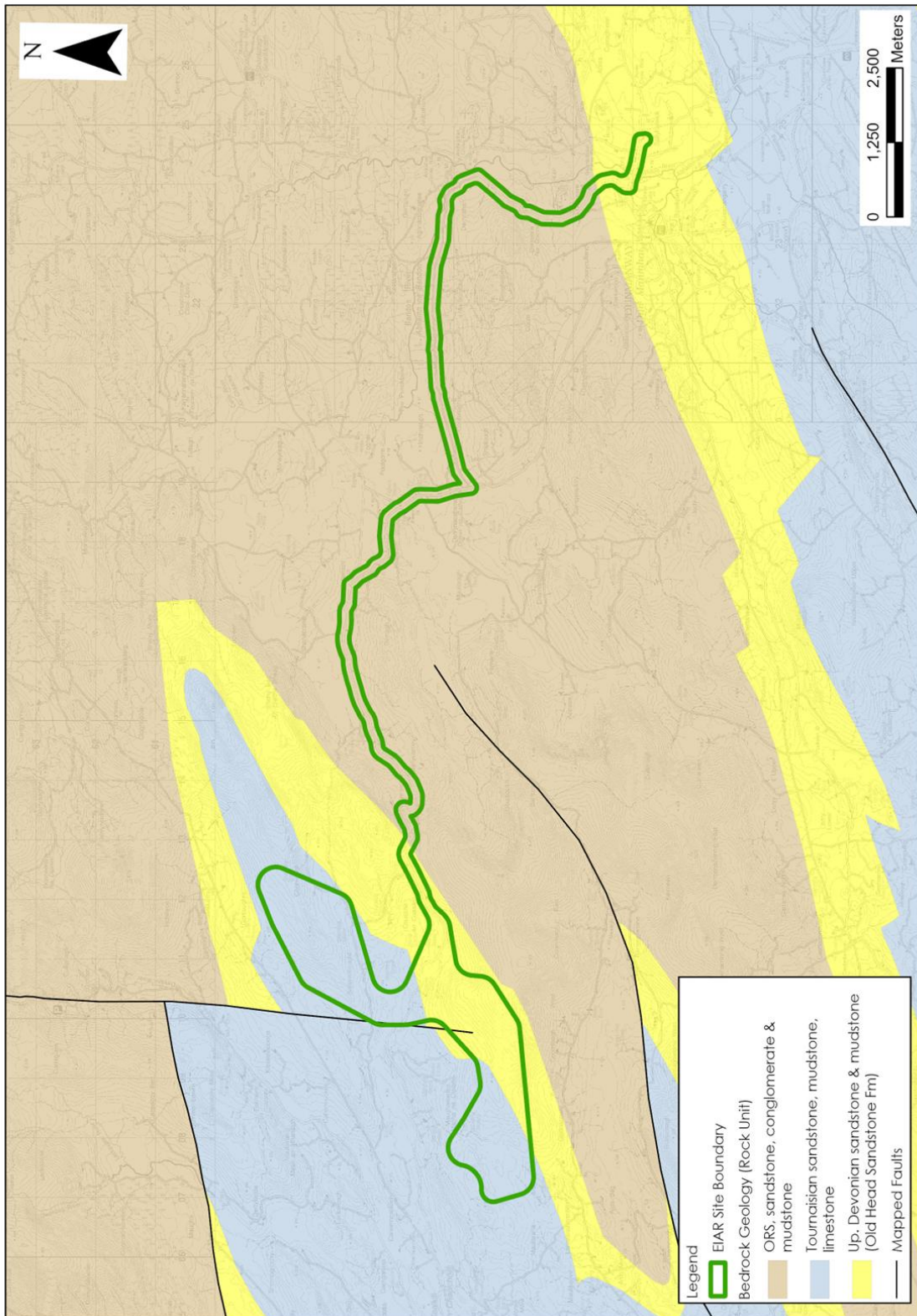


Figure 8-5: GSI Bedrock Geology Map.

### 8.2.11 Geological Resource Importance

The bedrock at the Site is classified as “Low” importance. The bedrock could be used on a “sub-economic” local scale for construction purposes. The bedrock types at the Site are not typically extracted on a commercial scale. Refer to **Table 8-2** for classification criteria.

The peat deposits at the Site can be classified as “Low” importance as the peat is not designated in this area and is significantly degraded in most places by forestry, agriculture and drainage. Similar peat deposits are also locally abundant in the study area.

The GSI online Aggregate Potential Mapping Database ([www.gsi.ie](http://www.gsi.ie)) shows that the crushed rock aggregate potential of the Proposed Wind Farm Site ranges from Very Low to Very High. Much of the Proposed Wind Farm site is noted as being of Very Low to Low potential. Some small areas of high potential are found in the north and in the northwest.

The GSI online Aggregate Potential Mapping Database ([www.gsi.ie](http://www.gsi.ie)) shows that the crushed rock aggregate potential along the Proposed Grid Connection ranges from very low to low. The majority of the route is not mapped in an area for granular aggregate potential. However, small sections of the route are mapped as having moderate to very high Granular aggregate potential along the Bandon River in the western section and very low Granular aggregate potential along the Bandon River in the central section of the Proposed Grid Connection.

### 8.2.12 Geological Heritage and Designated Sites

There are no recorded geological heritage sites within or adjacent to the Site ([www.gsi.ie](http://www.gsi.ie), Hennessy et al, 2023). The closest geological heritage site is Bantry Drumlins CGS (Site Code: CK018), located 0.5km to the southwest of the Proposed Wind Farm site southern turbine cluster. Refer **Figure 8-6** below for the locations of geological heritage sites.

Bantry Drumlins CGS comprises subglacial bedforms and includes a small, discrete cluster of hill features occupying the wide coastal embayment which hosts Bantry town. This is the southwestern end of the wide swathe of subglacial bedform features that dominate the lowlands across Ireland and is important for its internal diversity and form with respect to subglacial bedform features (Cork– County Geological site Report).

The Pass of Keimaneigh CGS (Site Code: CK071) is situated ~4km to the north of the Proposed Wind Farm site northern cluster. This site is described as a mountain pass in Shehy Mountains, between the Upper Lee and Kealkill valleys. The R584 road between Bantry and Béal Átha an Ghaorthaidh runs through the pass. The glacial meltwater channel at Keimaneigh is a major deglacial landform in the mountains along the Cork-Kerry county boundary (Cork – County Geological site Report). There are no other geological heritage sites within 5km of the Proposed Wind Farm site.

Within the Republic of Ireland, designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs). The Proposed Wind Farm Site is not located within or adjacent to any designated conservation site.

The nearest SAC to the Proposed Wind Farm site is Derryclogher (Knockboy) Bog SAC and pNHA (Site Code: 001873) which is located 7.6km to the northwest of the Site. The nearest NHA to the Proposed Wind Farm is Conigar Bog NHA (Code: 002386) which is located 5km to the northwest.

The nearest SAC to the Proposed Grid Connection is the Bandon River SAC. The Proposed Grid Connection intercepts the mapped Bandon River SAC where it runs near the Bandon

River, albeit the route is within the carriageway of regional roads at this location and therefore cannot directly affect the SAC.

Also local to the Proposed Grid Connection is Bandon Valley South of Dunmanway pNHA (Code: 001035). The designated site is located immediately downstream of where the Proposed Grid Connection crosses the Bandon River via a bridge at Dunmanway.

Hydrological and hydrogeological connections to these designates sites are assessed in Chapter 9: Hydrology and Hydrogeology.

Designated Sites local to the Site are shown in **Figure 8-6** below.

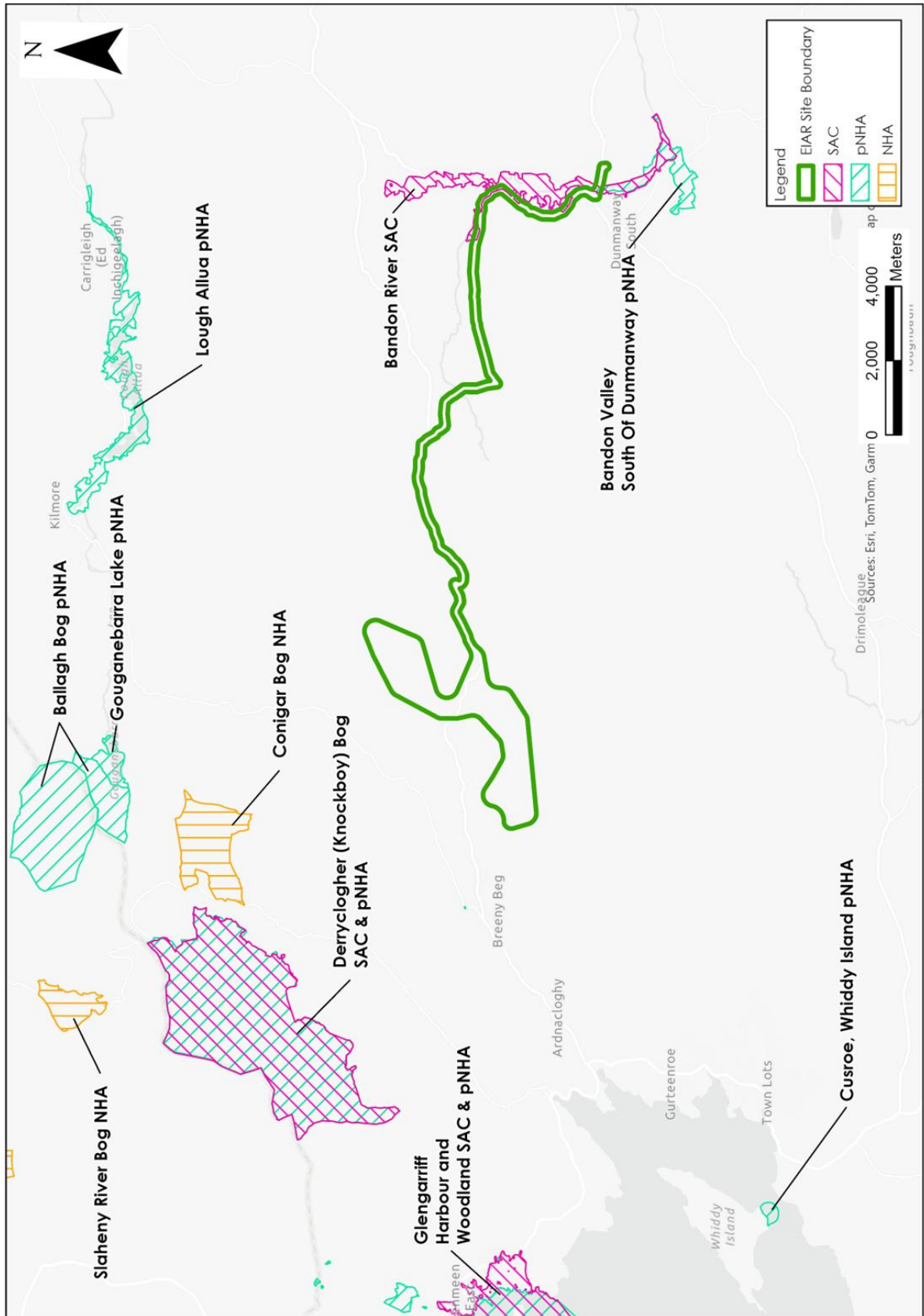


Figure 8-6: Local Designated Sites.

## 8.2.13 Soil Contamination

There are no known areas of soil contamination within the Site. During the site walkovers or investigations, no areas of contamination concern were identified.

According to the EPA online mapping (<https://gis.epa.ie/EPAMaps/>) there are no licensed waste facilities on or within the immediate environs of the site of the Site.

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

## 8.2.14 Geohazards

The GSI Landslide database ([www.gsi.ie](http://www.gsi.ie)) does not record any historic landslides in the vicinity of the Site or in the surrounding lands. The closest recorded landslide event is Goulacullin 2001 located ~3.6km to the east of the southern turbine cluster of the Proposed Wind Farm site. The mechanism of this landslide was due to Concave shear failure under the road.

The GSI Landslide Susceptibility Map ([www.gsi.ie](http://www.gsi.ie)) classifies the probability of a landslide occurring at a given location. The probability of a landslide occurring at the Proposed Wind Farm site is mapped as being Low to Moderately high with some small areas having high susceptibility.

Refer to Section 8.2.15 below for an overview of the Geotechnical and Peat Stability Risk Assessment Report.

The GSI mapped faults that intercept the Proposed Wind Farm site have no consequence for the Proposed Project in terms of stability or geohazards.

## 8.2.15 Geotechnical and Peat Stability Risk Assessment

A Geotechnical and Peat Stability Assessment Report (GPSAR, FTC, 2026) is included in **Appendix 8-1** of this EIAR. Summary data and conclusions from that report are provided below.

### 8.2.15.1 Introduction

Fehily Timoney and Company (FT) was engaged to undertake a geotechnical and peat stability assessment of the Proposed Wind Farm site.

Hydrological, hydrogeological and ecological factors were also assessed in the (GPSAR, FTC, 2026), 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.

### 8.2.15.2 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.

### 8.2.15.3 Peat Slides – Lessons Learned

The (GPSAR, FTC, 2026) peat stability assessment has been undertaken with due regard to documented 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 the Proposed Project and the construction methodologies to be implemented. It is important that the existing site drainage is maintained during construction to avoid a similar failure to that on Shass Mountain, which when a large volume of water draining from a forestry plantation was concentrated into the headwaters of a stream, and this is referenced in the Risk Assessments for the turbines/access roads.

It should be noted that the peat depth at Shass Mountain was significantly deeper (up to 5m) than the majority of the peat depths recorded across the Proposed Wind Farm site, making the likelihood of this type of failure occurring very low. The topography of the Site is also different to that at Shass Mountain and does not contain any areas where a large catchment area is focussed into a localised area of deep peat.

### 8.2.15.4 Peat Stability Analysis

An analysis of peat sliding was carried out at all the main infrastructure locations across the Proposed Wind Farm 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 8-7** 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 at the Proposed Wind Farm site or Proposed Grid Connection which suggests that site conditions do not pre-dispose themselves to failures/landslides.

The shear vane results indicate undrained shear strengths in the range 10 to 55kPa, with an average value of about 25kPa. The majority of the strengths recorded would be typical of drained peat as is present on the Proposed Wind Farm site. The lowest strength was recorded in the area of deepest peat, where no development is proposed.

Peat strength at sites of known peat failures (assuming undrained loading failure) are generally very low, for example the undrained shear strength at the Derrybrien failure (AGEC, 2004) as derived from back-analysis, was estimated at 2.5kPa.

The recorded undrained strength at the Proposed Wind Farm site is greater than the lower bound values for Derrybrien indicating that there is no close correlation to the peat conditions at the Derrybrien site and that there is less likelihood of failure on the Proposed Wind Farm site.

Table 8-7: 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          |

### 8.2.15.5 Geotechnical and 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<sup>1</sup> (short-term stability) and drained (long-term stability) analysis has been undertaken to determine the stability of the peat slopes on site.

<sup>1</sup> 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.

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 GPSAR (FTC, 2026) is included in **Appendix 8-1**.

### 8.2.15.5.1 **Undrained Analysis**

A summary of undrained analysis results is presented in **Table 8-8** below. As outlined above the undrained loading condition applies in the short-term during construction and until construction induced pore water pressures dissipate.

The undrained analysis for load condition 2 is considered the most critical load case as most peat failures occur in the short term upon loading of the peat surface.

The calculated FoS for load condition 1 is in excess of 1.40 for each of the locations (209 no. locations) analysed with a range of FoS of 3.87 to 114.96, indicating a low risk of peat instability.

The calculated FoS for load condition 2 is in excess of 1.40 for each of the locations (209 no. locations), analysed with a range of FoS of 2.23 to 19.11, again indicating a low risk of peat instability.

*Table 8-8: Summary Factor of Safety Results (undrained condition).*

| Turbine No./Waypoint | Factor of Safety for Load Condition |               |
|----------------------|-------------------------------------|---------------|
|                      | Condition (1)                       | Condition (2) |
| T1                   | 28.74                               | 8.21          |
| T2                   | 38.32                               | 8.84          |
| T3                   | 9.83                                | 2.81          |
| T4                   | 6.61                                | 3.31          |
| T5                   | 9.62                                | 4.28          |
| T6                   | 19.24                               | 5.50          |
| T7                   | 5.47                                | 3.71          |
| T8                   | 6.45                                | 3.06          |
| T9                   | 8.50                                | 5.47          |
| T10                  | 12.77                               | 6.05          |
| T11                  | 7.19                                | 4.42          |
| T12                  | 38.48                               | 6.41          |

| Turbine No./Waypoint                    | Factor of Safety for Load Condition |               |
|---|-------------------------------------|---------------|
|   | Condition (1)                       | Condition (2) |
| T13                                     | 38.48                               | 6.41          |
| T14                                     | 114.96                              | 10.45         |
| Proposed 110kV onsite substation        | 6.41                                | 3.50          |
| Met Mast                                | 6.41                                | 3.50          |
| Temporary Construction Compound (North) | 3.12                                | 9.36          |
| Temporary Construction Compound (South) | 5.89                                | 9.27          |
| Borrow Pit 1                            | 14.51                               | 4.15          |
| Borrow Pit 2                            | 6.41                                | 3.32          |
| Borrow Pit 3                            | 19.35                               | 4.47          |
| Borrow Pit 4                            | 5.13                                | 3.08          |
| Access Roads                            | 4.84 - 23.39                        | 2.64 – 5.10   |
| Peat and Spoil Management Areas         | 3.15 - 14.51                        | 1.84 – 5.83   |

### 8.2.15.5.2 *Drained Analysis*

Summary of drained analysis results are presented in **Table 8-9**. 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 load condition 1 is in excess of 1.40 for each of the locations (209 no. locations) analysed with a range of FoS of 1.93 to 57.48, indicating a low risk of peat instability.

The calculated FoS for load condition 2 is in excess of 1.40 for each of the locations (209 no. locations) analysed with a range of FoS of 2.49 to 20.68, also indicating a low risk of peat instability.

*Table 8-9: Summary Factor of Safety Results (drained condition).*

| Turbine No./Waypoint | Factor of Safety for Load Condition |               |
|----------------------|-------------------------------------|---------------|
|                      | Condition (1)                       | Condition (2) |
| T1                   | 14.37                               | 8.87          |
| T2                   | 19.16                               | 9.55          |
| T3                   | 4.92                                | 2.97          |

| Turbine No./Waypoint                    | Factor of Safety for Load Condition |               |
|---|-------------------------------------|---------------|
|   | Condition (1)                       | Condition (2) |
| T4                                      | 3.31                                | 3.55          |
| T5                                      | 4.81                                | 4.60          |
| T6                                      | 9.62                                | 5.92          |
| T7                                      | 2.74                                | 4.01          |
| T8                                      | 3.22                                | 3.27          |
| T9                                      | 4.25                                | 5.91          |
| T10                                     | 6.39                                | 6.54          |
| T11                                     | 3.59                                | 4.78          |
| T12                                     | 19.24                               | 6.90          |
| T13                                     | 19.24                               | 6.90          |
| T14                                     | 57.48                               | 11.29         |
| Proposed 110kV onsite substation        | 3.21                                | 3.77          |
| Met Mast                                | 3.21                                | 3.77          |
| Temporary Construction Compound (North) | 4.20                                | 7.32          |
| Temporary Construction Compound (South) | 6.37                                | 4.78          |
| Borrow Pit 1                            | 7.26                                | 4.44          |
| Borrow Pit 2                            | 3.21                                | 3.46          |
| Borrow Pit 3                            | 9.67                                | 4.78          |
| Borrow Pit 4                            | 2.57                                | 3.31          |
| Access Roads                            | 2.42 - 11.70                        | 2.83 - 5.52   |
| Peat and Spoil Management Areas         | 1.57 – 7.26                         | 2.5 - 7.24    |

### 8.2.15.6 Risk Assessment

A peat stability risk assessment was carried out for the infrastructure elements at the Site. This approach adheres to best practice guidance for geotechnical/peat stability risk assessments as given in PLHRAG Guidance and MacCulloch (2005). The risk assessment uses the results of the stability analysis (deterministic approach) in combination with qualitative factors, which

cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability, to assess the risk for each infrastructure element.

For each of the main infrastructure elements, a risk rating (product of probability and impact) is calculated. Where a location is rated 'Medium' or 'High', control measures are required to reduce the risk to at least a 'Low' risk rating. Where a subsection is rated 'Low' or 'Negligible', only routine control measures are required.

The results of the peat stability risk assessment for potential peat failure at the Proposed Wind Farm site infrastructure is presented as a Geotechnical Risk Register in Appendix B of **Appendix 8-1**.

The risk rating for each infrastructure element of the Proposed Wind Farm is designated as Negligible or Low following some mitigation/control measures being implemented.

Details of the required infrastructure specific mitigation/control measures can be found in Appendix B of the Geotechnical and Peat Stability Assessment Report (**Appendix 8-1**) and the general infrastructure specific control measures are summarised below:

- Detailed ground investigation to confirm peat, mineral soil and bedrock condition and properties;
- Use of experienced geotechnical staff for confirmatory site investigation;
- Maintain hydrology of area as far as possible by maintaining the flow of water in existing drains to prevent the build-up of water pressures in the peat, leading to the peat becoming "buoyant"; and,
- Use of contractors with experience in working peat and trained operators to carry out the work.

### 8.2.15.7 Peat Stability Assessment Summary

In summary, the findings of the peat stability risk assessment showed that the Proposed Wind Farm site has an acceptable margin of safety, is suitable for the Proposed Wind Farm and is considered to be of a low risk for peat failure provided appropriate control measures, such as implementing and maintaining an appropriate drainage system, are implemented.

The Proposed Grid Connection was not assessed for peat stability risk due to the lack of peat recorded during peat probing efforts along the public road corridor where works will occur.

The findings include mitigation/control 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.

## 8.3 Summary of Geology & Geotechnical Conditions

A detailed description of the geology of the Site is presented in this chapter.

Regional baseline geological data is available from the GSI through their online map viewer ([www.gsi.ie](http://www.gsi.ie)). The bedrock across the Proposed Wind Farm site is mapped as SILTSTONE, MUDSTONE and SANDSTONE variations. Subsoils are predominantly mapped as bedrock outcrop or subcrop (i.e. shallow or exposed bedrock) with pockets of blanket peat. Lower down on the slopes there is a transition into glacial tills derived from Devonian and Carboniferous sandstones and shales.

The Proposed Wind Farm site investigations and geotechnical assessments were extensive and consisted of 640 peat depth probes, 15 no. gouge cores 16 no. trial pits and 3 no. bedrock rotary core boreholes. The geological setting of the Proposed Wind Farm site has been thoroughly investigated, and the geological/hydrogeological setting is fully understood.

Site investigations and geotechnical assessments are summarised as follows:

- The results of the geotechnical peat stability analysis showed all locations to have low to negligible risk of peat instability and the Site is suitable for the Proposed Project;
- Peat depths recorded across the Proposed Wind Farm site ranged from 0 to 4.5m with an average depth of 0.6m, which is considered shallow for blanket bog;
- Approximately 78% of recorded peat depths were less than 1m and 95% of less than 2.0m;
- The peat depths recorded at the turbine locations varied from 0.1 to 2.1m with an average depth of 0.8m (this is considered shallow peat, turbines have successfully been constructed in several metres of peat);
- With respect to the new proposed access roads, peat depths are typically less than 1.0m (average 0.6m);
- At the 4 no. proposed borrow pit locations, peat depths are shallow (0.1 to 1.5m);
- No evidence of past failures or any significant signs of peat instability were noted on site by FT at the time of the geotechnical walkover surveys;
- The geotechnical hand vane results indicate undrained shear strengths in the range 10 to 55kPa, with an average value of about 25kPa;
- The strengths recorded would be typical of well drained peat as is present on the Proposed Wind Farm site;
- Mineral subsoils were typically described as silty, sandy GRAVEL with occasional SILT and SAND dominated subsoil. The GRAVEL in particular is likely to have originated from weathering of the underlying shallow bedrock;
- Refusal on bedrock (presumed) was recorded in all 16 no. trial pits with depth to bedrock ranging from 0.2m and 3.5m with an average of 1.5m;
- Depth to bedrock at turbine locations where trial pits were carried out ranged between 0.6 and 3.5m with an average of 1.5m;
- Trial pits were carried out at 6 no. proposed turbine locations (T3 – T6, T12 & T13) as these were the only turbines that could be accessed by an excavator;
- Drilling investigations encountered weathered SANDSTONE or SILTSTONE over strong SANDSTONE or SILTSTONE;
- The investigations indicate that deep overburden excavations will not be required due to the shallow depth of bedrock strata;
- No bedrock joints, fissures, fractures faults (groundwater bearing structures) were identified by the investigation drilling; and,
- The drilling demonstrates that the bedrock proposed for extraction at the 4 no. proposed borrow pits is strong at depth, competent and fit for the purpose of rock extraction and follow-on permanent storage of spoil.

## 8.4

### Receptor Importance and Sensitivity

Based on the criteria set out in **Table 8-2** above, the soils and peat at the Proposed Wind Farm site can be classed as being of low importance as the overlying peat and soil deposits are not designated in this area and are degraded in places as a result of the forestry and peat cutting operations and associated drainage.

The soils and subsoils along the Proposed Grid Connection can also be considered as being of low importance as the underground electrical cabling route is located predominantly along existing public roads and private access tracks, and no peat or soils

deposits are designated along the Proposed Grid Connection. The bedrock geology underlying the Site can be classed as being of medium importance where the bedrock could be used on a sub-economic scale.

The land, peat, soils and bedrock geological formations underlying the Site are scoped in for impact assessment due to their proximal location to the Proposed Project and the potential effects that the Proposed Project may have on these receptors.

No geological heritage site or designated site will be scoped in for impact assessment due to their distant location from the Proposed Project (i.e. from a land, soils and geology perspective, only direct effects within the Site will occur).

There is no potential for the Proposed Project to affect the land, soils and geological environment outside of the Site. Therefore, there is no potential for effects to occur on any geological heritage site or designated site.

## 8.5

# Characteristics of the Proposed Project

The Proposed Project will involve the removal of peat, soils, subsoils and bedrock for construction of access roads, internal cabling network, hardstanding emplacement, turbine foundations, substation, peat and spoil management areas, grid connection cabling, crane hardstands, construction compounds, drainage works and met mast installation.

It is proposed that bedrock won from the 4 no. onsite borrow pits (i.e. siltstone/sandstone) will be used to construct the sub-base layer of proposed upgraded and new access roads, hardstand areas and turbine base areas. Once installed the subbase layer will be overlain by a clean capping layer of high-grade limestone which will be sourced from local quarries. Please note that limestone is a sedimentary rock and is used country wide for public road construction. Limestone typically has a high strength/weight bearing capacity and is not prone to erosion.

The estimated quantity of available rock within the 4 no. borrow pits is 170,000m<sup>3</sup>. Conservative assumptions were made in estimating the quantity of rock available in the borrow pits.

Generally, the construction methodology for constructing any structure or platform foundation, such as a turbine base, hardstand or substation, involves removing all soft material to a depth where a suitable bearing material is encountered. Based on the site-investigation data it is expected gravity foundations will be constructed at all turbine locations. The maximum excavation depth at turbine locations is expected to be approximately 3 - 4m.

Up to 2.1km of existing access tracks requiring upgrade are present across the Proposed Wind Farm site and have been in operation for a significant number of years. Existing access tracks account for approximately ~15% of the overall proposed length of Proposed Wind Farm access roads (13.8km). In addition, 12.1km of new access track will be constructed at the Proposed Wind Farm site. Due to the typically shallow nature of the peat along the route of the proposed new roads, this will mainly be carried out using the excavate and replace technique. Crane hardstands, the substation platform, the met mast and the temporary construction compounds will all be constructed using the founded technique. The material excavated is required to be properly managed and stored and will be re-used in other elements of the Proposed Wind Farm infrastructure.

The quantities of peat and spoil requiring management at the Site have been calculated and are presented in **Table 8-10** below. The total estimated combined volume of peat and spoil to be managed following excavations during the construction phase of the Proposed Project is approximately 340,820m<sup>3</sup> (this includes a contingency factor of 10% to allow for increase in

volume upon excavation). It should be noted that the aforementioned peat and spoil volume will be extracted and transported throughout the Site on a sequential basis.

It is proposed to manage overburden generated through construction activities locally within the Proposed Wind Farm site, in designated peat and spoil management areas, for landscaping at the proposed turbine locations, placement of peat alongside access roads and in clearfell areas, and reinstatement of the 4 no. borrow pits. The total capacity of the identified peat and spoil management areas, including the proposed landscaping and side casting is approx. 368,400m<sup>3</sup> (refer to **Table 8-11** below) and therefore, there is more than enough capacity to manage the total volume of peat and spoil requiring management for the Proposed Wind Farm.

The majority of the excess spoil material excavated along the Proposed Grid Connection underground cabling trench will be transported to an appropriate licenced facility for disposal/recovery. The main contractor will determine the appropriate location for management of arisings from the route.

Further details are provided in the Peat and Spoil Management Plan (PSMP, FTC, 2026) for the works which is included in **Appendix 4-2**.

The Proposed Project also includes Biodiversity Management and Enhancement areas which are located within the Site. No excavations or generation of spoil will occur at the BMEP areas.

Table 8-10: Worst Case Peat, Mineral Soil (Spoil) Excavation Volumes.

| Development Component  | Peat Volume(m <sup>3</sup> ) (approx.)   | Spoil Volume(m <sup>3</sup> ) (approx.) |
|--|--|---|
| 14 no. Turbines and Hardstanding Areas (including foundations) | 52,200                                   | 85,800                                  |
| Access Roads   | 76,500                                   | 23,300                                  |
| Temporary Construction Compounds                               | 10,300                                   | 800                                     |
| Proposed 110kV onsite substation                               | 18,000                                   | 15,000                                  |
| Met Mast   | 320                                      | 100                                     |
| Proposed Grid Connection                                       | -  | 10,200                                  |
| Borrow Pits 4 no.  | 16,100                                   | 32,200                                  |
| <b>Sub-Total</b>   | <b>173,420</b>                           | <b>167,400</b>                          |
| <b>Total (m<sup>3</sup>)</b>                                   | <b>340,820 (Peat &amp; Spoil Volume)</b> |   |

Table 8-11: Peat and Spoil Management Areas.

| Development Component   | Peat and Spoil Volume(m <sup>3</sup> ) (approx.) | Comment   |
|---|--|---|
| Peat placement along access roads and in clear felled areas around turbines | 61,800   | Up to 1.5m in height upslope of founded roads   |
| Landscaping   | 21,000   | It is estimated that approximately 1,500m <sup>3</sup> of peat will be required for landscaping and ballast backfill purposes at each of the 14 no. turbine locations |
| Borrow Pits   | 265,600  | Refer to Section 5.4 of the Peat & Spoil Management Plan (Appendix 4-2)   |
| Reuse of rock excavated from proposed infrastructure                        | 20,000   | Rock excavated from turbine bases, hardstands, roads and the substation.  |
| <b>Total (m<sup>3</sup>)</b>  | <b>368,400</b>                                   | -   |

## 8.6 Likely and Significant Impacts on Land, Soils and Geology

### 8.6.1 Do Nothing Scenario

An alternative land-use option to the development of a renewable energy project at the Site would be to leave the Site as it is, with no changes made to existing land-use practices. In this Do-Nothing Scenario, the existing land use practices comprising of agricultural activities and forestry would continue at the Proposed Wind Farm site. Forestry will be felled as forestry compartments reach maturity. Re-planting of these areas with coniferous plantation is likely to occur. Land drainage carried out in areas of the Site will continue to function and may be extended in some areas.

If the Proposed Project were not to proceed, the opportunity to capture part of County 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. The opportunity to generate local employment, development contributions, rates and investment in the local area would also be lost. On the basis of the positive environmental effects arising from the Proposed Project, the do-nothing scenario was not the chosen option. The existing agricultural activities (grassland management) and forestry operations (felling and replanting) can and will continue in conjunction with the Proposed Project use of the Site.

Furthermore, the opportunity to create the proposed habitat enhancement areas would be lost. Please see **Appendix 6-4** Biodiversity Management and Enhancement Plan for details.

The land, soils and geology would remain largely unaltered as a result of the Do-Nothing Scenario.

### 8.6.2 Construction Phase - Likely Significant Effects and Mitigation Measures

The likely effects of the Proposed Project and mitigation measures that will be put in place during the construction phase to eliminate or reduce them are outlined below. The assessment considers the Proposed Project as a whole i.e. both the Proposed Wind Farm and the Proposed Grid Connection. Where this is required to be assessed separately, this is noted in the text.

#### 8.6.2.1 Potential Effects on Land (Land-Take)

The Proposed Project includes the construction of 14 no. turbines, associated hardstand areas, 2 no. temporary construction compound, an onsite substation, new access roads, 4 no. borrow pits and upgrades to the existing road network. The footprint of the Proposed Wind Farm infrastructure is 14.67ha.

These works will result in a change in the land environment within these areas. For example, the proposed works will result in the loss of 44ha of coniferous forestry due to the proposed infrastructure, along with 0.4ha of agricultural land, 1.8ha of heathland and 0.2ha of blanket bog.

Therefore, the existing baseline habitats will be replaced by turbine bases, hardstand areas, access roads and other related infrastructure.

The Proposed Wind Farm construction works will only result in very local topographic changes with the removal of overburden at the Proposed Wind Farm site.

There will be no effects on the lands adjoining the Proposed Wind Farm site.

The Proposed Grid Connection 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 (tarmacadam or subsoil/topsoil). Therefore, no effects on land or landuse will occur along the majority of the Proposed Grid Connection underground cable route.

**Pathways:** Excavation and infrastructure construction.

**Receptors:** Land (i.e. land upon which the Proposed Project will occur).

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

Negative, slight, direct, permanent, likely effect on land along the Proposed Grid Connection. In the absence of mitigation measures, there will be no potential for significant effects on land along the Proposed Grid Connection.

**Mitigation Measures / Impact Assessment:** The Proposed Grid Connection is located predominantly along existing public roads. There will be no change in the land environment along the existing roads, whereby the roads will be reinstated with a comparable ground surface. The use of the existing road network reduces the area which will be altered or disturbed as a result of the works associated with the Proposed Grid Connection. The only change to the land environment will occur where the new access tracks are proposed and these works will have a very small footprint.

Following the construction phase, areas of the Proposed Wind Farm site will be replaced by hardstand areas with a permanent development footprint of 14.67ha. This represents a change in landcover of ~1.25% of the overall Site.

The loss of coniferous forestry (44ha), peatland (0.2ha), agricultural land (0.4ha) and heathland (1.8ha) will not have a significant effect on land at the Proposed Wind Farm site due to the small development footprint. 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 Biodiversity Management and Enhancement Plan.

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 (44ha) 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.

**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.

## 8.6.2.2 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 compounds, met mast, internal cable network and borrow pits. 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 8.5 above.

There will be no loss of peat, spoil or bedrock from the Proposed Wind Farm site, as it will be accommodated within the designated peat and spoil management areas and the 4 no. onsite borrow pits. Peat and spoil will also be used for landscaping at the proposed turbine locations and in linear berms along access roads where appropriate.

**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:**

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

#### Proposed Wind Farm site

- Placement of turbines and associated infrastructure in areas with suitable ground conditions where appropriate (based on detailed site investigation data – the areas of deeper peat have been avoided by the Proposed Wind Farm infrastructure);
- The peat/soils and subsoils which will be removed during the construction of turbine hardstands will be localised to the turbine locations. The peat/soil/subsoil will be placed/spread locally alongside the excavations or stored within the designated peat and spoil management areas or borrow pits;
- Excavated peat/soils/subsoils shall be excavated and stored separately to topsoil; this will prevent mixing of materials and facilitate reuse afterwards;
- The peat placed within the peat and spoil management areas will be restricted to a maximum height of 1.5m. Weak/liquified peat will be stored in the centre of the peat and spoil management areas areas with firmer/drier peat placed around the outside;
- The placement of excavated peat will be avoided without first establishing the adequacy of the ground to support the load. The placement of peat within the peat and spoil management areas areas will require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works;
- It will be ensured that the surface of the placed peat will be shaped to allow efficient run-off of surface water. Shaping of the surface of the peat will be carried out as placement of peat within the peat and spoil

- management area progresses. This will reduce the likelihood of debris run-off and reduce the risk of instability of the placed peat;
- Finished/shaped side slopes in the placed peat will be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate.
  - Where available, the acrotelm will be placed on the finished surface with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat and spoil within the peat and spoil management areas;
  - Movement monitoring instrumentation will be placed around the areas where peat has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer on site;
  - Supervision by the Project Geotechnical Engineer will be carried out for the works; and,
  - An interceptor drain will be installed upslope of the designated peat and spoil management areas to divert any surface water away from these areas. This will help ensure stability of the placed peat and reduce the likelihood of debris run-off. (interceptor drains will not be required at all areas as the existing drainage network can function as interceptor drains – silt fences will be installed upgradient of the peat and spoil management areas in these locations).

Proposed Grid Connection:

- Excess spoil material or pavements materials containing tar generated during the cable route construction will be transported by permitted waste contractors to a suitable permitted/licensed site for disposal/recovery.

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

**Significance of Effects:** No significant effects on soils, subsoils or bedrock will occur.

### 8.6.2.3 Contamination of Soil by Leakages and Spillages

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 refuelling truck 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;
- All fuel 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;
- 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 transformer within proposed 110kV onsite substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- 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**).

**Post Mitigation Residual Effect:** 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 will occur.

#### 8.6.2.4 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 and spoil management 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 included in **Appendix 4-2** of the EIAR.

**Post Mitigation Residual Effect:** Following implementation of these mitigation measures the residual effected is imperceptible, 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 will occur.

### 8.6.2.5 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 Project 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 (FT, 2026) showed that the Site has an acceptable margin of safety, is suitable for the Proposed Project 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 Report);
- 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.

**Post Mitigation Residual Effect:** 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 will occur.

### 8.6.2.6 Biodiversity Management and Enhancement Plan (BMEP)

The BMEP (Appendix 6-4) sets out the measures to be implemented to ensure that the Proposed Project will result in a net gain in biodiversity. It is proposed to enhance a total of 5.3ha of peatland habitat. The proposed peatland restoration will result in enhancement of wet heath habitat on the Proposed Wind Farm site and enhance the biodiversity in the locality of the Proposed Project.

In addition, an area of approximately 0.54ha of broadleaf native tree planting will be undertaken in the Proposed Wind Farm southern turbine cluster, adjacent to the proposed 110kV onsite substation. This will expand an area of native forestry that currently exists at this location. Enhancement measures within the proposed bat felling buffers will result in habitats of higher suitability for Kerry Slug within the Proposed Wind Farm site.

**Pathway:** Enhancement measures and targeted revegetation.

**Receptor:** Peatland, wet heath and riparian woodland.

**Pre-Mitigation Potential Impact:** Positive, slight, direct, permanent likely effect from the BMEP.

#### **Mitigation Measures:**

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

Given the nature of the restoration measures the following mitigation measures are proposed:

- Before any works are completed silt fences will be installed to limit the movement of entrained sediment in surface water runoff;
- Proposed off-road routes will be walked in advance of any machinery;
- All machinery operators will be experienced;
- The Proposed Wind Farm site will be walked before a machine goes off-road;
- Bog mats will be used where the excavator is required to travel over wet ground; and,
- A low ground pressure excavator with wide tracks (1.9m or greater) will be used to reduce compaction of the peat and subsoils.

**Pots Mitigation Residual Effect:** The likely residual effect of the Proposed Project on peat following the implementation of the BMEP 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.

**Significance of Effects:** No significant effects on soils and subsoils will occur.

### 8.6.2.7 Erosion of Exposed Peat, Soils and Subsoils During Tree Felling

Tree felling is a component of the Proposed Wind Farm works, with ~44ha of felling of coniferous forestry proposed.

During felling operations there is a high likelihood of erosion due to the disturbance of soils and subsoils associated with vehicle and plant movements. This also has associated potential effects on the water

environment; and therefore this aspect is assessed in further detail in Chapter 9: Hydrology and Hydrogeology.

**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 Proposed 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 Proposed Wind Farm site along specified off-road routes (referred to as racks);
- Brush 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 brush 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 brush will be applied when the brush 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.

### 8.6.3 Operational Phase - Likely Significant Effects and Mitigation Measures

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

- Some construction vehicles or plant may be necessary for maintenance of Proposed Wind Farm which could result in minor accidental leaks or spills of fuel/oil;

- The transformer in the proposed 110kV onsite 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.

### 8.6.3.1 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, long 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 Proposed Wind Farm site.

**Proposed Mitigation Measures:**

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

**Post-Mitigation Residual Effect:** Due to the small scale and intermittent nature of any maintenance works the residual effect will be a negative, imperceptible, indirect, long-term, unlikely effect on bedrock.

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

### 8.6.3.2 Potential Effects from Site Vehicle/Plant Use

Plant and site vehicles used in site 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, long 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 Proposed Wind Farm site.

**Proposed Mitigation Measures:**

- Vehicles used during the operational phase will be refuelled off site before entering the site;
- No fuels will be stored on-site during the operational phase;
- 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, long-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.

### 8.6.3.3 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.

**Pathway:** Peat, subsoil and bedrock pore space.

**Receptor:** Peat, subsoil and bedrock.

**Potential Pre-Mitigation Effect:** Negative, direct, slight, long 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 Proposed Wind Farm site.

**Proposed Mitigation Measures:**

- All transformers will be banded to 110% of the volume of oil used in each transformer; 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, long-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.

### 8.6.4 Decommissioning Phase - Likely Significant Effects and Mitigation Measures

The potential impacts associated with decommissioning of the Proposed Wind Farm will be similar to those associated with construction but of reduced magnitude. The Proposed Grid Connection will not be decommissioned.

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 Proposed Wind Farm has been fully assessed in the EIAR.

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 Wind Farm 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.

The Proposed Grid Connection and proposed 110kV onsite substation will remain in place as it will be under the ownership and control of the ESBN and Eirgrid.

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 Wind Farm.

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

### 8.6.5 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 Project 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.

### 8.6.6 Post Construction Monitoring

None required.

### 8.6.7 Risk of Major Accidents and Disasters

Due to the nature of the Proposed Wind Farm site, *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 Assessment Report (FT, 2026) has been undertaken for all Proposed Project 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.

## 8.6.8 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 Proposed Project 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.

## 8.6.9 Conclusion

Excavation of peat, subsoil and bedrock will be required for site levelling and for the installation of the Proposed Project infrastructure. This will result in a permanent removal of peat, subsoil and possibly bedrock at most excavation locations. Excavated peat and spoil will be utilized to re-instate the borrow pits 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 and Spoil Management Plan (PSMP, FTC, 2026) (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 Report (FTC, 2026) 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 Project.

## 8.7 EIA Classification Summary

Please see the below table for a summary of all identified impacts for the Proposed Project relating to land soils and geology.

Table 8-12: Assessment Classification Summary.

| Topic                     | Pre-Mitigation Effect       | Mitigation Section Reference | Residual Effect             | Significance    |
|---------------------------|-----------------------------|------------------------------|-----------------------------|-----------------|
| <b>Construction Phase</b> |                             |                              |                             |                 |
| <b>Land and Land-Use</b>  | Permanent, Slight, Negative | Section 8.6.2.1              | Permanent, Slight, Negative | Not Significant |

|   |   |                 |                                     |                 |
|---|---|-----------------|-------------------------------------|-----------------|
| Peat and Subsoil Excavation                                     | Permanent, Moderate, Negative   | Section 8.6.2.2 | Permanent, Slight, Negative         | Not Significant |
| Leakages and Spillages  | Short-Term, Slight, Negative  | Section 8.6.2.3 | Short-Term, Imperceptible, Negative | Not Significant |
| Erosion of Exposed Subsoils and Peat                            | Short-Term, Slight, Negative  | Section 8.6.2.4 | Short-Term, imperceptible, Negative | Not Significant |
| Peat Instability and Failure                                    | Permanent, Slight, Negative   | Section 8.6.2.5 | Permanent, Imperceptible, Negative  | Not Significant |
| Biodiversity Management and Enhancement Plan                    | Permanent, Slight, Positive   | Section 8.6.2.6 | Permanent, Moderate, Positive       | Not Significant |
| Erosion of Exposed Peat, Soils and Subsoils During Tree Felling | Permanent, Slight, Negative   | Section 8.6.2.7 | Permanent, Imperceptible, Negative  | Not Significant |
| <b>Operational Phase</b>  |   |                 |                                     |                 |
| Site Road Maintenance   | Long-Term, Imperceptible, Negative  | Section 8.6.3.1 | Long-Term, Imperceptible, Negative  | Not Significant |
| Site Vehicle / Plant Use  | Long-Term, Slight, Negative   | Section 8.6.3.2 | Long-Term, Imperceptible, Negative  | Not Significant |
| Potential effects from the Use of Oil in Transformers           | Long-Term, Slight, Negative   | Section 8.6.3.3 | Long-Term, Imperceptible, Negative  | Not Significant |
| <b>Decommissioning Phase</b>                                    |   |                 |                                     |                 |
| Land Soils and Geology  | The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of reduced magnitude. | Not Significant | Not Significant                     | Not Significant |