VOLUME 4: APPENDIX V1-9.1: PEAT LANDSLIDE HAZARD RISK ASSESSMENT (PLHRA)

Strathy South Wind Farm Grid Connection

Volume 4: Appendix V1-9.1: Peat Landslide Hazard and Risk Assessment

SSEN Transmission

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Basis of Report

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1.0 Introduction

1.1 General

SLR Consulting Ltd (SLR) was commissioned by ASH design+assessment Ltd. on behalf of Scottish and Southern Electricity Networks (SSEN) Transmission to undertake a Peat Landslide Hazard and Risk Assessment (PLHRA) for the proposed Strathy South Wind Farm Grid Connection (the "Proposed Development").

This PLHRA considers the Proposed Development with the Proposed Alignment (hereafter referred to as 'the Proposed Alignment'), which is located approximately 3.0 km south of Strathy and Melvich, Sutherland, Scotland, see **Figure V1-9.1.1**.

The methods adopted for the assessment follow the best practice guidance issued by the Scottish Government[1] for investigation, assessment and reporting for power infrastructure development in peat areas. The guidance provides a screening tool to determine whether a PLHRA is required.

The requirements to undertake a PLHRA are when blanket peat is present, slopes exceed 2° and the proposed infrastructure is located on peat, or when raised bogs are present. These conditions exist at the Proposed Alignment and therefore a PLHRA is required.

Where relevant, reference is also made to guidance published by the Scottish Environment Protection Agency (SEPA)[2] and wind farm construction good practice guidance[3] where relevant to construction on peat.

The work has been undertaken by a team of Geotechnical Engineers and Geologists, with over 10 years' experience in undertaking peat assessments. The team was led by a Fellow of the Chartered Institution of Water and Environmental Management (CIWEM) and Chartered Water and Environment Manager, with more than 30 years' consultancy experience and specialising in the assessment of soils, geology and water for renewable power projects in Scotland.

1.2 The Proposed Alignment

The Proposed Alignment comprises approximately 10.5 km of 132 kV double circuit overhead line (OHL) supported by steel lattice towers from Strathy North 'T' (near Dallangwell) to a new cable sealing end (CSE) compound, prior to connecting into Connagill 275/132 kV substation via two short sections of single circuit 132 kV underground cable (UGC) and formation of access tracks (permanent, temporary and upgrades to existing) as shown on **Figure V1-9.1.2**.

Full details of the Proposed Alignment are provided in the **Volume 1: Chapter 3: The Proposed Development.**

1.3 Scope of Work and Objectives

The purpose of this report is to identify those parts of the Proposed Alignment that are naturally susceptible to a higher risk of instability so that they can be avoided or accommodated. It

1 Energy Consents Unit Scottish Government., (April 2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Second Edition

2 Scottish Government, Scottish Natural Heritage, SEPA., (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only

3 NatureScot (July 2024), Good Practice During Wind Farm Construction. https://www.nature.scot/doc/good-practice-during-wind-farm-construction.

should be noted that all peat slopes have a risk of instability, and the vast majority of peat slope failures occur naturally.

The peat stability assessment is primarily concerned with the influence of the peat on the development of the Proposed Alignment. The main objective is to assess the potential peat stability at the Proposed Alignment, identify areas of potential concern and identify mitigation measures to ensure the maintenance of peat stability before, during and after construction.

It is important to note that peat instability and the impacts of any instability are not constrained by artificial site or ownership boundaries but by topographic and geomorphologic boundaries. It is therefore important to ensure that the breadth of scope of any assessment adequately covers the areal extent of possible impact.

The peat depth interpolation and peat slide risk calculation areas extend out to a maximum extent defined as 100 m from each peat depth survey point, with consideration of wider assessment areas not defined by distance but by review of geomorphology with review of hydrological and topographic boundaries which are factors influencing the peat stability assessment.

The risk assessment is based on ground models developed using a Geographical Information System (GIS) specifically for this Proposed Alignment. A numerical analysis was undertaken in which coefficients were allocated for each of the factors influencing peat stability and their impact on possible receptors.

The conceptual layout of the Proposed Alignment was considered alongside the findings from the peat probing, sampling and analysis by the design team to optimise the Proposed Alignment layout and associated access to avoid or mitigate areas of unacceptable peat slide risk. The layout presented in the drawings represents the final iteration of the scheme layout.

The system outlined above was developed in accordance with the guidelines on PLHRA by the Scottish Government[1] or the investigation, assessment, and reporting for power infrastructure developments in peat areas. The analysis and interpretation are based upon the results obtained from this process as well as previous experience and the results of case studies elsewhere. Where deviations from this guidance have occurred, this is highlighted and explained in the text.

The objectives have been achieved by completion of the following scope of works:

- a desk-based review of available reports which include geological, hydrological and topographical information;
- peat depth surveys and peat augering;
- geomorphological mapping of the Proposed Alignment to identify the prevailing conditions influencing the potential for, or any evidence of, active, incipient or relict peat instability, including identification of the location and photographic record, as appropriate;
- reporting on evidence of any active, incipient or relict peat instability, and the potential risk of future instability, describing the likely causes and contributory factors;
- identification of potential controls to be imposed on the Contractors for the Works to minimise the risk of peat instability occurring at the Proposed Alignment; and
- provide recommendations for further work or specific construction methodologies to suit the ground conditions at the Proposed Alignment to mitigate any significant risk of potential peat instability.

Construction of the Proposed Alignment would only increase the risk of peat slope instability if good geotechnical construction practice is ignored, and it is a requirement of all power infrastructure developments to follow a very carefully worded and designed Construction and Environmental Management Plan (CEMP) which incorporates the recommendations of the PLHRA.

Without the guidance contained in a Construction Method Statement or CEMP, the following factors could increase the risk of instability:

- construction of access tracks;
- installation of OHL infrastructure;
- stockpiling of peat and loading of slopes; and
- blocking of natural drainage, inappropriate new drainage or drainage discharge.

2.0 Peat Instability

The importance of assessing the stability of peat deposits in relation to renewable energy and power infrastructure developments came to the fore because of peat failures during the construction of Derrybrien[4] Windfarm in Ireland in 2003. Although no fatalities were associated with these failures, there was a significant environmental impact. There is a potential for peat instability to occur, particularly where deposits are more than 1 m depth. Peat instability is influenced by many factors, including, but not limited to, peat depth, hill slope gradient, underlying geology and subsurface hydrology.

This section reviews the nature of peat and how current and past activities can influence stability. The factors which are likely to influence the potential for peat instability are:

- significant peat depths over impermeable bedrock or minimal soil;
- the presence of slope gradients greater than 4^{o} (approximately) and general topography;
- natural drainage paths;
- evidence of past failures, including soil creep;
- drainage features at the base of slopes which could lead to undercutting;
- forestry plantations and artificial drainage; and
- recent climate patterns.

It should be noted that peat instability is not a recent phenomenon and there is documentary evidence of peat landslides dating back over 500 years[5]. Many landslides that involve peat have no human interference that could be considered as a trigger, and this should be borne in mind when considering the susceptibility of a site to potential instability.

2.1 Background Information Regarding Peat

Peat is found in extensive areas in the upland and lowland regions of the UK and is defined as the partly decomposed plant remains that have accumulated in-situ, rather than being deposited by sedimentation. When peat forming plants die, they do not decay completely as their remains become waterlogged due to regular rainfall. The effect of water logging is to exclude air and hence limit the degree of decomposition. Consequently, instead of decaying to carbon dioxide and water, the partially decomposed material is incorporated into the underlying material and the peat 'grows' in-situ.

Peat is characterised by low density, high moisture content, high compressibility and low shear strength, all of which are related to the degree of decomposition and hence residual plant fabric and structure. To some extent, it is this structure that affects the retention or expulsion of water in the system and differentiates one peat from another.

Lindsay[6] defined two main types of peat bog, raised bog and blanket bog, which are prevalent on the west coast of Europe along the Atlantic seaboard. In Britain, the dominant peatland is blanket bog which occurs on the gentle slopes of upland plateaux, ridges and benches and is predominantly supplied with water and nutrients in the form of precipitation. Blanket peat is usually considered to be hydrologically disconnected from the underlying mineral layer.

4 Lindsay, R.A. and Bragg, O., (2004), 'Windfarm and Blanket Peat, The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway, Ireland'. University of East London

5 Smith, L.T., (Ed) (1910), 'The literary of John Leland in or about the years 1535-1543.' Vol.5, Part IX. London: AF Bell and Sons.

6 Lindsay, R.A., (1995), 'Bogs: The ecology, classification and conservation of Ombrotrophic Mires.' Scottish Natural Heritage, Perth.

There are two distinct layers within a peat bog, the upper acrotelm and the lower catotelm. The acrotelm is the fibrous surface to the peat bog[7], typically less than 0.5 m deep, which exists between the growing bog surface and the lowest position of the water table in dry summers. Below this are various stages of decomposition of the vegetation as it slowly becomes assimilated into the body of the peat. Catotelm is the lower, more typically decomposed and permanently saturated layer of peat.

For geotechnical purposes the degree of decomposition (humification) can be estimated in the field by applying the 'squeezing test' proposed by von Post and Grunland[8]. The humification value ranges from H1 (no decomposition) to H10 (completely decomposed). The extended system set out by Hobbs[9] provides a means of correlating the types of peat with their physical, chemical and structural properties.

The relative position of the water table within the peat controls the balance between accumulation and decomposition and therefore its stability, hence artificial adjustment of the water table by drainage requires careful consideration.

2.2 Peat Shear Strength

In geotechnical terms, the shear strength of a soil is the physical characteristic that provides stability and coherence to a body of soil. For mineral soils such as clays or sands, such strength is variously given by an inter-particle friction value and cohesion. Depending on whether the mineral soil is predominantly cohesive (clay) or non-cohesive (sand) governs which of the components of strength control the behaviour of the soil.

For peat soils, where the major constituent is organic and there is likely to be little or no mineral component, the geotechnical definition of shear strength does not strictly apply. At present there is no real alternative method for defining the shear strength of peat, therefore the geotechnical definition is generally adopted, in the knowledge that it should be used with great caution.

As noted previously, the acrotelm or near surface peat comprises a tangle of fresh and slightly rotted roots and vegetable fibres. These roots and fibres impart a significant tensile shear strength capacity to the material which provides it with a significant load carrying capacity. The acrotelm is, in effect, a fibre reinforced soil.

In the more decomposed catotelm, the tensile shear strength is reduced as the roots and fibres become more rotted. However, the loss in strength due to decomposition is off set to a limited degree, by a gain in strength due to the overburden pressure. In geotechnical engineering there is an established relationship for recently deposited soils, between the shear strength of a sample and the thickness of overburden above it.

Consequently, it is almost impossible to predict a shear strength profile in peat and attempts to measure the shear strength using normal geotechnical methods can be misleading. Typical values of shear strength from hand shear vanes would be in the range 10-60 kilopascal (kPa) although values over 100 kPa have been recorded in peat elsewhere. The higher strengths are almost certainly the influence of roots or other non-decomposed material. It is believed that the strength of peat should be quoted as a cohesion value as there are few, if any, discrete particles to give the material a significant frictional resistance. It should be noted, however, that any quotation of shear strength for peat should be treated with extreme caution.

7 Ingram, H.A.P., (1978), 'Soil layers in mires: function and terminology'. Journal of Soil Science, 29, 224-227.

8 Von Post, L. and Grunland, E., (1926), 'Sodra Sveriges torvillganger 1' Sverges Geol. Unders. Avh., C335, 1-127.

9 Hobbs, N.B., (1986), 'Mire morphology and the properties and behaviour of some British and foreign peats.' Quarterly Journal of Engineering Geology, London, 19, 7-80.

2.3 Peat Stability

2.3.1 Factors to be Considered

There is considerable observational information relating to debris and peat flows although the actual mechanisms involved in peat instability are not fully understood. The main influences on slope stability are geological, geotechnical, geomorphic, hydrological, topographic, climatic, agricultural, and human influences such as drainage and construction activity. Peat is affected to a degree by changes in any of the above list and it is vital to appreciate that changes to the existing equilibrium would affect the level of slope stability during construction and operation of the Proposed Alignment.

Some of the contributory factors to peat instability are summarised below:

- The geographical limits which could be affected by potential instability are not confined to the artificial boundaries imposed by land ownership; landslip occurring above a site could affect the Proposed Alignment and property down slope or downstream of the Proposed Alignment for several kilometres.
- Agriculture and grazing have a substantial effect on peat areas, and this can be compounded in areas that have been managed to improve grazing. Grazing compacts the peat surface reducing the rainwater infiltration and the additional nutrients change the ecological balance of the original peat bog. Agricultural management can include surface drainage and periodic burning, both of which can leave the surface of the peat bare for a period of time resulting in temporary desiccation of the surface. Subsequent wetting of the peat and resumption of peat accumulation results in the former desiccated and possibly ash covered surface being incorporated into the body of the peat which introduces a weak discontinuity in the profile; this in turn becomes another unknown factor in the stability assessment.
- Forestry has a substantial effect on slope stability particularly in the early stages as the creation of a forest involves disruption of the natural equilibrium and drainage of the slopes and the installation of artificial drains by deep ploughing. The construction of access tracks further disrupts the drainage and concentrates groundwater flow into narrow, fast flowing erosive streams. The work by Winter *et al.*[10] noted that forest tracks can act to retard or concentrate the down slope flow of water and thus aid its penetration into the slope below. Such a mechanism has been observed at a number of recent landslips that have affected the road network in Scotland.
- Natural Drainage – some of the precipitation falling onto a natural upland peat bog would be absorbed into the low permeability catotelm peat. However, most of the water would run-off as sheet flow through upper, high permeability acrotelm. Thus, the water is transmitted to the lower slopes in a reasonably controlled manner through a range of interconnections that operate at different scales and speed. Failure to understand this and to disrupt the transmission process for the groundwater could result in instability.
- Artificial Drainage – where artificial drainage has been used to improve the quality of the grazing or to promote forestry it reduces the overall volume of water entering the bog and transfers this water to the edges more rapidly. This can result in ditches and streams becoming enlarged, causing increased erosion and a greater silt burden in the stream water.

10 Winter, M.R., Macgregor, F. and Shackman, L. (2005a), 'Scottish tracks networks landslide study' Trunk tracks: network management division, published report series. The Scottish Government.

2.3.2 Peat Mass Stability

The principal surface indicator of peat slide potential is cracking of the peat land surface, and it is the identification of crack patterns in the field and the attendant causes of the cracking that is fundamental to a peat stability assessment.

Sites that have exhibited natural instability in the past are likely to be more susceptible to future instability during and following construction of power infrastructure, therefore it is important to identify such instability as part of the PLHRA.

Types of Failure

The result of instability in peat is the down slope mass movement of the material; there are a number of definitions of peat instability which are used to characterise the type of failure. A brief description is given below:

- Bog Bursts or Bog Flows – the emergence of a fluid form of well humified, amorphous peat from the surface of a bog, followed by the settling of the residual peat, in-situ[11];
- Peat Slides – the failure of the peat at or below the peat / substratum interface leading to translational sliding of detached blocks of surface vegetation together with the whole underlying peat stratum[11]; and
- Bog Slide – an intermediate form of instability where failure occurs on a surface within the peat mass with rafts of surface vegetation being carried by the movement of a mass of liquid peat.

Bog Bursts

Accounts of bog bursts are generally associated with very wet climates or areas which have received storm rainfall events. Bog bursts can be associated with particularly wet peat landscapes; therefore, it is possible to identify broad regions of a higher susceptibility to these failures. The constraints used to identify the areas of higher susceptibility to bog burst failure are given below:

- peat thickness in excess of 1.5 m with no upper limit;
- shallow gradients, generally within the range of 2 to 10^{o}, peat thicker than 1.5 m is generally not observed on slopes steeper than 10^{o}, also moisture content is generally reduced on steeper slopes due to drainage;
- ground which is annually waterlogged to within the upper 1 m below ground level (the groundwater level may rise above this but rarely falls below)[12];
- greater humification of the lower catotelm within the waterlogged ground; and
- lower surface tensile strength of the fibrous acrotelm peat and vegetation.

The humified mass can be considered as analogous to a heavy liquid and the stability of this mass is maintained by the strength of the surface or acrotelm peat. Should the surface become weakened through erosion or desiccation or the construction of a surface drainage ditch for agricultural or forestry reasons or through turbary (peat cutting), failure is made more likely.

Peat Slides

Peat slides tend to be translational failures with a defined shear surface at or close to the interface with the substrate.

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11 Dykes, A.P and Kirk, K.J., (2001), 'Initiation of a multiple peat slide on Cuilcagh Mountain, Northern Ireland.' Earth Surface Processes and Landforms, 26, 395-408.

12 Crisp, D.T., Dawes, M. & Welch, D. (1964), 'A Pennine Peat Slide', The Geographical Journal, Vol 130, No4, pp519-524.

The factors generally considered to influence susceptibility to peat slide failures are listed below:

- peat depth up to 2 m;
- slope gradients between 5° and 15°;
- natural or artificial drainage cut into the surrounding peat landscape;
- greater humification of the lower catotelm within the waterlogged ground; and
- lower surface tensile strength of the fibrous peat and vegetation.

It is noted that some of the factors causing instability are common to both bog bursts and peat slides.

The peat – substrate interface is the primary zone of failure and is enhanced by elevated water content at this boundary and softening or weathering of the lower mineral surface. For this reason, any investigation or probing should try to distinguish the nature of the lower mineral substrate.

Bog Slides

A bog slide is a variation on a peat slide where part of the peat mass is subject to movement, usually on an internal layer of material, which may be more prone to movement, such as an interface between the acrotelmic and catotelmic layer.

2.3.3 Natural Instability

The stability of a peat mass is maintained by a complex interrelationship of many factors, some of which may not be immediately obvious. Key factors include sloping rock head and proximity to a water body. Rainfall often acts as the trigger after the slope has already been conditioned to fail by natural processes.

It should also be remembered that peat bogs are growing environments and that there would come a time, on sloping ground, where the forces causing instability, the weight of the bog, can no longer be resisted by the internal strength of the peat and its interface with the underlying mineral surface. At this point, failure would occur.

The weight of the peat bog or any soils mantling steep hill slopes would be increased during periods of very heavy rain and it is common to see landslips occurring following extreme rainfall events. This may be a concern for future developments where one of the predicted effects of global warming will be a greater frequency of extreme weather, intense storms being one element.

3.0 Desk Study

3.1 Topography

Based on the digital terrain model available from the BGS Geoindex[13], the topography across the Proposed Alignment is generally low-lying (20 to 150 m AOD) with typically moderate slopes with some locally steep slopes around hilltops and surface water and river valleys.

The Proposed Alignment exhibits moderate to steep slopes in the western extents which climb towards the east before reaching a peak of approximately 150 m AOD near Tower 39 in the central area. The Proposed Alignment gently slopes towards the east with a steeper descent at Kirkton before reaching the lowest elevation of approximately 20 m AOD on the banks of the Halladale River. There are extensive flatter expanses and gentle slopes situated throughout the Proposed Alignment, particularly between Towers 41 and 48.

3.2 Geology

3.2.1 Artificial Ground

Published BGS online data[13] indicates that there is a localised area of made ground deposits located approximately 230 m from Tower 57, which crosses the existing Kirkton to Upper Bighouse access track. The area of made ground is situated linearly alongside the Halladale River.

3.2.2 Superficial Geology

Based on the available BGS online data[13], the superficial geological mapping shows that the western extents of the Proposed Alignment are comprised of glaciofluvial deposits (gravel, sand and silt) and very localised alluvium on the banks of the River Strathy.

Peat deposits are mapped throughout the majority of the Proposed Alignment, from Tower 30 to 49, with localised mapped peat deposits present at Tower 54 and 61.

Mapped superficial deposits are absent in localised areas in the west and east of the Proposed Alignment, indicating bedrock at or near surface. This includes the area in the west of the Proposed Alignment between Tower 24 and Tower 30 and in the east at Tower 56 and localised areas near Tower 61 and 62.

Superficial deposits vary significantly in the eastern extents of the Proposed Alignment. There are areas of mapped alluvium (clay, silt, sand and gravel) generally associated with adjacent watercourses near Tower 53 and Tower 63. Hummocky glacial deposits, comprised of sand, gravel and boulders, are mapped near Tower 47, between Tower 50 and Tower 53, between Tower 55 and 57 and near Tower 61 and 62. In addition, there are mapped glaciofluvial and glaciofluvial sheet deposits (gravel, sand and silt) situated across Tower 57 to Tower 60, Tower 62 and Tower 64.

Figure V1-9.1.3 shows the superficial geology BGS mapping and the Proposed Alignment.

3.2.3 Bedrock Geology

Based on the available BGS online data[13], the Proposed Alignment is underlain by a variety of bedrock formations including sedimentary, metamorphic and igneous rocks. In the western extents of the Proposed Alignment, the Kirtomy Gneisses is mapped, comprised of metamorphic rocks including gneiss and semipelite. This formation is underlying Tower 19

13 BGS Online Viewer, available at [https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.133433804.376188765.1646739904-1030004651.1646739904]

and Tower 21 to 29. Further west, the Bighouse Formation is present from Tower 30 to 34, comprised of sedimentary rocks including sandstones and conglomerates.

In the northern areas of the Proposed Alignment, Towers 35 to 39 are underlain by the Lower Old Red Sandstone Group. This formation is comprised of sedimentary rocks including sandstone, mudstone and conglomerates. In addition, a localised area to the north of Tower 39 and across Tower 40 is underlain by the Strath Halladale Granite, comprised of igneous granites. This formation is also mapped across the majority of the east of the Proposed Alignment, from Tower 54 to 62, Tower 64 and localised areas along the route including Tower 49.

Furthermore, the Portskerra Psammite Formation is mapped across the majority of the central areas of the Proposed Alignment, from Tower 41 to Tower 54. This formation is comprised of metamorphic rocks including psammites and semipelites.

Figure V1-9.1.4 shows the bedrock geology BGS mapping and the Proposed Alignment.

3.2.4 Structural Geology

BGS online data indicates that there are several minor faults, generally trending north to south in the western areas of the Proposed Alignment and east to west towards the eastern areas of the Proposed Alignment. The most significant mapped linear features are present in the east and west of the Proposed Alignment extents, both trending north to south. The linear feature in the western area of the Proposed Alignment is described as a 'back-feature of terrace' whilst the fault in the east is inferred, with exact displacement unknown.

3.3 Peatland Classification

The Carbon and Peatland Map 2016[14] indicates that approximately 6.1 km and 3 km of the proposed OHL alignment is located within an area of Class 1 and Class 2 peatland respectively. Class 1 and 2 peatland are considered nationally important carbon-rich soils, deep peat and priority peatland habitat with areas likely to be of high conservation value. In addition, Class 2 peatland is considered to be of high restoration potential.

There are areas of Class 1 peat mapped in the western extents of the Proposed Alignment, at proposed Towers 19, 20 and 22. In addition, there are areas of Class 1 peat mapped across the majority of the northern areas of the Proposed Alignment including at Tower 26, between Towers 29 and 32, between Towers 35 to 39, Towers 41 to 49 and at Tower 54.

The cable sealing end (CSE) compound, UGC and Towers 23 to 25, Tower 27, Tower 28, Tower 33, Tower 34, Tower 51, Towers 55 to 61, and Tower 64 are located in mapped Class 2 peatland.

The remainder of the Proposed Alignment is mapped as Class 5 peatland with a very localised area of Class 3 peatland mapped in the western extents of the Proposed Alignment adjacent to the River Strathy and Tower 19.

Class 3 peatland is not considered priority peatland habitat, however, most of the soils are carbon-rich and areas of deep peat may be present. Class 5 peatland is not associated with peatland habitats, but soils are carbon-rich and deep peat may be present.

The proposed access tracks to the towers and infrastructure are located within areas of Class 1, 2, 3 and 5 peatland.

Peat and peat soils throughout and surrounding the Proposed Alignment have been used intensively over the past century. Across the Proposed Alignment, grazing, artificial drainage

14 NatureScot, Carbon and Peatland Map 2016, Available online at: map.environment.gov.scot/soil_maps/

and peat cuttings have been observed using aerial imagery and during site walkovers. In addition, plantation forestry is present to the west of the Proposed Alignment. In addition, the east of the Proposed Alignment was subject to intense peat loss as a consequence of the 2019 Flow Country Wildfire.

3.4 Ground Stability Hazards

There are no recorded movements of land on BGS GeoIndex[13] within the vicinity of the Proposed Alignment area.

3.5 Mining

The Coal Authority Interactive Map viewer[15] indicates that the Proposed Alignment is not located within a Coal Mining Reporting area, Development High Risk area or Surface Coal Resource area.

From review of the BGS GeoIndex[13] there are recorded mineral sites related to borrow pits for construction of access tracks near the Proposed Alignment. These pits are located predominantly in the east with Kirkton gravel pit being mapped in two localities and with an active status.

3.6 Hydrology

The Proposed Alignment is located within three main surface water catchments: the River Strathy to the west, the Halladale River surface water catchment to the east, and the Tongue Coastal catchment to the north. The Proposed Alignment crosses over the Halladale River at NGR NC 90230 59519, between Tower 63 and 64.

The Proposed Alignment is drained by the following sub catchments:

- Bowside Burn sub catchment of the River Strathy which drains a small area to the south-west of the Study Area. The burn flows generally westwards before discharging into the River Strathy approximately 420 m downstream of the Proposed Alignment. The Proposed Alignment would cross the burn at NGR NC 83133 60994 (between Towers 21 and 22 (no track is proposed to cross the burn) and poles associated with the existing 132 kV OHL would be dismantled within this catchment; and,
- Allt na n Eaglaise sub catchment of the Halladale River which drains a large area to the south and south-east of the Study Area. Allt ne n Eaglaise flows generally northwards, through the eastern extent, before discharging into the Halladale River approximately 680 m downstream of the Study Area. The Proposed Alignment would cross Allt na n Eaglaise at NGR NC 88565 60876 (between Towers 53 and 54). There are several tributaries of Allt na n Eaglaise within the Proposed Alignment.

3.7 Hydrogeology

Information from Scotland's environment map[16] indicates that the Proposed Alignment is underlain by the Moine Supergroup, the Middle Old Red Sandstone, the Lower Old Red Sandstone and an unnamed igneous intrusive complex (Late Silurian to Early Devonian). The Moine Supergroup is a low productivity aquifer yielding small amounts of groundwater in near surface weathered zones and secondary fractures. This aquifer type is mapped throughout the majority of the Proposed Alignment, in the east underlying Towers 21 to 28, and throughout

15 Coal Authority Viewer. Available at [https://mapapps2.bgs.ac.uk/coalauthority/home.html]

16 Scotland's Environment Online Viewer. Available at [https://map.environment.gov.scot/sewebmap/]

the north and east from Towers 40 to 53. The Middle Old Red Sandstone is a moderately productive aquifer comprised of sandstones, siltstones, mudstones and conglomerates which locally yield small amounts of groundwater. This aquifer is mapped throughout the northern area of the Proposed Alignment, between Towers 29 and 39.

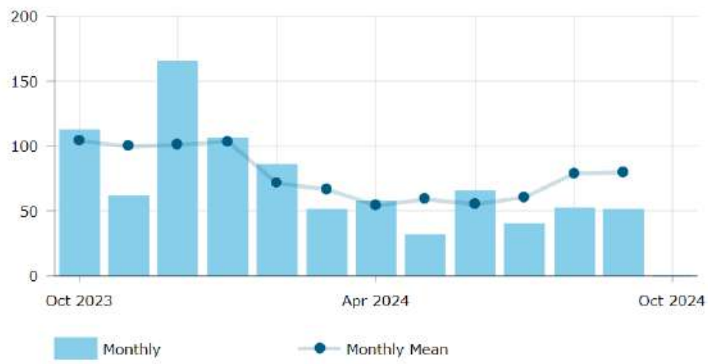
3.8 Flooding

Review of SEPA Flood Risk Maps[17], confirms that there is a fluvial floodplain associated with the River Strathy, the Halladale River, Allt na Eaglaise and Allt na Cleite. The majority of the Proposed Alignment is located out with the mapped floodplain with the exception of existing access tracks to be upgraded. Small areas of surface water flooding are shown throughout the Proposed Alignment. The proposed towers are not located within any potentially flood prone areas. Flood risk is discussed further in **Volume 1: Chapter 9**.

3.9 Rainfall

Periods of intense heavy rainfall are often seen as triggers for instability events. Rainfall data from the closest SEPA weather station[18] at Strathy Bridge (station number 234319), located approximately 860 m to the north of the Proposed Alignment, shows the monthly rainfall in the region from October 2023 until October 2024. The highest monthly rainfall was 165.6 mm in December 2023.

Figure 1: Monthly Rainfall totals in mm from Strathy Bridge Station



3.10 Environmental Designations

Review of NatureScot Sitelink confirms that approximately 250 m of Proposed Alignment is located within the western edge of West Halladale Site of Special Scientific Interest (SSSI) which is also part of the larger Caithness and Sutherland Peatlands Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site. The SSSI, SAC, SPA and Ramsar site have been designated for breeding bird assemblage, otters, marsh saxifrage and various freshwater and upland habitats including blanket bog habitats. The qualifying or notified features of the designated sites are sensitive to changes in peat and water quality.

17 SEPA Flood Risk Maps. Available at [https://scottishepa.maps.arcgis.com/apps/webappviewer/index.html?id=b3cfd390efa44e3b8a72a07cf5767663&showLayers=FloodMapsBasic_5265;FloodMapsBasic_5265_1;FloodMapsBasic_5265_2;FloodMapsBasic_5265_3;FloodMapsBasic_5265_4;FloodMapsBasic_5265_5;FloodMapsBasic_5265_6;FloodMapsBasic_5265_7;FloodMapsBasic_5265_9;FloodMapsBasic_5265_10;FloodMapsBasic_5265_11&marker=258564;660671;27700;;;Search%20location&scale=16000]

18 SEPA Rainfall Data. Available at [https://www2.sepa.org.uk/rainfall#464495]

The Proposed Alignment is also located within the northern extent of the Flow Country World Heritage Site. Assessment is detailed within **Volume 4: Appendix V1-7.7: Flow Country WHS Assessment**.

3.11 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

Review of the National Vegetation Classification (NVC) habitat mapping concluded that GWDTE's are sustained by incident rainfall and local surface water runoff, therefore the buffers proposed in SEPAs GWDTE guidance need not apply. Further details on GWDTE are provided within Volume 1: **Chapter 7: Ecology** and **Volume 1: Chapter 9: Soil, Geology & Water**.

3.12 Private Water Supplies

A review of local council data for the Proposed Alignment indicates that there are two private water supplies (PWS), and 11 SEPA CAR authorisations have been identified at eight locations within the study area. However, none of these locations are deemed to be at direct risk of any peat instability, as confirmed in Section 6.0. Further details are provided in **Volume 1: Chapter 9: Soil, Geology & Water**.

3.13 Geomorphology

A review of the peatland geomorphology across the Proposed Alignment was undertaken as part of this assessment. A desk-based review of the aerial photographs was followed by a site walkover to analyse the geomorphological conditions across the Proposed Alignment. Typical conditions observed throughout the Proposed Alignment are summarised below in the following sections with detailed geomorphology mapping is displayed on **Figure V1-9.1.5**.

3.13.1 Peat Deposits

There are localised deep peat deposits (>1 m depth) situated across the Proposed Alignment. However, these deposits are generally situated across flatter expanses and in minor topographic lows. The peat deposits are generally confined by topography and rarely situated across steeper slopes.

Within the central areas of the Proposed Alignment, deep peat of up to 2 m was recorded within the area of Towers 32 – 35, with most peat depths ranging from 1 to 1.5 m. Typical peat deposits observed in the central area of the OHL alignment are shown by **Photo 1**. Deep peat up to 2.5 m was encountered within the area of Tower 41 with a shallowing of peat depths towards Tower 39 where steeper slopes are present. Towards the eastern extends of the Proposed Alignment peat depths of over 2 m were recorded at Towers 43 and 44 as these towers are within flatter expanses. Towers 47, 48 and 49 are also positioned within flatter expanses and peat depths up to 3 m were mapped.

Further to the south-east deep peat up to 2.5 m is recorded at Tower 61. The western areas of the Proposed Alignment do not feature many areas of deep peat. There is localised deep peat of up to 2 m at Tower 19 in the south-west.

Deeper peat (>1m) was present in localised areas of proposed access tracks within the Proposed Alignment.

Areas of localised of deeper peat were recorded at the permanent access track north-east of Tower 32 and the temporary access track to the east towards Tower 35.

Localised areas of deeper peat were recorded at the existing access track (to be upgraded) north of Tower 42 and with sections of permanent track at Tower 43, 44 and sections of temporary access track between Towers 45 to 46 and between 47 and 48.

Localised pockets of deep peat were recorded on the permanent access track connecting up the sections of existing access track to be upgraded, located approximately 1 km south-west of Melvich.

The access tracks in the south-east generally recorded shallow peat depths with only localised deeper peat recorded at the temporary access track around Towers 51, 54, 57 and 58. An area of more extensive deeper peat is present on the permanent access track around Tower 61 with some minor localised areas of deeper peat present between Tower 62 and 63.

No areas of instability relating to peat deposits was observed across the Proposed Alignment.

Photo 1: Area of deeper peat up to 2.5m recorded at Tower 35, looking north. National Grid Reference (NGR): NC 85433 62804

3.13.2 Peat Erosional Features

From review of aerial photography, there are localised areas of bare peat across the Proposed Alignment, predominantly in the south-east areas near Tower 49 as shown by **Photo 2**. The erosion across this location was generally associated with the network of drainage in this area.

No areas of instability relating to peat erosion was observed across the Proposed Alignment.

Photo 2: Area of bare peat and resulting dendritic drainage at Tower 49. NGR: NC 88139 61838.

3.13.3 Natural Drainage

Drainage across the Proposed Alignment is characterised by a network of rivers, streams and lochs. The northern and central areas of the Proposed Alignment generally drain towards the north by a network of watercourses (Baligill Burn, Allt na Cleite and Alltan Domhaich) into the sea. The western area of the Proposed Alignment drains towards the River Strathy and the eastern area towards the Halladale River.

No areas of instability relating to surface water drainage were observed across the Proposed Alignment.

3.13.4 Artificial Drainage and Peat Cuttings

Artificial drainage and peat cuttings were frequently observed on review of aerial photography and during site visits.

Artificial drainage across the Proposed Alignment is generally associated with the existing tracks to within the east and west of the Proposed Alignment as shown in **Photo 3**. This drainage trends mostly east to west and was up to 2 m width by 1 m depth.

In addition, historic peat cuttings have been identified across the Proposed Alignment, predominantly in the northern areas near Towers 28 and 29 and between Towers 35 and 44 (see **Photo 4**). Peat cuttings are also present in the west near to Tower 19 and Tower 47.

No areas of instability relating to artificial drainage and peat cuttings were observed across the Proposed Alignment.

Photo 3: Artificial drainage ditch trending east to west at access track south of Cnoc a'Choire Mhor. NGR: NC 87732 63486.

Photo 4: Peat cuttings near Towers 36 and 37, looking north. NGR: NC 86075 63030.

3.13.5 Forestry and Felled Forestry

There is a small area of unnamed plantation forestry in the south-east of the Proposed Alignment at Tower 49. Further to the south-east there are areas of woodland creation schemes comprised of native forestry close to Tower 51 and between Towers 58 and 59. There is extensive plantation forestry to the western boundary out with the Proposed Alignment.

3.13.6 Bedrock

The OS mapping and aerial photography exhibits bedrock exposures across the Proposed Alignment. This was confirmed by site visits where exposed bedrock was frequently recorded, especially in the western extents of the Proposed Alignment across the steeper slopes near Bowside Lodge and in the eastern extents near Tower 62 adjacent to the Halladale River. Bedrock outcrops were also observed at Tower 41, within the central area of the Proposed Alignment (see **Photo 5**).

No areas of instability relating to bedrock exposures were observed across the Proposed Alignment.

Photo 5: Bedrock outcrop of Psammite near Tower 41 at Creagan Reamhar, looking north-west. NGR: NC 87003 63168.

3.13.7 Extension/Compression Features

There was no evidence of any natural or infrastructure induced peat instability identified from the site walkover surveys. No extension or compression features were observed in the peat within the Proposed Alignment and within areas of existing infrastructure or natural and/ or anthropogenic drainage indicating that the current conditions and infrastructure are not currently influencing peat stability.

There is no evidence of any significant historic peat failures or slides across the Proposed Alignment from the aerial photographs, nor from review of local newspapers or historic mapping.

4.0 Fieldwork

4.1 Peat Surveys

The following peat depth surveys were undertaken by SLR;

- Phase 1 survey undertaken in November 2023.
- Phase 2 surveys undertaken in April, May, July and September 2024.

Peat surveys were carried out in accordance with best practice guidance for developments on peatland[19,20]. Phase 1 peat probing resulted in probing on a 100 m grid on initial assessment areas of the OHL route which was used in preliminary site layout designs. Phase 2 probing saw detailed probing undertaken across the Proposed Alignment layout, focussing on access tracks, tower locations and other site infrastructure. The Phase 1 survey informed the site design such that areas of recorded peat could avoided where technically feasible.

Phase 2 probing was typically undertaken on linear infrastructure (permanent / temporary tracks) at 25 m to 50 m spacings with offset probing locations either side (approximately 10 m to 25 m). Infrastructure (towers UGCs and CSE compound) was typically probed at 10 m grid spacings.

The proposed OHL and Tower 19 are in proximity to the existing Strathy North 132 kV trident 'H' wood pole OHL. In addition, the alignment at Tower 19 intercepts an existing BT cable. Therefore, where the proposed OHL intercepts existing utility infrastructure, peat probes were undertaken at a safe offset distance as agreed with SSEN Transmission.

Where surveys were undertaken by SLR, the thickness of the peat was assessed using a graduated peat probe, approximately 6 mm diameter and capable of probing depths of up to 10 m. This was pushed vertically into the peat to refusal and the depth recorded, together with a unique location number and the co-ordinates from a handheld Global Positioning System instrument (GPS). The accuracy of the GPS was quoted as ±2 m, which was considered sufficiently accurate for this survey. All data was uploaded into a GIS database for incorporation into various drawings and analysis assessments.

Where the peat probing met refusal on a hard substrate, the 'feel' of the refusal can provide an insight into the nature of the substrate. The following criteria were used to assess material:

- Solid and abrupt refusal – rock;
- Solid but less abrupt refusal with grinding or crunching sound – sand or gravel or weathered rock;
- Rapid and firm refusal – clay; or
- Gradual refusal – dense peat or soft clay.

The relative stiffness of the peat was also assessed from the resistance to penetration of the probe and from the effort required to extract the probes (retrieval of the probe was often impossible for one person). In all instances refusal was met on obstructions allowing identification of subsurface geology.

19 Scottish Renewables & SEPA (2012) 'Developments on Peatland Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste'.

20 Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only.

4.2 Peat Depth

Peat is generally defined as a soil with a surface organic layer in excess of 0.5m[19]. Where the probing recorded less than 0.5 m thick, it is considered to be a peaty soil (or organo-mineral soil). Soils with a peaty organic horizon over mineral soil are often referred to as 'peaty soils'. These organo-mineral soils are extensive across the UK uplands, but do not meet recognised definitions of peat as they are either shallower than true peat or have a lower carbon density.

A total of 10,762 peat probes were undertaken across all survey phases, with the results summarised in **Table A** and detailed within the peat depth interpolation figures (**Figure V1-9.1.6** and **Figure V1-9.1.7**). The interpolation was undertaken using the Inverse Distance Weighting (IDW) methodology.

The peat was found to vary across the Proposed Alignment in terms of thickness and coverage. Deeper peat was generally encountered in flatter, lower gradient areas of the Proposed Alignment. Areas of deeper peat depths are discussed in detail in **Section 3.11.1**. All probing data is provided in **Annex A**.

Table A: Peat Probing Results

Peat Thickness (m)	No. of Probes	Percentage (of total probes undertaken on-site)
0 (no peat)	129	1.2
0.01 – 0.49 (peaty soil)	6626	61.6
0.50 – 0.99	1809	16.8
1.00 – 1.49	727	6.8
1.50 – 1.99	545	5.1
2.00 – 2.49	346	3.2
2.50 – 2.99	294	2.7
3.00 – 3.49	164	1.5
3.50 – 3.99	71	0.7
> 4.0	51	0.5

4.3 Physical Peat Condition

Peat and peat soils surrounding the Proposed Alignment have been subject to a number of pressures over the past century which include grazing (deer), peat cutting (turbary) and wildfire which has contributed to significant degradation of peat habitats in areas of the Proposed Alignment. Peatland condition is detailed further in **Volume 4: Appendix V1-7.3: Habitat Technical Report**.

Peat is described using BS5930[21] and the Von Post classification[22]. Four peat samples were collected by SLR along the proposed OHL alignment, using a peat auger and used to inform interpretations of the peat condition and underlying substrate.

21 BS 5930:2015+A1:2020, Code of practice for ground investigations

22 Von Post, L. and Grunland, E., (1926), 'Sodra Sveriges torvillganger 1' Sverges Geol. Unders. Avh., C335, 1-127.

Table B: Peat Coring Results

Location	Von Post Description	Description
PC01: Tower 61	H2, B2 H3, B2	GL – 1.00 Dark brown fibrous PEAT 1.00 – 4.00 Dark brown pseudo-fibrous PEAT
PC02: Tower 49	H2, B2 H4, B2	GL – 1.00 Dark brown fibrous PEAT 1.00 – 2.00 Dark brown pseudo-fibrous PEAT
PC03: Tower 49	H2, B2 H3, B2	GL – 1.00 Dark brown fibrous PEAT 1.00 – 3.00 Dark brown pseudo-fibrous PEAT
PC04: Upgraded Access Track	H2, B2 H3, B2	GL – 0.50 Dark brown fibrous PEAT 0.50 – 3.00 Dark brown pseudo-fibrous PEAT

Peat core logs and photographs are presented within **Annex B**.

4.4 Substrate

Where possible, in the SLR investigation, an assessment of the substrate was made, as described previously. From the evidence of the probing and coring, the substrate was recorded as the following:

- Granular, recorded at 9,730 (90%) probe locations; and
- Rock, recorded at 1,032 (10%) probe locations.

Based on a review of the BGS mapping and site surveys, the granular material is anticipated to be of glacial till origin and of weathered bedrock (see **Photo 6**). No rock samples were recovered from probe locations however, based on the limited rock exposures and BGS mapping, the bedrock is interpreted to be metamorphic, igneous and sedimentary in nature.

Photo 6: Road cutting displaying granular substrate at existing access track (to be upgraded) near Cnoc Eadar Dha Allt looking east. NGR: NC 86658 64682.

5.0 Hazard and Risk Assessment

5.1 Introduction

The Scottish Government Guidance[1] provides an overview of the principles of hazard and risk with respect to peat landslides. The guidance is noted as illustrative only and the developers can present their own methodology providing, it is clearly explained and incorporates consideration of the likelihood of instability and the consequences should it occur. The following sections detail the preferred methodology used within this assessment.

A 'Hazard Ranking' system has been applied based on the analysis of risk of peat slide as outlined in the Scottish Government Guidance[1]. This is applied on the principle:

Hazard Ranking = Hazard x Exposure

This philosophy can be applied to the assessment carried out so far in the following approach:

Hazard Ranking = Risk Rating x Impact Rating

5.2 Methodology

The determination of Risk Rating and Impact Rating values is based on a number of variables which impact the likelihood of a peat slide and the relative importance of these variables specific to the Proposed Alignment.

Similarly, the consequences or exposure to receptors is dependent on variables including the particular scale of a peat slide, the distance it will travel, and the sensitivity of the receptor.

In the absence of a predefined system, the approach to determining and categorising Risk Rating and Impact Rating is determined on a site-by-site basis. The particular system adopted for the PLHRA is outlined in the following sections.

5.3 Slope Stability

The stability of peat is a complex subject and there are numerous inter-relationships that affect the stability.

A quantitative assessment requires a numerical input, and such an analysis cannot account for the unquantifiable input required for a comprehensive peat stability assessment. For this reason, a purely quantitative assessment should only be considered as a guide and a qualitative assessment of stability should be used to inform the final recommendations.

The characteristics of the peat failure phenomena have been incorporated in a stability risk assessment to evaluate the risk of instability occurring within the peat areas. The main factors controlling the stability of the peat mass are the surface gradients, the depth and condition of the peat at each location and the type of substrate.

The natural moisture content and undrained shear strength of the peat are important; however, it is generally accepted that where present, the peat would be saturated and have a very low strength. It is believed to be unrealistic to rely on specific values of shear strength to maintain stability when back analysis of failed slopes indicates that there is often a significant discrepancy between measured strength in peat and stability. Shear strength has been assumed to be constant and worst case, throughout this assessment. It has also been assumed, as a worst case, that the groundwater level is coincident with the ground surface.

5.4 Risk Rating

The potential for a peat slide to occur during the construction of the Proposed Alignment depends on several factors, the importance of which can vary from site to site. The factors requiring considerations would typically include:

- Peat depth;
- Slope gradient;
- Substrate material; and
- Evidence of instability or potential instability.

Of these, peat depth and slope gradient are considered to be principal factors. Without a sufficient peat depth and a prevailing slope, peat slide hazard would be negligible.

The rating system outlined below differs slightly from that proposed in the Scottish Government Guidance[1] as the system adopted here incorporates three inputs compared to two in the guidance, with the potential impact of substrate added in this section.

The probability of a peat landslide 'Risk Rating' (score) was derived by multiplying the coefficients for the four key factors (with historic instability as 1) together to produce a risk rating which is a measure of the likelihood of peat instability, and this enables potential areas of concern to be highlighted. For the assessment, the following rating system was applied as shown in **Table C**.

Table C: Probability of Peat Landslide

Risk Rating Coefficient	Potential Stability Risk (Pre-Mitigation)	Action
<5	Negligible	No mitigation action required.
5 - 15	Low	As for negligible condition plus development of a site-specific construction and management plan for peat areas.
16 - 30	Medium	As for Low condition plus may require mitigation to improve site conditions.
31-50	High	Unacceptable level of risk, the area should be avoided. If unavoidable, detailed investigation and quantitative assessment required to determine stability and sensitivity to minor changes in strength and groundwater regime combined with long term monitoring.
>51	Very High	Unacceptable level of risk, the area should be avoided.

5.4.1 Peat Depth

Table D shows the peat depth ranges and their related peat depth coefficients. The ground conditions were assessed by using peat depths recorded during peat probing. Thin peat was classed as being 0.5 m to 1.5 m thick, with deposits in excess of this being classed as thick. The thickness ranges used are intended to reflect the risk of instability associated with both peat slides (in thin peat) and bog slides. Where the probing recorded peat less than 0.5 m thick, this has been considered to be an organic soil rather than peat and are outside the scope of this assessment.

In addition to peat thickness, the presence of existing landslip debris or indicators of meta-stable conditions such as tension cracks or slumping in the peat suggest the material is likely to become even less stable should the existing ground conditions change. Where evidence of historical slips, collapses, creep or flows is seen, a separate coefficient has been applied. No signs of instability were observed as detailed in Section 3.0 and therefore, no separate coefficients are required.

Table D: Coefficients for Peat Depth

Peat Depth Range	Description	Peat Depth Coefficients
(<0.5 m)	Peaty/organo mineral soil	0
(0.5 – 1.5 m)	Thin Peat	2
(>1.5 m)	Thick Peat	3*
-	Slips /collapses / creep / flows	8

***Note that thicker peat generally occurs in areas of shallow gradients and records indicate that thick peat does not generally occur on steeper gradients.**

5.4.2 Slope Gradients

Table E gives the coefficients applied to the categorised slope angles. The slope gradients were assessed by reference to the mapping and particularly the DTM which was used to generate a slope map (**Figure V1-9.1.8**), from which the gradient at each probe location could be determined. The gradient quoted at each location was based on the average gradient over a 5 m grid.

Coefficients for slope gradient have been assigned to ensure the potential for both peat slides (gradients of 4-15°) and bog slides (gradients of 2-10°) are addressed. By simple inspection it is clear that steeper slopes pose a greater risk of instability than shallow gradients. Therefore, a graduated gradient scale from 0° to >12° (the practical maximum gradient on which peat is commonly observed) has been applied.

Table E: Coefficients for Slope Gradients

Slope Angle (°)	Slope Angle Coefficients
<2°	1
2°≤ <4°	2
4°≤ <8°	4
8°≤ <12°	6
>12°	8

5.4.3 Substrate

Table F shows the substrate type and their related substate coefficient. As noted above, most failures in thin peat layers occur at the interface with the underlying substrate; the nature of the substrate has an influence on the probable level of stability.

Peat failures often occur within glacial till deposits in which an iron pan is observed in the upper few centimetres (Dykes and Warburton, 2007)[23]. They have also been observed over glacial till without and obvious iron pan, or over impermeable bedrock. They are rarely cited over permeable bedrock as the formation of peat deposits is deemed to be less likely.

23 Dykes A and Warburton J (2007) Mass movements in peat: A formal classification scheme. Geomorphology 86, pp. 73–93

Where sand and / or gravel (derived from glacial till/weathered bedrock) form the substrate, the effective strength of the interface can be considered to be good with comparatively high friction values. Under these conditions, failure is likely to occur in a zone within the peat, just above the interface. Further factors are necessary to cause a failure of this nature (increased pore pressures within the peat) and occurrence of such events is rare.

Where clay forms the interface, there is likely to be a significant zone of softening in the clay (due to saturation at low normal stresses, poor or non-existent vertical drainage and the effect of organic acids), resulting in either very low undrained shear strength or low effective shear strength parameters. The result is that potential shearing could occur either in the peat, on the interface or in the clay; all three possibilities have been documented in the past.

A rock substrate provides a high strength stratum, however, the rock surface can be smooth, and, depending on the dip orientation of the strata, it can provide a very weak interface. For these reasons, at this stage, a rock interface has been given the same risk rating as clay.

Table F: Coefficients for Substrate

Substrate Conditions	Substrate Coefficients
Granular	1
Rock	2
Cohesive	3
Not proven	3
Slip material (Existing materials)	5

Probing across the Proposed Alignment indicated primarily granular and bedrock substrates using the refusal method. This was confirmed by visual observations of exposures and coring at selected locations across the proposed infrastructure as shown on the logs contained within **Annex B**.

5.4.4 Results

The table of results, included in **Annex B,** shows that 10,762 probe locations were identified within the extent of the Proposed Alignment, peat (>0.5 m) was present at 4,007 locations. The stability risk rating identified the following:

- no peat was recorded at 129 locations (1%), hence no risk;
- negligible risk at 8,990 (83%) probe locations;
- low risk at 1,427 (13%) locations;
- medium risk at 203 (2%) locations; and
- high risk at 13 (1%) locations.

Figure V1-9.1.9 presents the interpreted risk of peat instability based on the multiplication of the risk coefficients discussed above in **Table D** to **Table F**.

5.5 Impact Rating

An assessment of the receptors 'Impact Rating' of the medium and high risk locations has been undertaken. It should be noted that the impact assessment is primarily concerned with impacts that affect the environment, ecology, public or infrastructure associated with the development, both on-site and potentially off-site. This assessment does not consider the detailed ecological impact of construction induced peat instability; however, the majority of the sensitive on-site receptors are the watercourses and thus the inferred ecological and environmental issues are addressed. The proposed mitigation measures in Section 6.0 would limit the potential for any slope failures into watercourses and drainage features, hence limit such impacts. The effect a slope failure may have on the construction site and infrastructure can be easily identified. However, the effect of an instability event on features impacted by an event not associated with the Proposed Alignment is harder to predict. In order to address this effect, it is not considered appropriate to assess the effect at every potential receptor location close to the Proposed Alignment; but rather to assess the effect a particular infrastructure feature (tracks, towers, UGCs, CSE compound) would have on the structures or features surrounding it. By adopting such an approach, the assessment of infrastructure features where a risk ranking of ‘negligible’ or ‘low’ (assessed in the stability risk assessments described above) is discounted from further assessment.

The impact rating coefficient (score) is derived by multiplying the receptor ranking coefficient (score) by the distance coefficient (score) and the elevation coefficient (score) for each impact receptor associated with a particular infrastructure feature. The ranking process by attributing the different weighting systems to each factor is detailed in the following sub-sections.

5.5.1 Receptor Ranking

Receptors are generally nearby structures or features that may be affected by peat movements caused during or following construction. Generally, only receptors immediately down gradient of the infrastructure feature could be affected by peat instability therefore the first phase of feature ranking requires topographic ridges and valleys to be identified across the Proposed Alignment and surrounding area. From this, receptors at risk from particular infrastructure features can be identified. However, should instability occur on a steep slope, there is the risk of the back scarp of the instability migrating up-slope, there-by affecting areas previously considered not to be at risk.

The main receptors located within the Proposed Alignment and surrounding area which could potentially be affected in the event of a peat slide were primarily watercourses and associated tributaries, existing tracks and paths and the proposed power infrastructure.

Following identification of receptors at risk, these are ranked according to their size and sensitivity. **Table G** presents the coefficients placed on particular receptor types.

Table G: Coefficients for Receptor Ranking

Nature of Feature	Feature Coefficient
Non-critical infrastructure (minor / private roads, tracks)	1
Watercourses, GWDTE, PWS and critical infrastructure (pipelines, motorways, dwellings and business properties etc.)	3
Sub-Community (settlement 1-10 residents)	6
Community (settlement of >10 residents)	8

5.5.2 Receptor Proximity

The proximity of an impact receptor is also critical in assessing the likely level of disruption it may suffer following an instability event. Based on this, two further coefficients – distance from infrastructure feature and relative elevation differences between the infrastructure feature and impact receptor – are applied in deriving an impact ranking. **Table H** and **Table I** present the coefficients derived for distance and elevation of impact receptors.

Table H: Coefficient for Receptor Proximity

Distance from Coefficient Feature	Distance Coefficient
>1 km	1
100 m – <1 km	2
10 – <100 m	3
0 – <10 m	4

Table I: Coefficient for Impact Feature Elevation

Relative Elevation of Feature	Elevation Coefficient
0 -<10 m	1
10 – <50 m	2
50 – <100 m	3
>100 m	4

Based on distance to impact receptors, in this instance, watercourses have been identified as the most sensitive receptor near the Proposed Alignment. Other receptors have been discounted, either because they are not present or distance to receptor mitigates risk. Watercourses are the principal receptor as they are at risk of not only direct impact from a peat slide but potentially the watercourse creates a pathway to impact other receptors indirectly, either ecological or potential water users downstream. Based on **Table G** the watercourses would have an impact receptor coefficient (score) of 3 and then considering the distance to the receptor and the relative elevation differences on-site of receptors, a potential impact can be derived.

5.6 Hazard Ranking

In order to achieve a meaningful and manageable result from the hazard ranking, the results of the Risk Rating and Impact Rating have been normalised to a standard numerical scale (**Table J** below).

Table J: Rating Normalisation

Risk Rating		Impact Rating	
Current Scale	Normalised Scale	Current Scale	Normalised Scale
Negligible <5	1	Very Low <10	1
Low 5 - <15	2	Low 11 - 20	2
Medium 16 - 30	3	High 21 - 30	3
High 31 - 50	4	Very High 31-50	4
Very High >51	5	Extremely High >51	5

The method of assessing probability of landslide, adverse consequence and hazard developed by SLR Consulting incorporates additional critical elements such as the substrate interface and coefficients for the receptor position, distance and elevation and as such is considered to be more rigorous than the assessment scheme proposed by the Scottish Government[1]. The Hazard Ranking scale does equate to the Scottish Government[1] scale, with rankings divided over four zones.

A simple multiplication of these coefficients would result in potentially large and unwieldy risk and impact rating numbers. SLR has therefore opted to normalise these values to bring them in line with the values used in the Scottish Government Guidance[1], as illustrated in **Table K**.

Table K: Hazard Ranking

Hazard Ranking	Hazard Ranking Zone	Action
1 - 4	Insignificant	No mitigation action required although slide management and monitoring shall be employed. Slide management shall include the development of a site specific construction plan for peat areas.
5 - 10	Significant	As for Insignificant condition plus further investigation to refine the assessment combined with detailed quantitative risk assessment to determine appropriate mitigation through relocation or re-design.
11 - 16	Substantial	Consideration of avoiding project development in these areas should be made unless hazard mitigation can be put in place without significant environmental effect.
17 - 25	Serious	Unacceptable level of hazard; development within the area should be avoided.

The stability risk assessment has demonstrated that the majority of the Proposed Alignment lies within an area of negligible to low risk (98% of probe locations) with regards to stability based on **Figure V1-9.1.9**.

2% of probe locations are identified as medium or high risk of peat instability across the Proposed Alignment. Following review, the majority of these locations are not considered to have either a potential impact on the development infrastructure, due to locality, either well away from influencing infrastructure, in a down gradient position or have no impact on the local watercourses (receptors). Therefore 9 medium risk sites have been identified (numbered on **Figure V1-9.1.9**) and are discussed in the following section.

The stability risk assessment results presented in **Table L** further below shows the calculated hazard ranking associated with every location where there is a stability risk of medium or above, at or close to infrastructure. The particular mitigation measures to reduce the risk of instability occurring are dependent upon location and the type of proposed structure. Proposed mitigation measures and actions already undertaken to reduce the risk of peat instability occurring are also identified in **Table L**, together with the associated, revised hazard ranking. A more detailed discussion of the possible mitigation measures is presented in Section 6.0.

6.0 Slide Risk and Mitigation

6.1 Overview

A number of mitigation measures can be implemented to further reduce the risk levels identified across the Proposed Alignment. These range from infrastructure specific measures to general good practice that should be applied across the Proposed Alignment to increase awareness of peat instability and enable early identification of potential displacement and opportunities for mitigation.

Risks may be mitigated by:

- Undertaking site specific stability analysis using better quality geotechnical data, final design loads for infrastructure and detailed ground models in areas of specific concern.
- Precautionary construction measures – including use of monitoring, good practice and a geotechnical risk register relevant to all locations.

Mitigation measures are provided below specific to each area of “Medium” risk. These mitigation measures will also help further reduce “Low” and “Negligible” risks to potential receptors with Section 6.2 providing information on good practice pre-construction, during construction and post-construction (i.e. during operation).

6.2 Embedded Mitigation

The paragraphs below detail good practice that is recommended during construction and follow the principles detailed in the NatureScot Guidance (2024)[3]. These measures are considered 'embedded mitigation' for the purposes of the assessment, and have been assumed to be in place for the purposes of the assessment presented in the EIA Report:

For excavated groundworks:

- Use of appropriate supporting structures around peat excavations to prevent collapse and the development of tension cracks.
- Avoid cutting trenches or aligning excavations across slopes (which may act as incipient head scarps for peat failures) unless appropriate mitigation has been put in place.
- Implement methods of working that minimise the cutting of the toes of slopes, e.g. working up-to downslope during excavation works.
- Monitor the ground upslope of excavation works for creep, heave, displacement, tension cracks, subsidence or changes in surface water content.
- Monitor cut faces for changes in water discharge, particularly at the peat-substrate contact.
- Minimise the effects of construction on natural drainage by ensuring natural drainage pathways are maintained or diverted such that there is no significant alteration of the hydrological regime of the site; drainage plans should avoid creating drainage / infiltration areas or settlement ponds towards the tops of slopes (where they may act to both load the slope and elevate pore pressures).

For permanent tracks:

- Maintain drainage pathways through tracks to avoid ponding of water upslope.
- Monitor the top line of excavated peat deposits for deformation post-excavation.

- Monitor the effectiveness of cross-track drainage to ensure it water remains free-flowing and that no blockages have occurred.

For temporary tracks:

- Prior to the construction, setting out the centreline of the proposed track should include a walk over performed by the site manager or general foreman, along with the suitably qualified Geotechnical Engineer, and appropriate Clerk of Works. This should be carried out to check that the ground conditions / drainage paths are as expected, and "fine-tuning / micrositing" of the alignment if required.
- Weather policy should be agreed and implemented during works, e.g. identifying 'stop' rules (i.e. weather dependent criteria) for cessation of track construction or trafficking (e.g. allowing tracks to thaw following periods of hard frost).
- Allow peat to undergo primary consolidation by adopting rates of road construction appropriate to weather conditions.

For storage of peat:

- Ensure stored peat is not located in areas identified with 'Medium' or higher peat landslide likelihoods.
- Undertake site specific stability analysis for all areas of peat storage to ensure the likelihood of destabilisation of underlying peat is minimised. Analysis should consider the slope angle of the storage location, the thickness of peat being stored and being loaded and use representative parameters for both the stored and underlying peat.
- Avoid storage of peat in areas of peat >1.5 m in depth.
- Minimise haul distances for peat, storing as near to excavation as possible.
- Monitor effects of wetting / re-wetting stored peat on surrounding peat areas, and prevent water build up on the upslope side of peat mounds. Mitigate any run-off.

In addition to these control measures, the following good practice should be followed:

- A geotechnical risk register (GRR) should be prepared for the site following intrusive investigations post-consent and location specific stability analyses – the risk register should be considered a live document and updated with site experience as infrastructure is constructed.
- The locations highlighted in Section 6.2 should be included within the GRR.
- All construction activities and operational decisions that involve disturbance to peat deposits should be overseen by an appropriately qualified geotechnical engineer with experience of construction on peat sites.
- Awareness of peat instability and pre-failure indicators should be incorporated in site induction and training to enable all site personnel to recognise ground disturbances and features indicative of incipient instability.
- Monitoring checklists should be prepared with respect to peat instability addressing all construction activities proposed for site.

Monitoring during and post construction:

The following activities will be built into any monitoring of groundworks undertaken for the development:

- Ponding on the upslope side of infrastructure sites and on the upslope side of access tracks.

- Subsidence and lateral displacement of tracks.
- Blockage or underperformance of the installed site drainage system.
- Development of tension cracks, compression features, bulging or quaking bog anywhere in a 50 m corridor surrounding the site of any construction activities or site works.

This monitoring should be undertaken on a quarterly basis in the first year after construction, biannually in the second year after construction and annually thereafter; in the event that unanticipated ground conditions arise during construction, the frequency of these intervals should be reviewed, revised and justified accordingly.

- Ensure adequate drainage is maintained for any peat storage areas;
- Minimise haul distances for peat, storing as near to excavation as possible; and
- Monitor effects of wetting / re-wetting stored peat on surrounding peat areas, and prevent water build up on the upslope side of peat mounds. Mitigate any run-off.

In addition to these control measures, the following good practice should be followed:

- A geotechnical risk register (GRR) should be prepared for the Proposed Alignment following intrusive investigations post-consent and location specific stability analyses – the risk register should be considered a live document and updated with site experience as infrastructure is constructed.
- All construction activities and operational decisions that involve disturbance to peat deposits should be overseen by an appropriately qualified geotechnical engineer with experience of construction on peat sites.
- Awareness of peat instability and pre-failure indicators should be incorporated in site induction and training to enable all site personnel to recognise ground disturbances and features indicative of incipient instability.
- Monitoring checklists should be prepared with respect to peat instability addressing all construction activities proposed for site.
- A documented procedure shall be in place and rapid reaction strategy in place prior to the commencement of construction on peat land. This strategy shall be enacted should signs of peat movement be recorded across the Proposed Alignment. This approach requires periodic and continued monitoring of the construction process by a suitably qualified geotechnical engineer.
- A detailed Construction Environmental Management Plan (CEMP) shall be produced and incorporate the conclusions of the peat stability report, continuously update the assessment and develop appropriate mitigations to respond to the peat slide risk as development proceeds.
- As part of the geotechnical risk register (GRR), regular inspection and monitoring of stored peat should be undertaken until temporary storage has been completed. This involves with recording of any visual signs of ground movement including identification of tension cracking or slumping of peat material. Future inspection frequency would be determined post construction and be dependent upon meteorological conditions.
- Awareness of peat instability and pre-failure indicators should be incorporated in site induction and training to enable all site personnel to recognise ground disturbances and features indicative of incipient instability.

6.3 Proposed Mitigation

As noted in **Figure V1-9.1.9**, where the risk assessment has identified a negligible or low risk of peat instability, no specific mitigation measures are necessary. However, in order to ensure best practise is employed, there would be a need for careful monitoring and the construction management must include careful design of both the permanent and temporary works appropriate for peat soils; as detailed in Section 6.2.

The areas of the infrastructure that were rated as medium or high risk, or above, were subjected to a hazard assessment; a number of areas were discounted as they do not fall within influencing distance of any of the key proposed site infrastructure. The procedure adopted was to review the peat slide risk data and identify those areas with a medium risk or greater, that were in close proximity or influencing distance of any of the proposed infrastructure or watercourses. Those risk areas where there is no development would not affect the natural stability of the peat.

Table L lists the locations that have been identified to have a medium risk of peat instability on the Proposed Alignment infrastructure. A variety of mitigation measures are recommended to reduce the risk of peat instability. Analysis of each location has shown that all can be mitigated to a Hazard Ranking of “Insignificant”.

Table L:Risk Register

Identified Risk Location	Risk Rating	Impact Rating	Hazard Ranking	Infrastructure at Risk Zone	Key Receptor	Mitigation	Revised Hazard Ranking
1	Medium	Very Low	Insignificant	Tower 24 & temporary track	Existing Access Track	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards existing access track. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide. Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	Insignificant
2	Medium	Very Low	Insignificant	Tower 25 & temporary track	Existing Access Track	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards existing access track. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide. Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	Insignificant
3	Medium	Low	Significant	Tower 30 & temporary track	Allt an Reidhe Ruaidh (watercourse)	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide.	Insignificant

Identified Risk Location	Risk Rating	Impact Rating	Hazard Ranking	Infrastructure at Risk Zone	Key Receptor	Mitigation	Revised Hazard Ranking
						Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	
4	Medium	Low	Significant	Permanent Access Track	Unnamed watercourse	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide. Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	Insignificant
5	Medium	Low	Significant	Permanent Access Track	Allt na Cleite (watercourse)	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide. Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	Insignificant
6	Medium	Low	Significant	Permanent Access Track	Allt na Cleite (watercourse)	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide.	Insignificant

Identified Risk Location	Risk Rating	Impact Rating	Hazard Ranking	Infrastructure at Risk Zone	Key Receptor	Mitigation	Revised Hazard Ranking
						Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	
7	Medium	Very Low	Insignificant	Temporary Access Track	Achridigill Burn	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide. Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	Insignificant
8	Medium	Low	Significant	Temporary Access Track	Unnamed watercourse	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide. Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	Insignificant
9	Medium	Very Low	Insignificant	Temporary Access Track	Unnamed watercourse	Excavation of peat prior to construction would reduce and mitigate risk of peat landslide towards watercourse. Suitable shoring of excavations would assist in mitigating risk during construction. Catch wall ditches or fences could be constructed downslope of the risk location to mitigate against any peat slide during construction works. Drainage pathways should be maintained during and post construction to reduce risk of peat slide.	Insignificant

Identified Risk Location	Risk Rating	Impact Rating	Hazard Ranking	Infrastructure at Risk Zone	Key Receptor	Mitigation	Revised Hazard Ranking
						Good construction practices, as detailed in the Section 6.2, should be followed to mitigate against any instability.	

7.0 Conclusion

The report has highlighted the complicated inter-relationship between all the aspects that influence the stability of peat. The Proposed Alignment has been assessed for potential hazards associated with peat instability and has been based on:

- a walk-over survey by an experienced geologist;
- a thorough inspection of the digital terrain map;
- review of historical and geological maps and publications and aerial photography; and
- a programme of peat survey and coring fieldwork.

The overall conclusion regarding peat stability is that there are areas of medium or high risk of peat instability across the Proposed Alignment and most have these have been avoided during the design process. For the remaining 9 medium risk areas, a hazard impact assessment was completed which concluded that, with the employment of appropriate mitigation measures, all of the areas can be considered as posing an insignificant risk.

Regardless, additional mitigation measures have been identified in areas where hazards are already considered insignificant to further reduce the risk of potential hazards occurring.

This report should be considered as the first stage in the development of a fundamental understanding of the various inter-relationships that govern and control the peatlands at the Proposed Alignment.

The commissioned assessment has purposefully kept the extent of physical intrusion into the sensitive peat areas to an absolute minimum. The results are considered appropriate to support a planning application.

Good construction methods and appropriate micro-siting (at detailed design stage) would also be effective at controlling residual peat landscape risk for lower risk locations at the Proposed Alignment. Providing that the recommended mitigation measures are put in place and adhered to, the risk of peat landslide as a result of the Proposed Alignment is assessed as not significant.

More detailed ground investigations will be required to support the geotechnical design stage of the Proposed Alignment. This will be incorporated into the Construction Method Statement which will be submitted to the Planning Authority for approval as part of the condition compliance prior to any site works commencing.

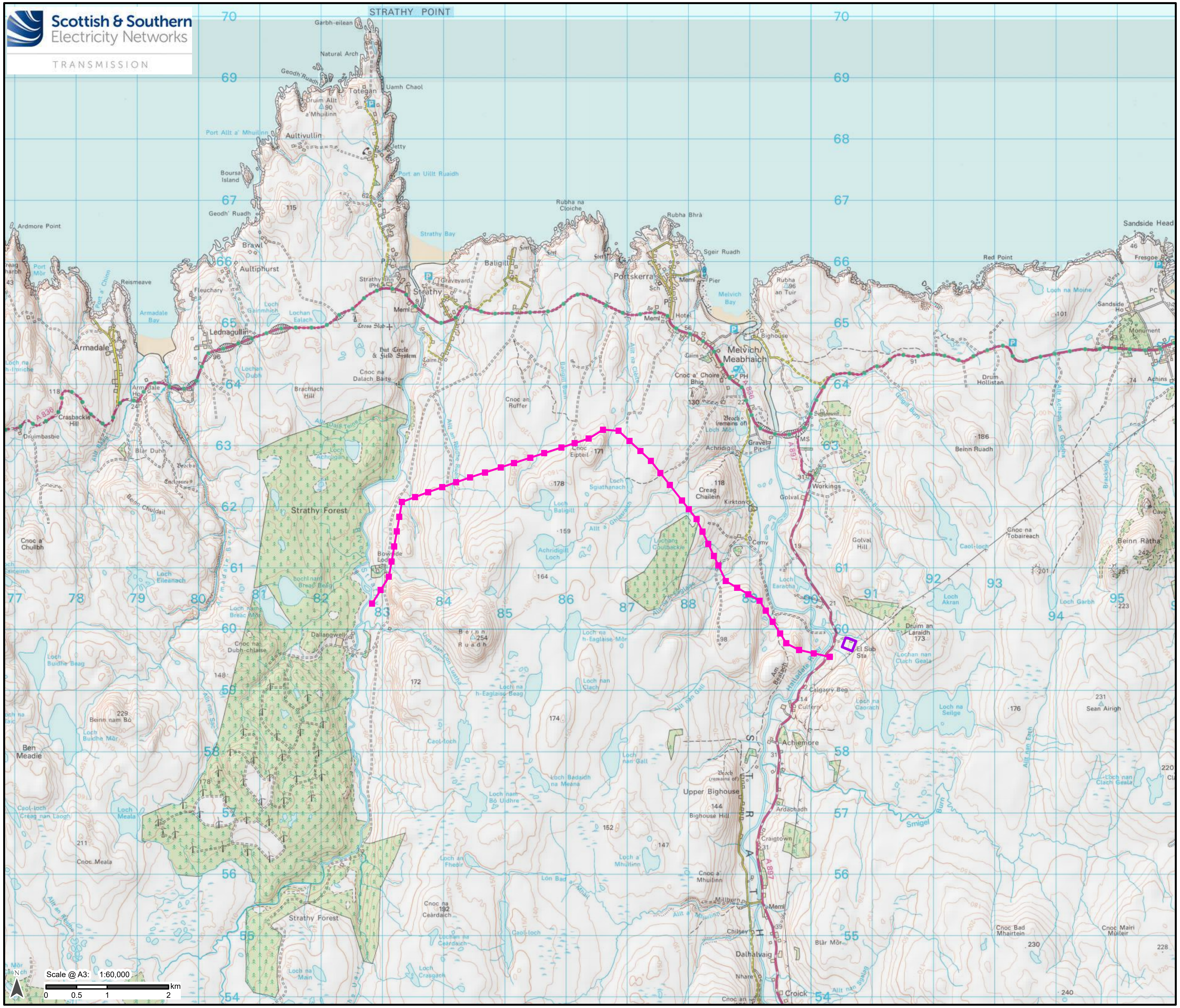
Figures

Strathy South Wind Farm Grid Connection

Volume 4: Appendix V1-9.1: Peat Landslide Hazard and Risk Assessment

SSEN Transmission

SLR Project No.: 428.013137.00001_04



Legend

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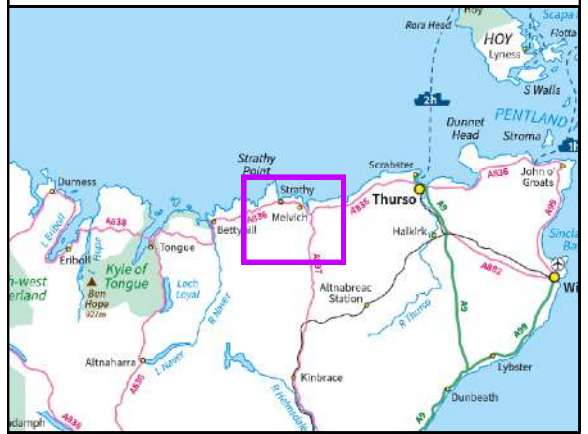
- Proposed OHL Alignment
- Connagill 275/132 kV Substation



Project No: LT560

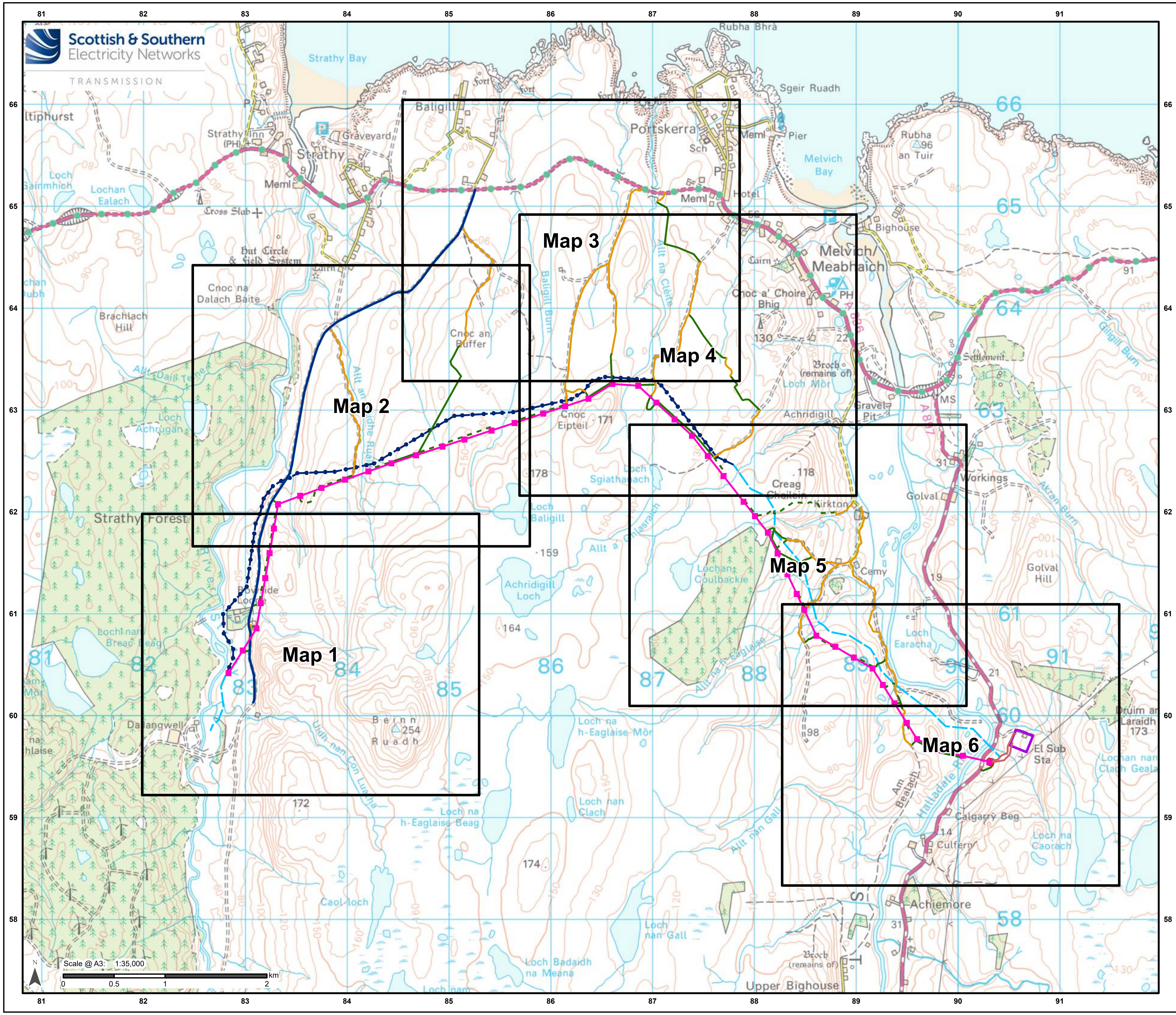
Project: Strathy South Wind Farm Grid Connection
Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.1 - Site Location

Drawn by: MM

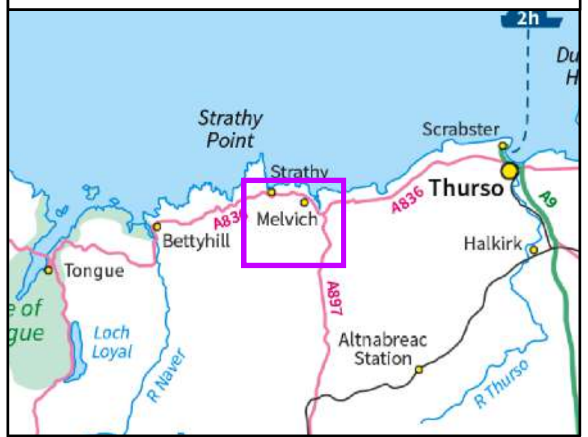
Date: 18/12/2024

Drawing: 428.013137.00001.00061.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Proposed Underground Cable (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing 132kV OHL (to be retained)



Project No:	LT560
Project:	Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment
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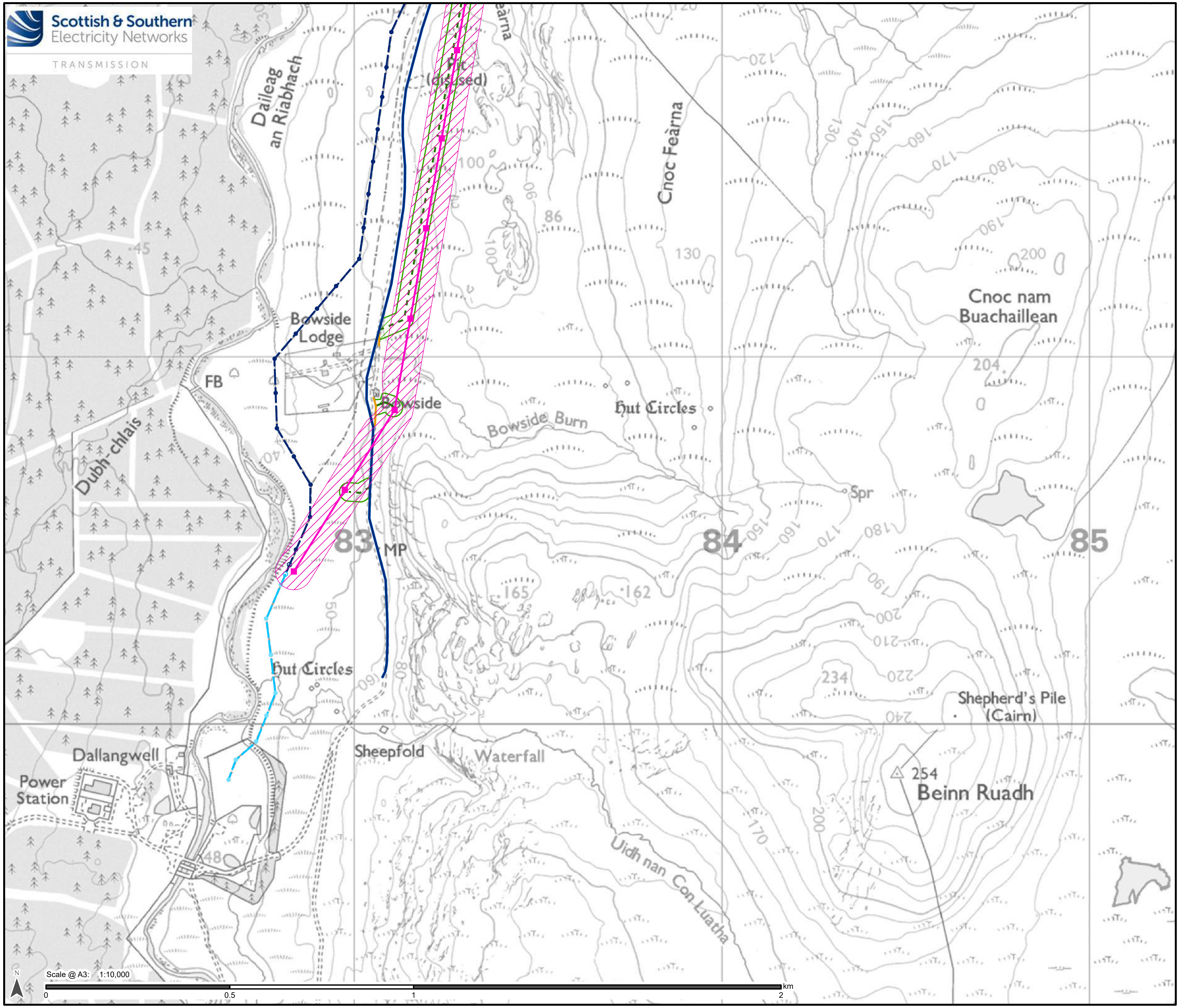
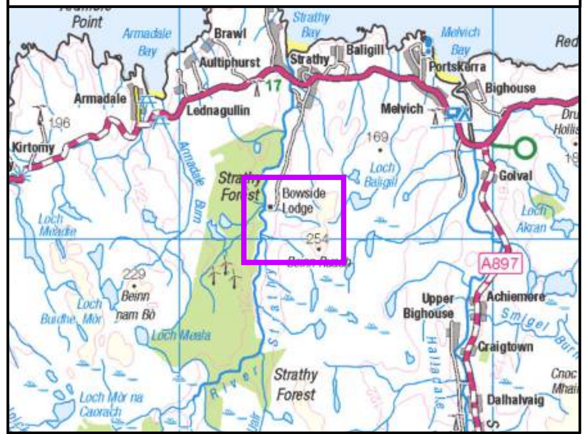
Drawn by:	MM — Date: 18/12/2024
Drawing:	428.013137.00001.00081.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Proposed* Wood Pole (H pole) (to be retained)
- Proposed* Wood Pole (H pole) (to be dismantled)

*Proposed as part of Strathy Wood Wind Farm Grid Connection



Project No: LT560

Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.2 - Site Layout Map 1

Drawn by: MM

Date: 18/12/2024

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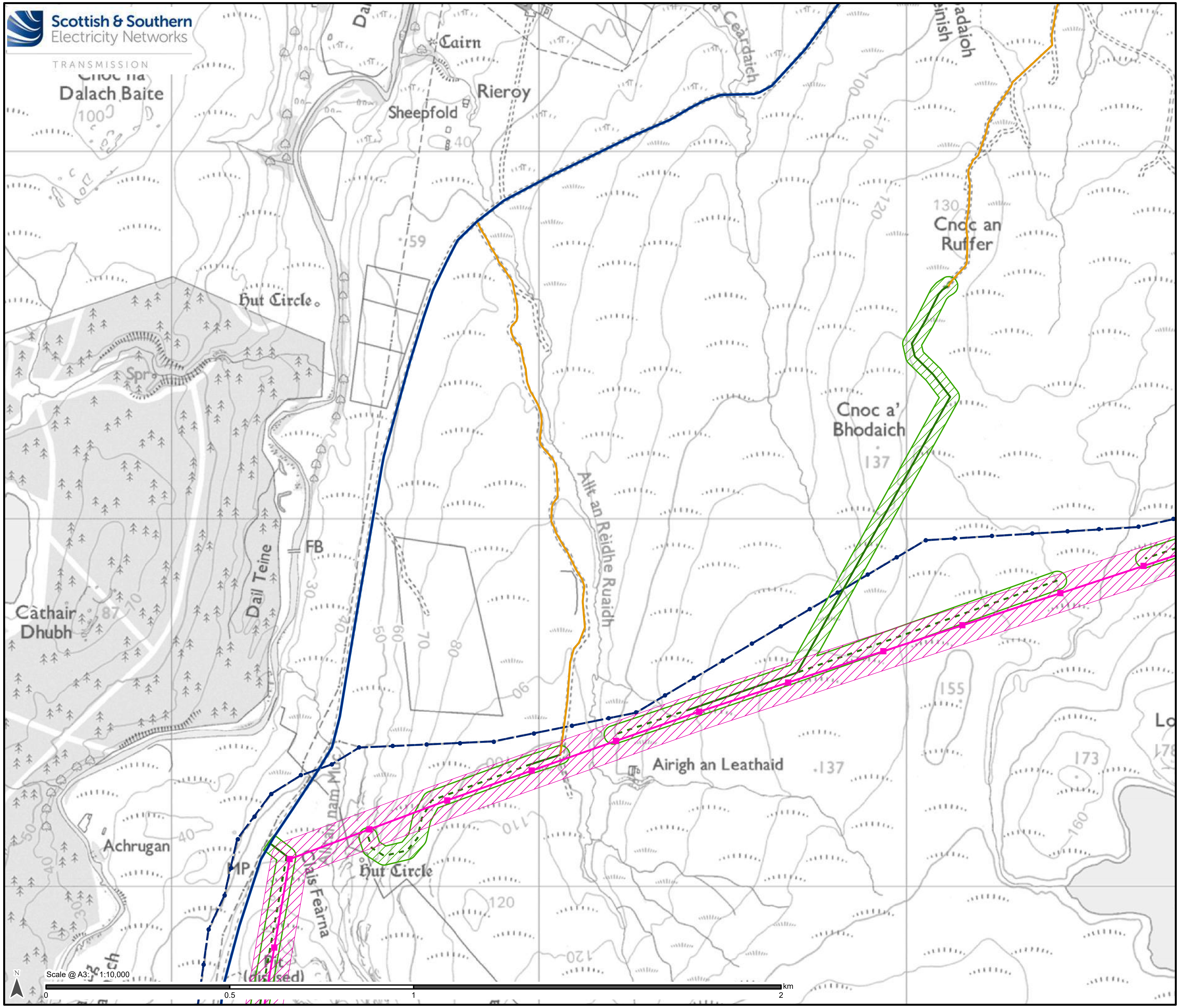
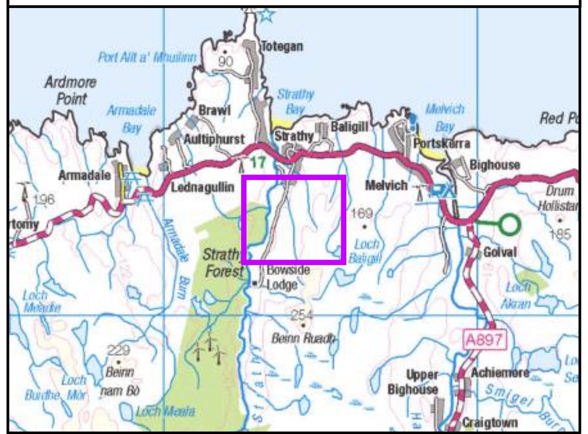


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)



Project No: LT560

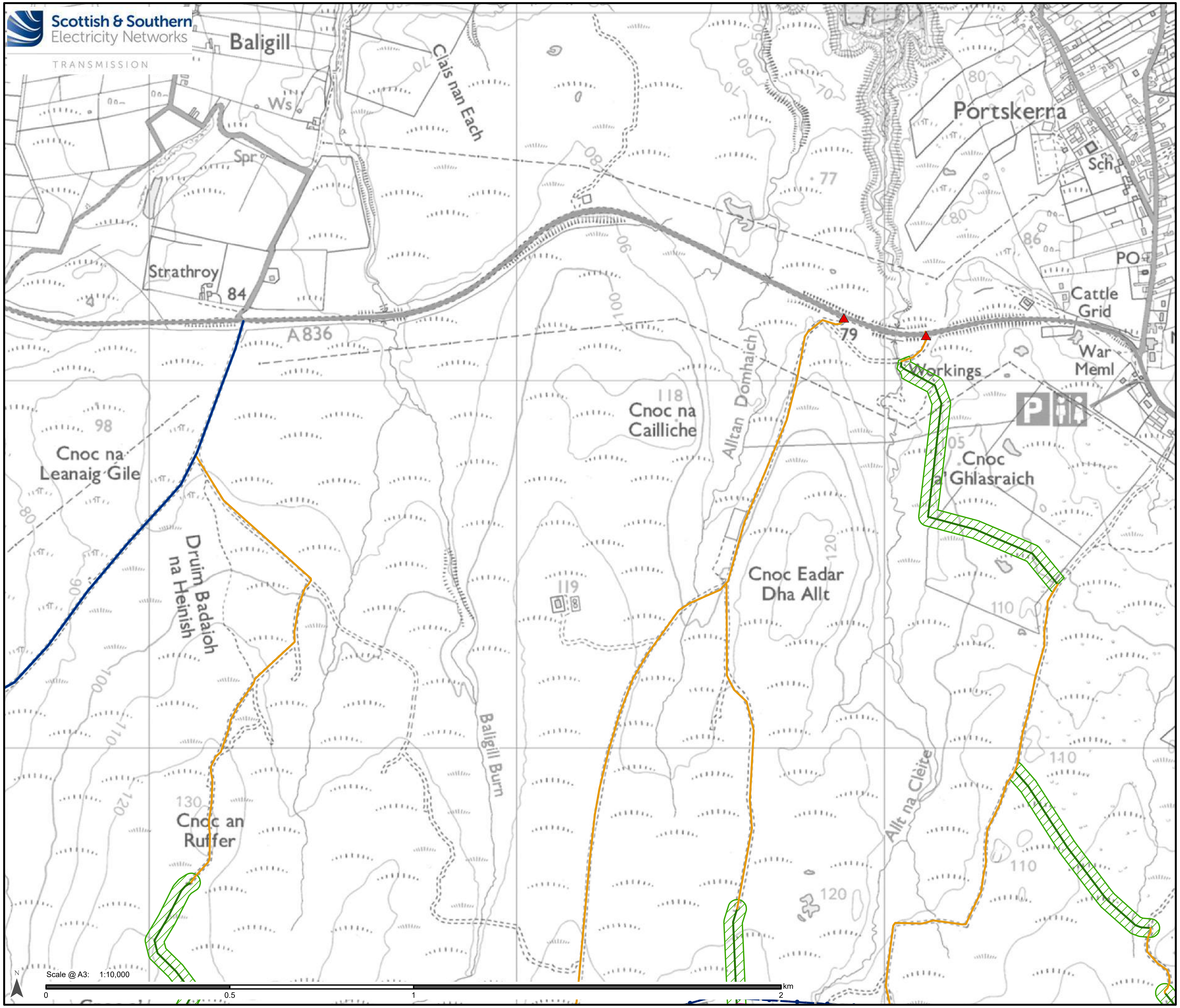
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.2 - Site Layout Map 2

Drawn by: MM

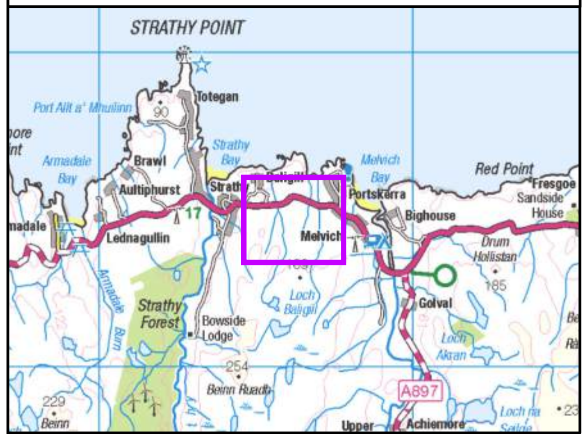
Date: 18/12/2024

Drawing: 428.013137.00001.00081.0



Legend

- Limit of Deviation (OHL)
- Existing Bellmouth (To Be Upgraded)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)



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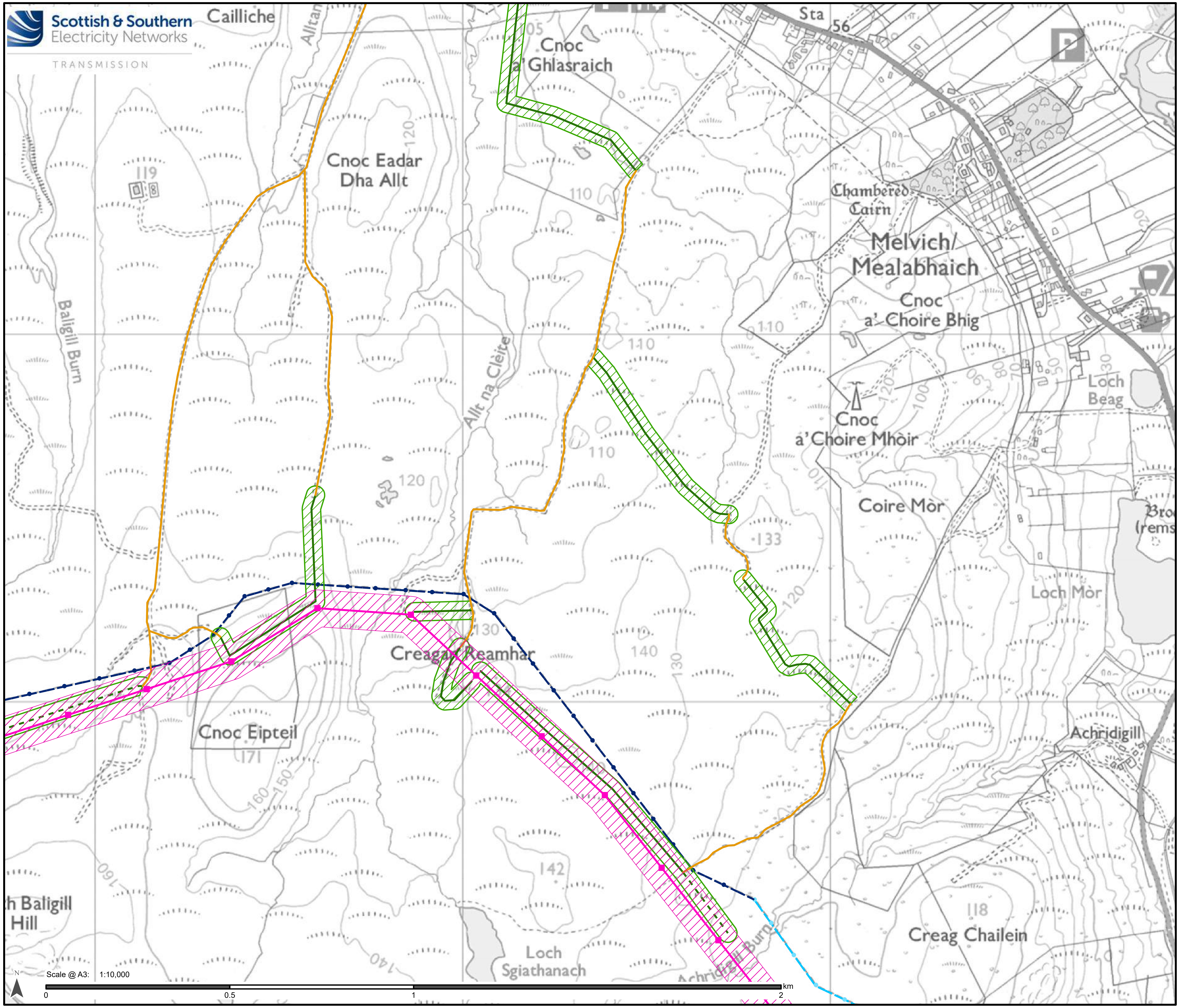
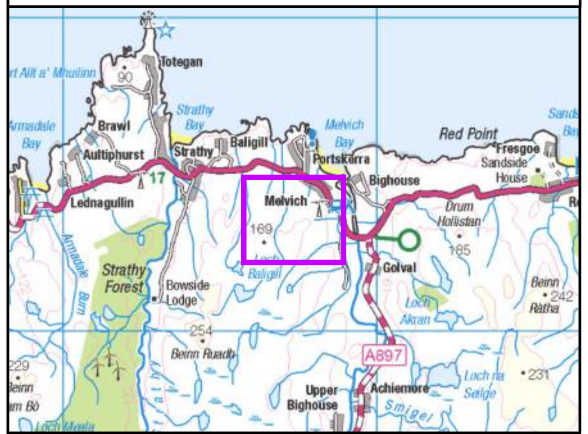


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)



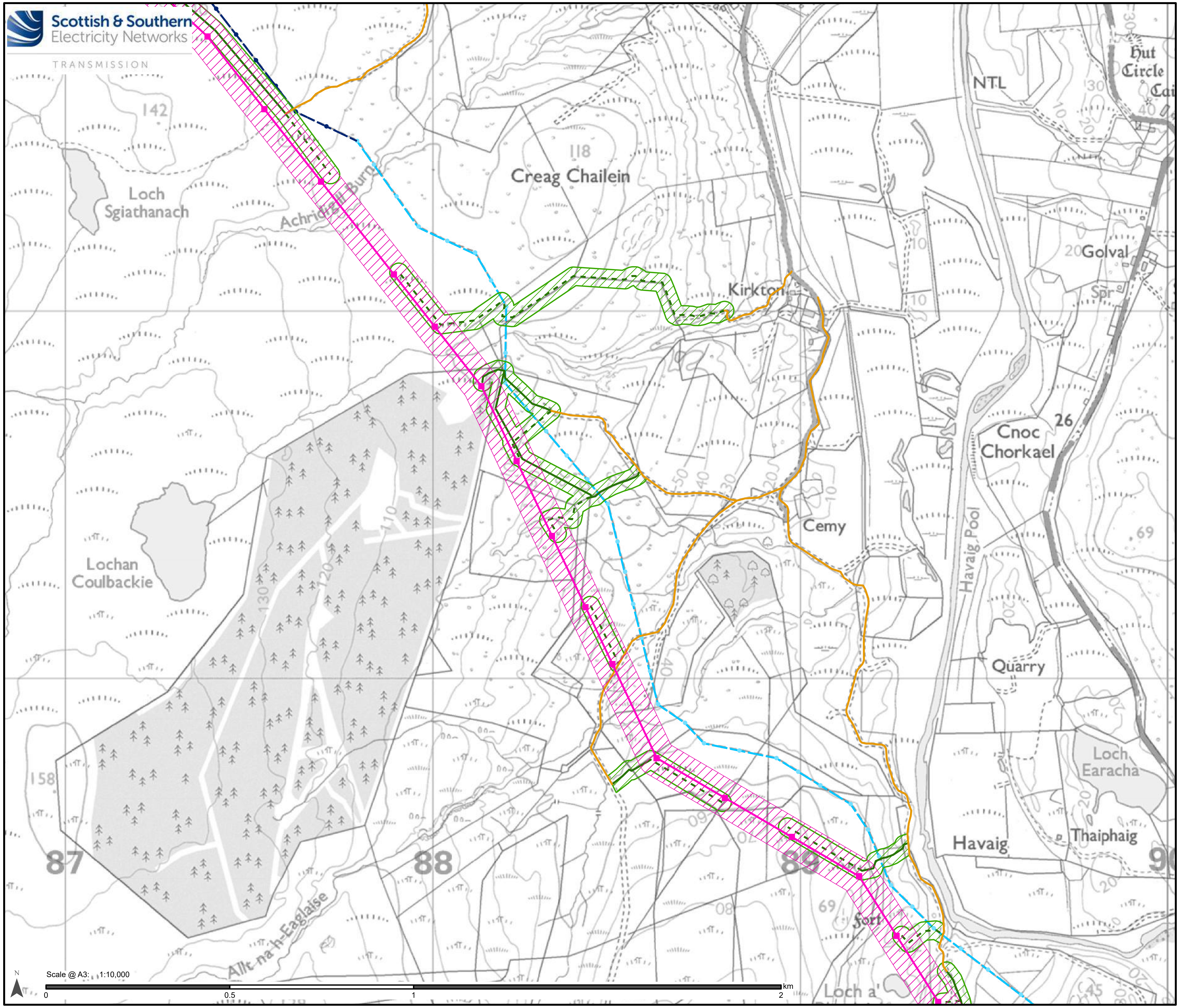
Project No: LT560
Project: Strathy South Wind Farm Grid Connection
Peat Landslide Hazard and Risk Assessment

Title:
Figure V1-9.1.2 - Site Layout
Map 4

Drawn by: MM
Date: 18/12/2024

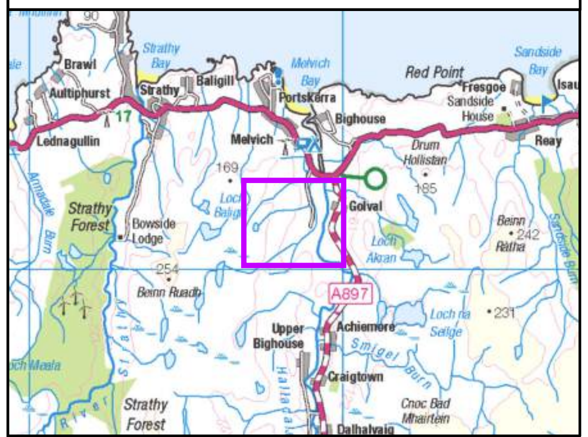
Drawing: 428.013137.00001.00081.0

Scottish & Southern Electricity Networks
TRANSMISSION



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)



Project No: LT560
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.2 - Site Layout Map 5

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Date: 18/12/2024

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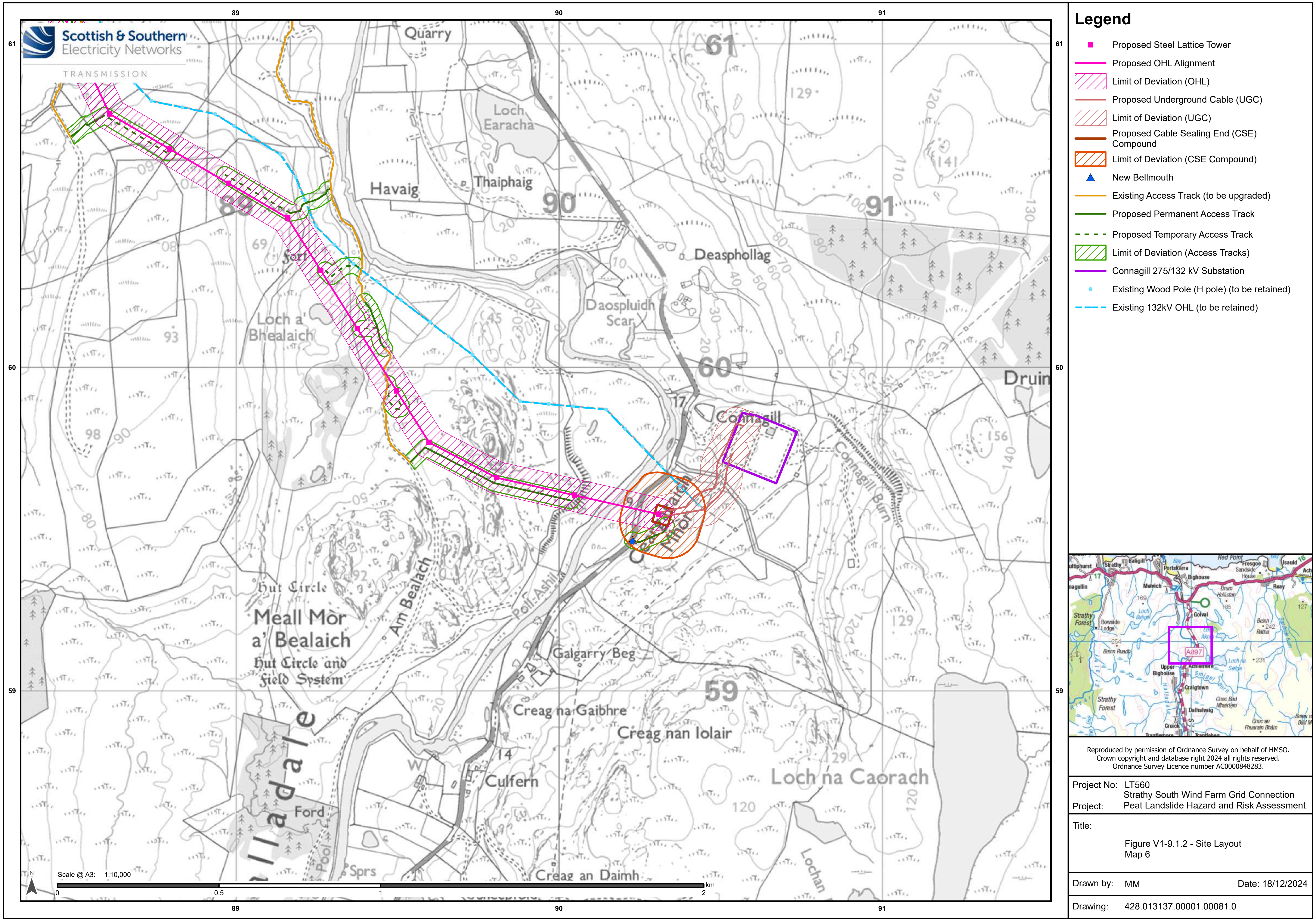

Project No: LT560

Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.2 - Site Layout Map 6

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Date: 18/12/2024

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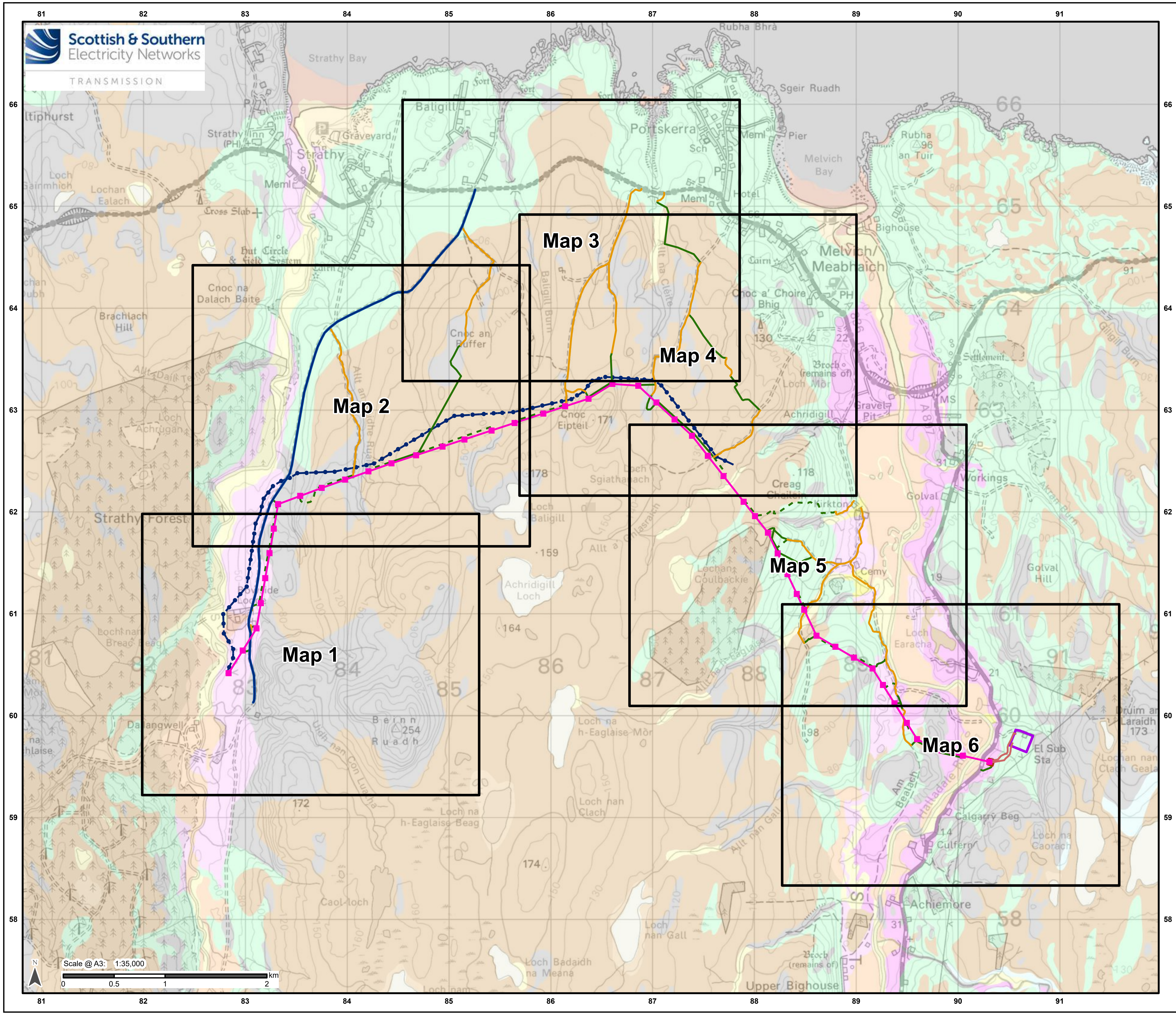
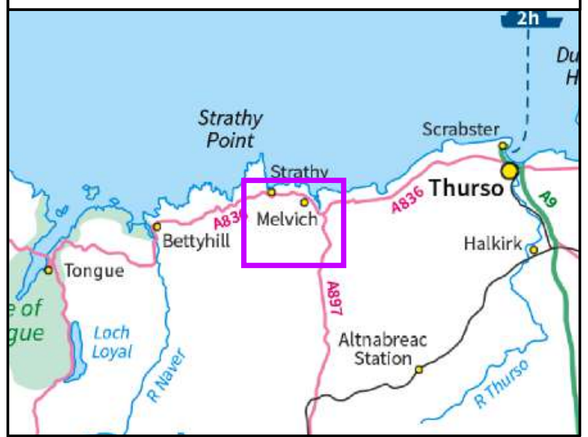


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Proposed Underground Cable (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)

Superficial Geology

- Alluvial Fan Deposits - Gravel, Sand, Silt And Clay
- Alluvial Fan Deposits - Sand, Gravel And Boulders
- Alluvium - Clay, Silt, Sand And Gravel
- Blown Sand - Sand
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Glaciofluvial Ice Contact Deposits - Gravel, Sand, Silt And Clay
- Glaciofluvial Sheet Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Lacustrine Deposits - Clay, Silt And Sand
- Marine Beach Deposits - Sand And Gravel
- Peat - Peat
- River Terrace Deposits - Gravel, Sand And Silt
- Thormaid Till Member - Diamicton
- Bedrock at or Near Surface



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Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

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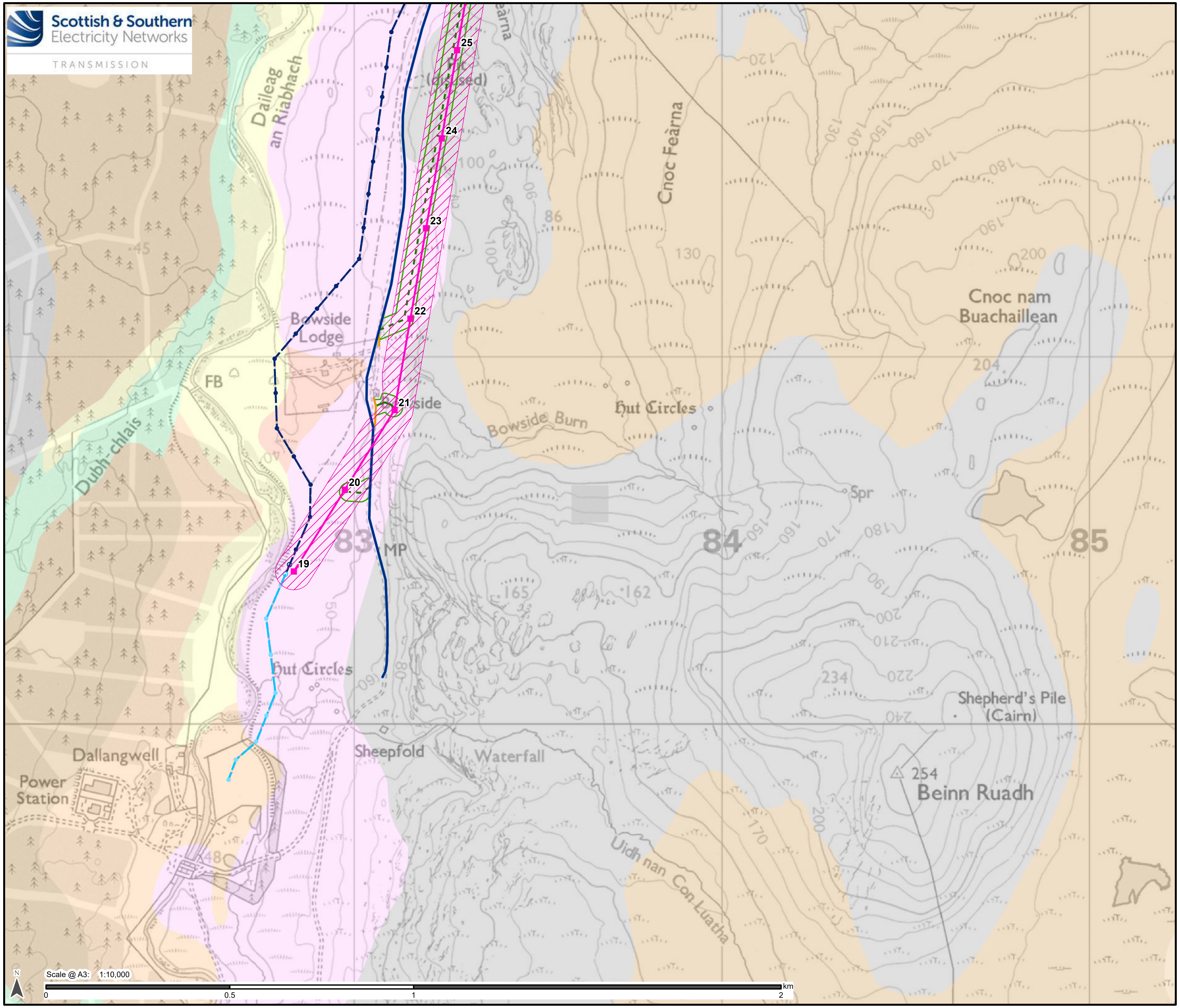


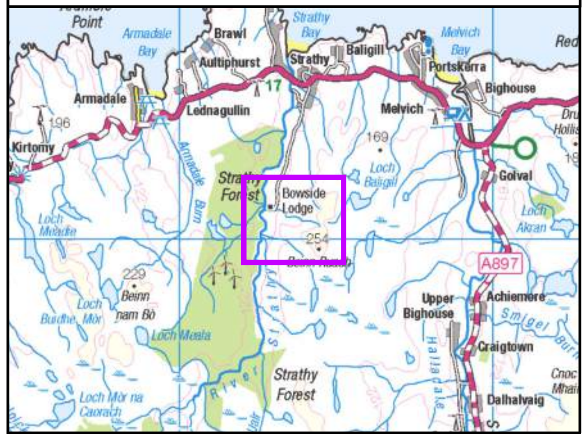
Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Proposed* Wood Pole (H pole) (to be retained)
- Proposed* Wood Pole (H pole) (to be dismantled)

*Proposed as part of Strathy Wood Wind Farm Grid Connection

Superficial Geology

- Alluvial Fan Deposits - Gravel, Sand, Silt And Clay
- Alluvium - Clay, Silt, Sand And Gravel
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Lacustrine Deposits - Clay, Silt And Sand
- Peat - Peat
- River Terrace Deposits - Gravel, Sand And Silt
- Bedrock at or Near Surface



Project No:	LT560
Project:	Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment
Title:	Figure V1-9.1.3 - Superficial Geology Map 1
Drawn by:	MM — Date: 18/12/2024
Drawing:	428.013137.00001.00063.0

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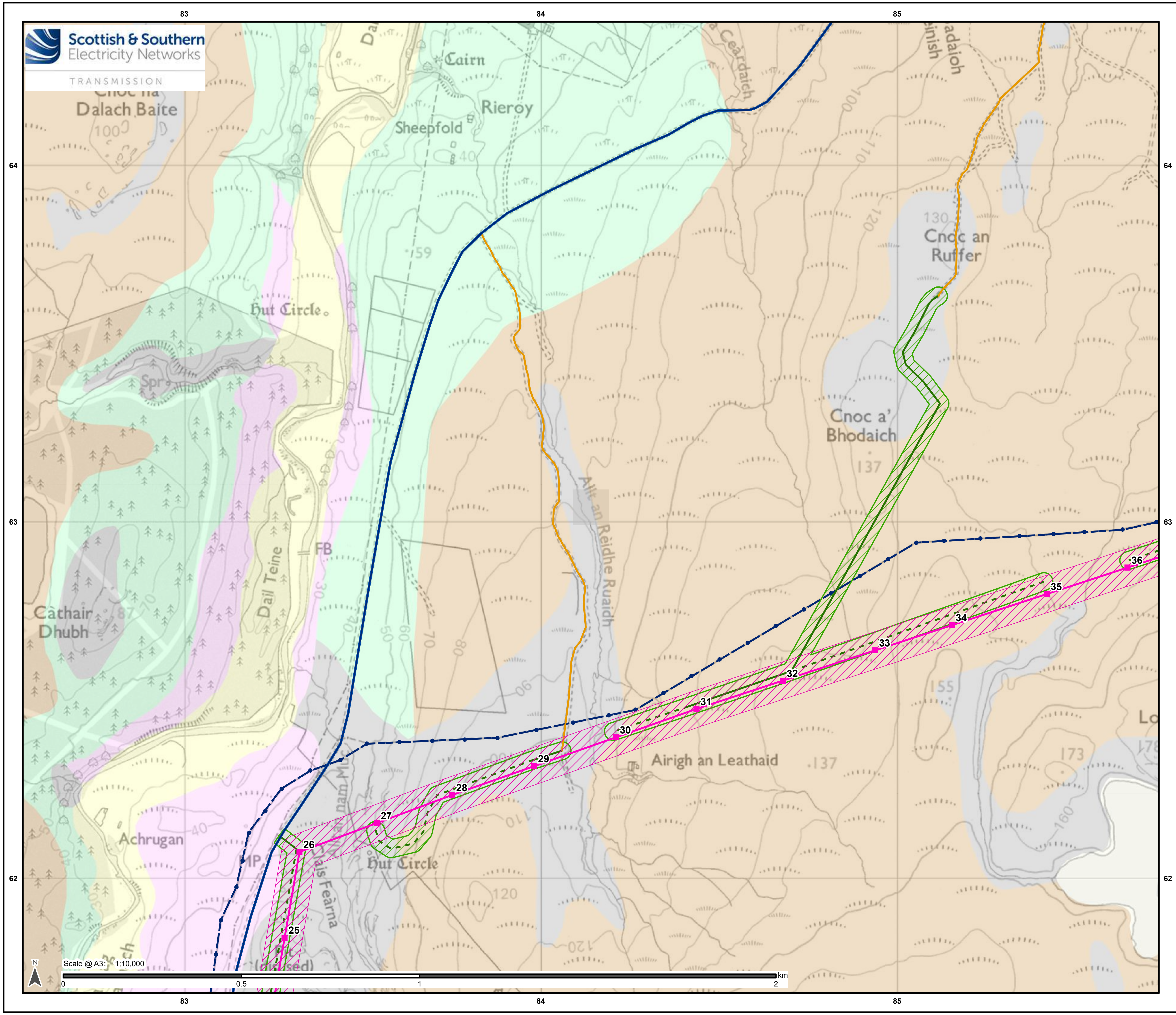
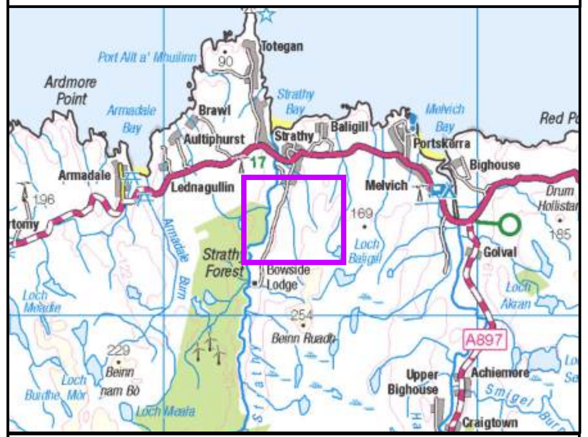


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)

Superficial Geology

- Alluvium - Clay, Silt, Sand And Gravel
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Peat - Peat
- Bedrock at or Near Surface



Project No: LT560

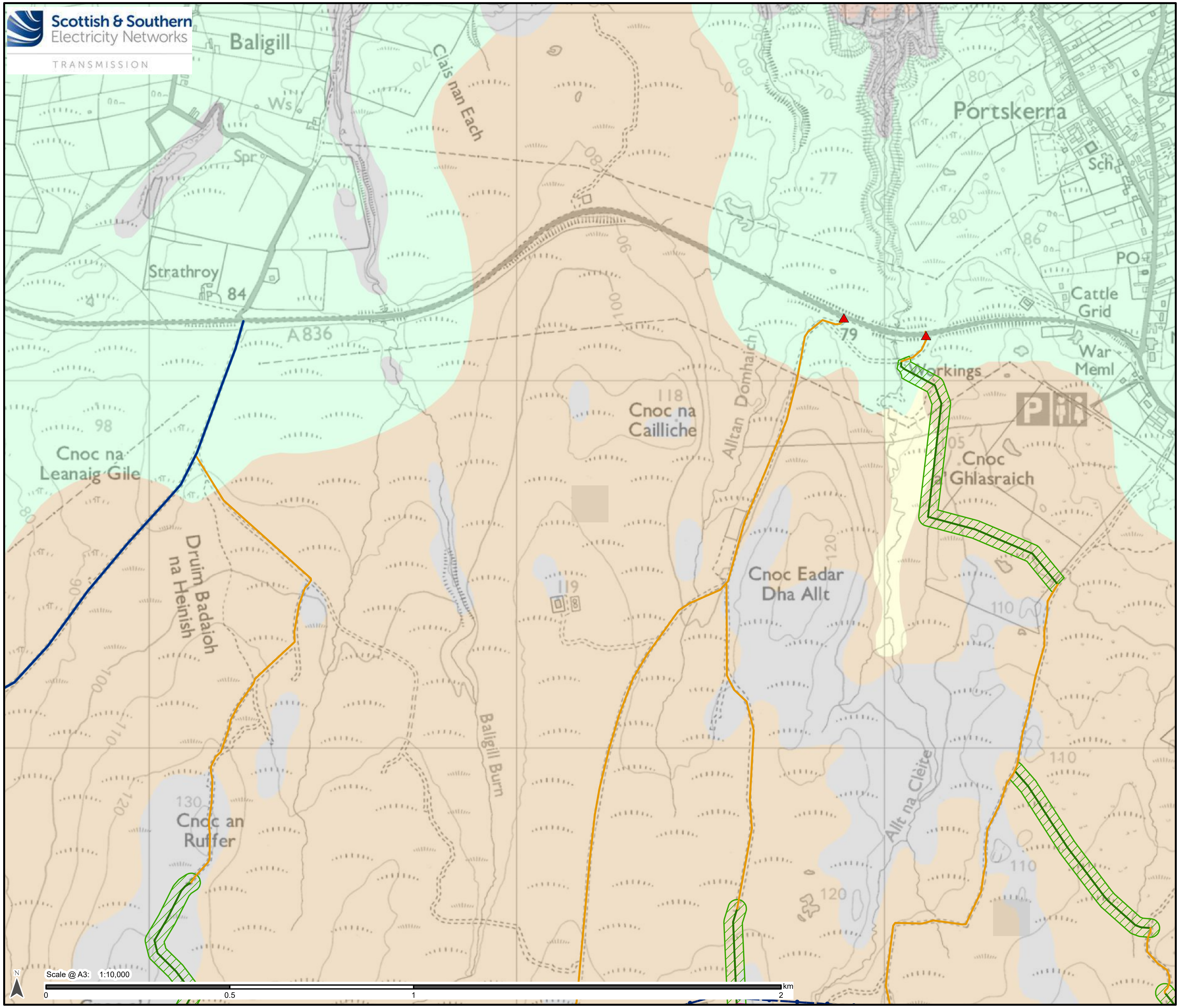
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.3 - Superficial Geology Map 2

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00063.0

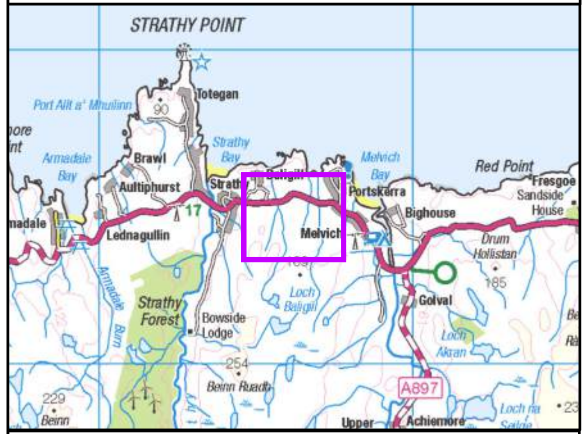


Legend

- Limit of Deviation (OHL)
- Existing Bellmouth (To Be Upgraded)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)

Superficial Geology

- Alluvium - Clay, Silt, Sand And Gravel
- Blown Sand - Sand
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Glaciofluvial Sheet Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Marine Beach Deposits - Sand And Gravel
- Peat - Peat
- River Terrace Deposits - Gravel, Sand And Silt
- Bedrock at or Near Surface



Project No: LT560

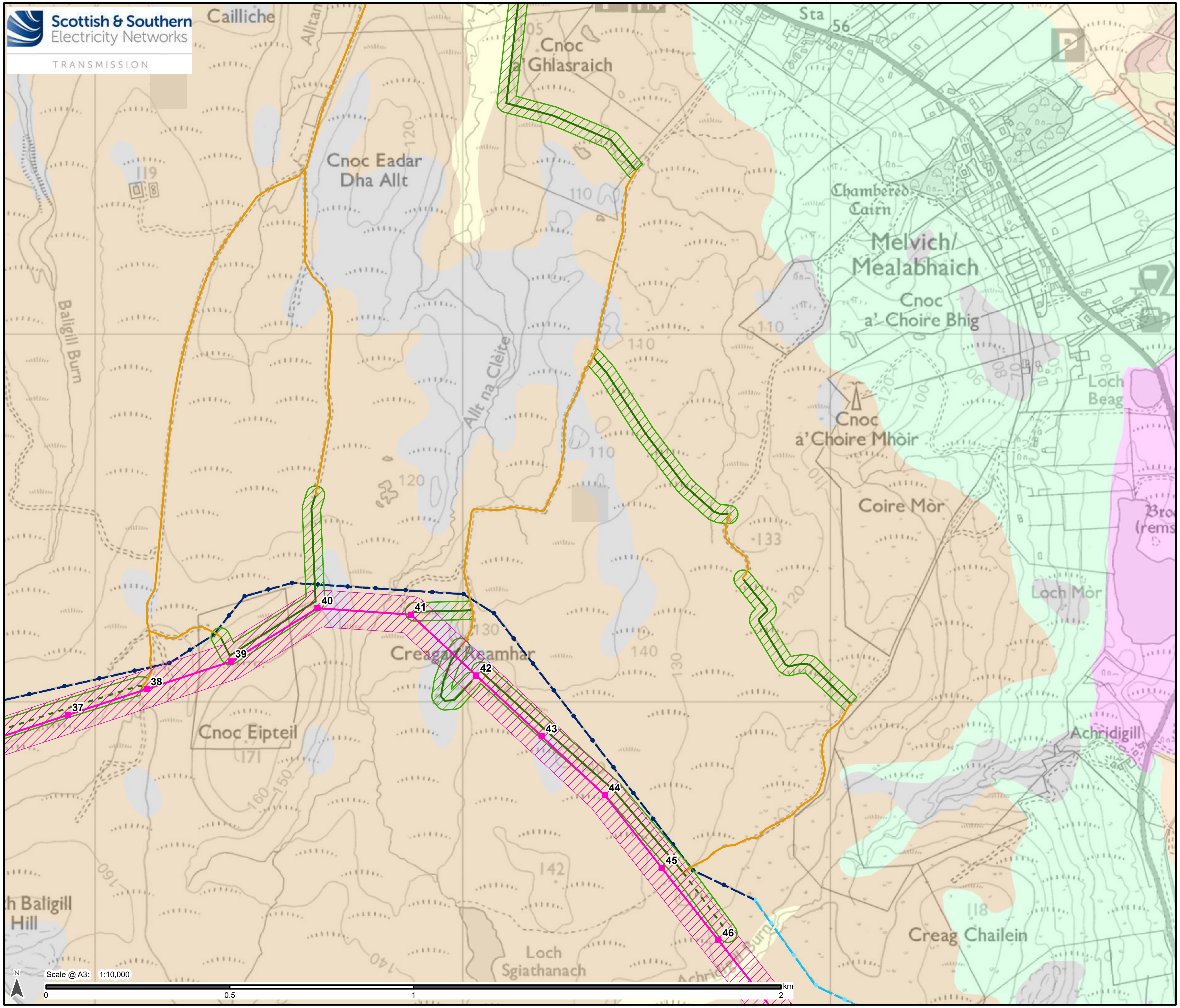
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.3 - Superficial Geology Map 3

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00063.0

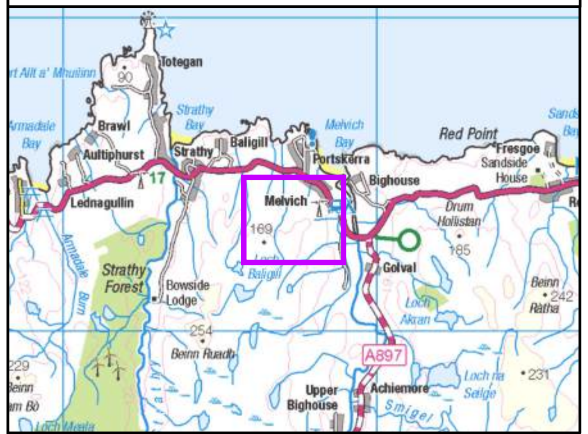


Legend

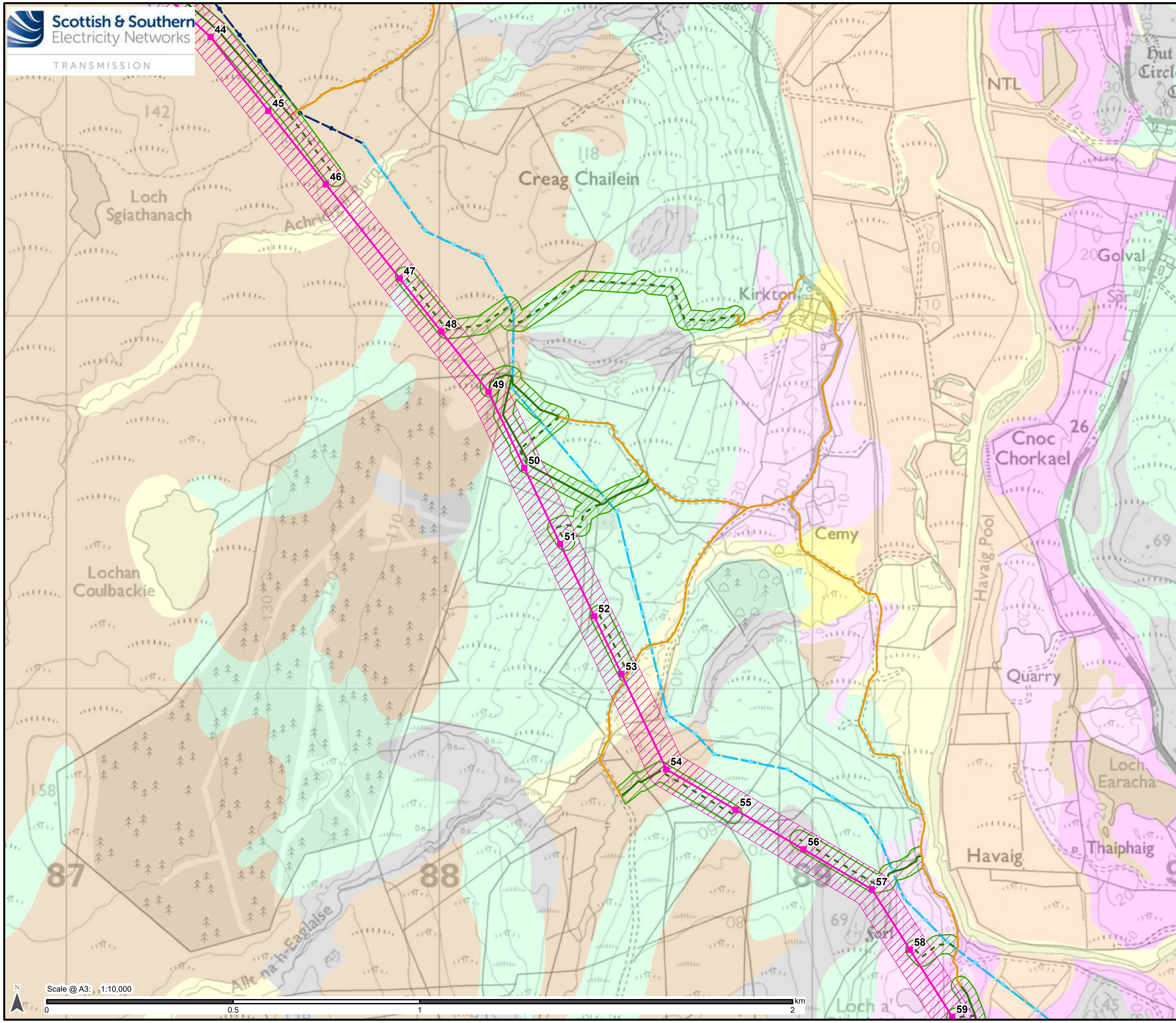
- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)

Superficial Geology

- Alluvium - Clay, Silt, Sand And Gravel
- Blown Sand - Sand
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Glaciofluvial Sheet Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Marine Beach Deposits - Sand And Gravel
- Peat - Peat
- River Terrace Deposits - Gravel, Sand And Silt
- Bedrock at or Near Surface



Project No:	LT560
Project:	Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment
Title:	Figure V1-9.1.3 - Superficial Geology Map 4
Drawn by:	MM — Date: 18/12/2024
Drawing:	428.013137.00001.00063.0

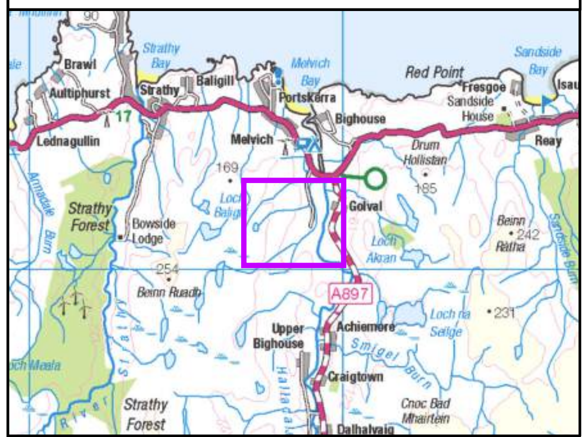


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)

Superficial Geology

- Alluvial Fan Deposits - Sand, Gravel And Boulders
- Alluvium - Clay, Silt, Sand And Gravel
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Glaciofluvial Ice Contact Deposits - Gravel, Sand, Silt And Clay
- Glaciofluvial Sheet Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Peat - Peat
- River Terrace Deposits - Gravel, Sand And Silt
- Bedrock at or Near Surface



Project No: LT560

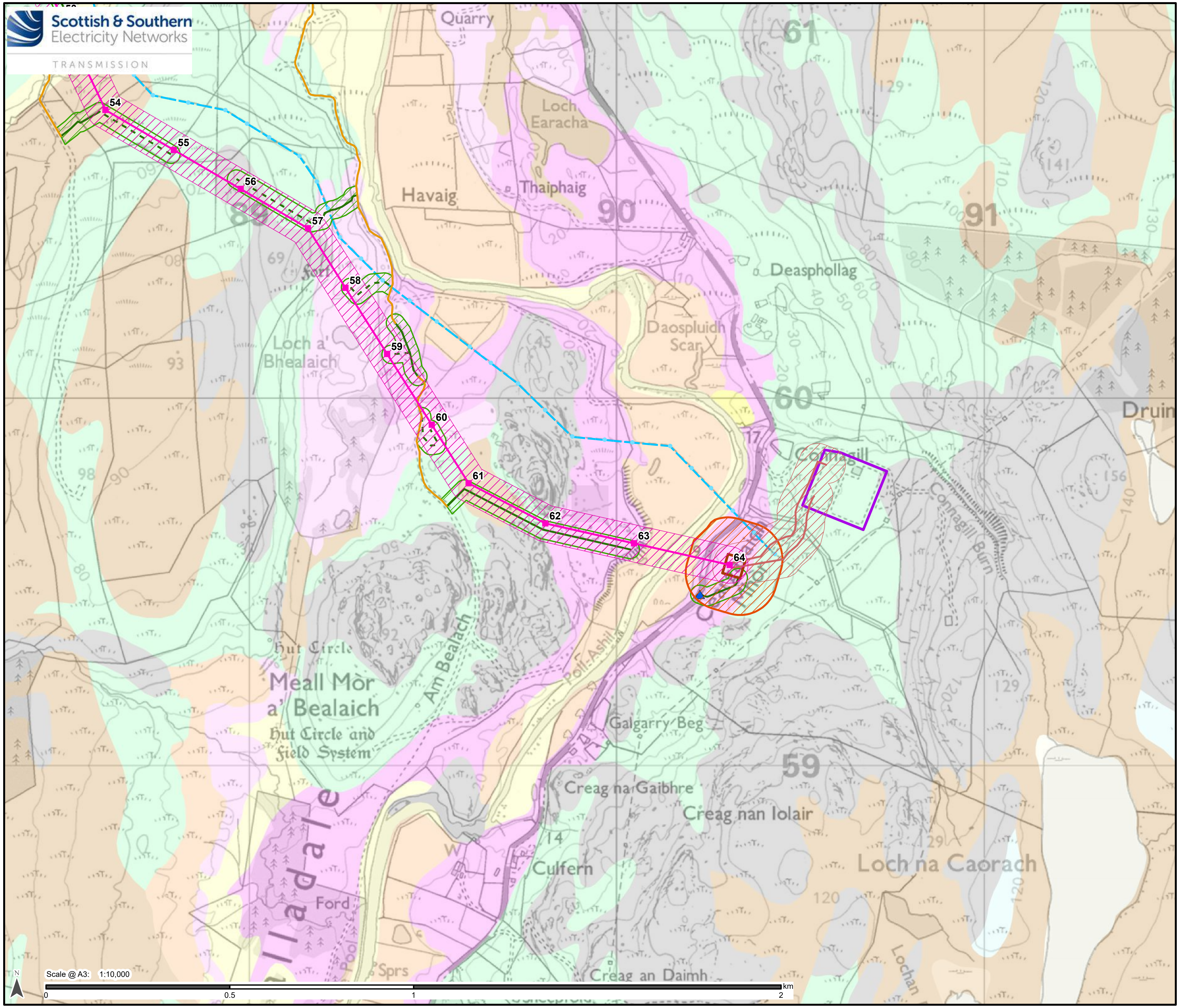
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

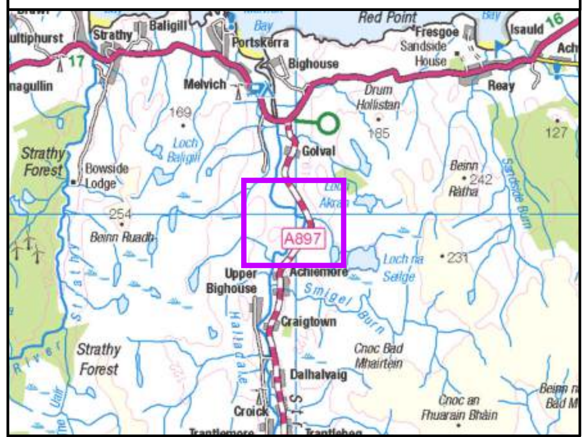
Title: Figure V1-9.1.3 - Superficial Geology Map 5

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00063.0





Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Proposed Underground Cable (UGC)
- Limit of Deviation (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Limit of Deviation (CSE Compound)
- New Bellmouth
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)

Superficial Geology

- Alluvial Fan Deposits - Sand, Gravel And Boulders
- Alluvium - Clay, Silt, Sand And Gravel
- Glaciofluvial Deposits - Gravel, Sand And Silt
- Glaciofluvial Ice Contact Deposits - Gravel, Sand, Silt And Clay
- Glaciofluvial Sheet Deposits - Gravel, Sand And Silt
- Hummocky (moundy) Glacial Deposits - Sand, Gravel And Boulders
- Lacustrine Deposits - Clay, Silt And Sand
- Peat - Peat
- River Terrace Deposits - Gravel, Sand And Silt
- Thormaid Till Member - Diamicton
- Bedrock at or Near Surface

Project No: LT560

Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.3 - Superficial Geology Map 6

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00063.0

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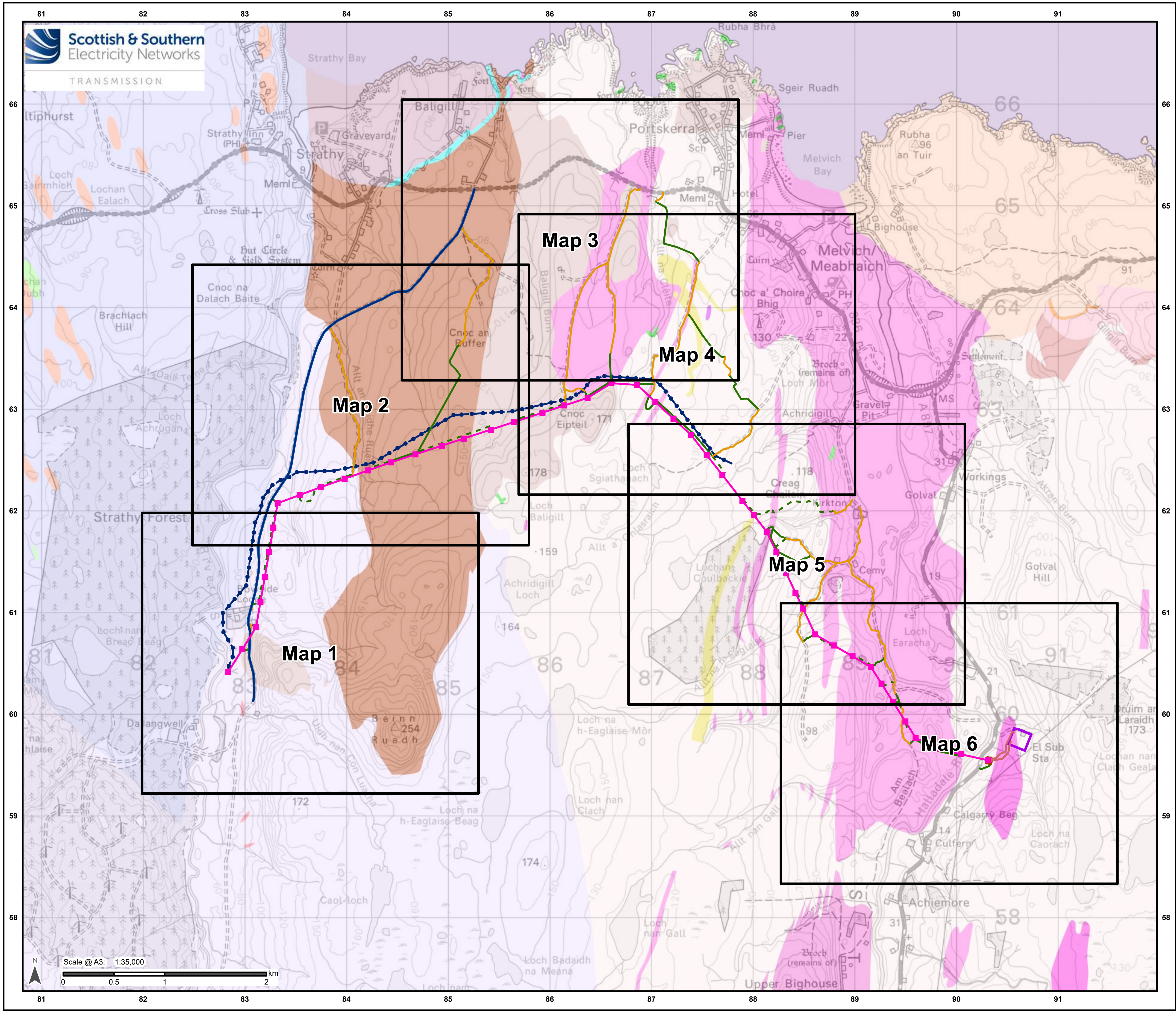


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Proposed Underground Cable (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)

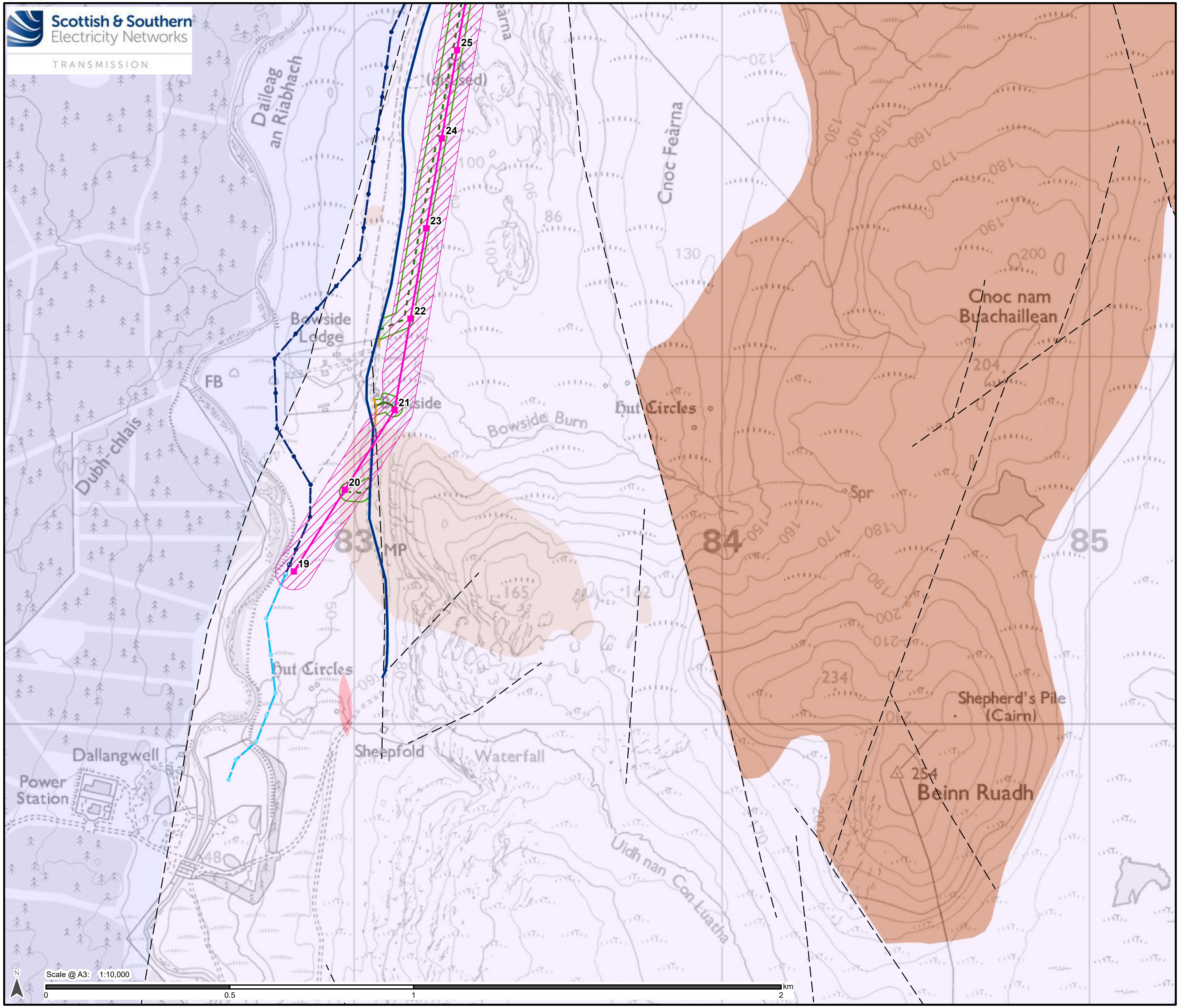
Bedrock Geology

- Bighouse Formation - Sandstone
- Bighouse Formation - Sandstone, Conglomerate And Argillaceous Rocks
- Bighouse Formation - Siltstone, Calcareous
- Lower Old Red Sandstone Group - Conglomerate And Sandstone, Interbedded
- Luachair Sandstone Member - Sandstone And Conglomerate, Interbedded
- Rubha Sandstone Member - Conglomerate
- Rubha Sandstone Member - Sandstone With Subordinate Conglomerate And Siltstone
- Sandside Sandstone Formation - Sandstone And Siltstone, Interbedded
- Sandside Sandstone Formation - Siltstone, Calcareous
- Tobaireach Conglomerate Member - Conglomerate
- Clerkhill Appinite Suite - Amphibolite
- Kirtomy Gneisses - Semipelite, Gneissose
- Portskerra Psammite Formation - Migmatitic Psammite With Migmatitic Semipelite
- Portskerra Psammite Formation - Quartzite
- Strathy Complex - Gneiss
- Strathy Complex - Ortho-amphibolite

Igneous Rocks

- Strath Halladale Granite - Diorite
- Strath Halladale Granite - Granite, Biotite
- Badanloch Granite Sheets - Granite, Foliated-biotite
- Scottish Highland Ordovician Minor Intrusion Suite - Granite
- Scottish Highland Ordovician Minor Intrusion Suite - Leucotonalite
- Scottish Highland Ordovician Minor Intrusion Suite - Tonalite, Foliated
- Unnamed Igneous Intrusion, Pre-caledonian - Amphibolite

Project No:	LT560
Project:	Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment
Title:	Figure V1-9.1.4 - Bedrock Geology Overview
Drawn by:	MM
Date:	29/01/2025
Drawing:	428.013137.00001.00076.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Proposed* Wood Pole (H pole) (to be retained)
- Proposed* Wood Pole (H pole) (to be dismantled)

*Proposed as part of Strathy Wood Wind Farm Grid Connection

Bedrock Geology

- Bighouse Formation - Sandstone, Conglomerate And Argillaceous Rocks
- Lower Old Red Sandstone Group - Conglomerate And Sandstone, Interbedded
- Kirtomy Gneisses - Semipelite, Gneissose
- Strathy Complex - Gneiss

Igneous Rocks

- Scottish Highland Ordovician Minor Intrusion Suite - Granite

Linear Features

- Fault, inferred

Project No: LT560

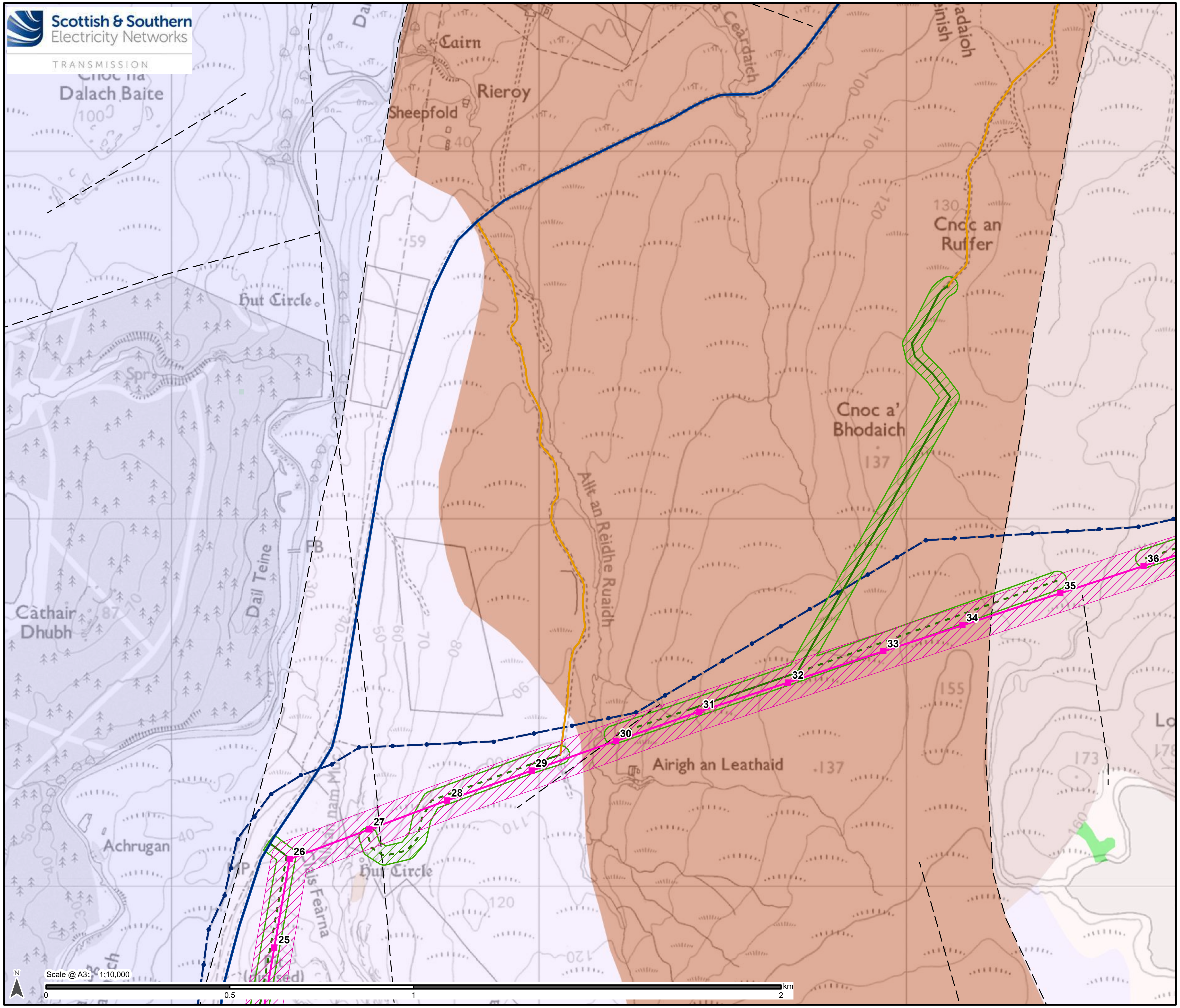
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.4 - Bedrock Geology Map 1

Drawn by: MM

Date: 29/01/2025

Drawing: 428.013137.00001.00076.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)

Bedrock Geology

- Bighouse Formation - Sandstone, Conglomerate And Argillaceous Rocks
- Lower Old Red Sandstone Group - Conglomerate And Sandstone, Interbedded
- Clerkhill Appinite Suite - Amphibolite
- Kirtomy Gneisses - Semipelite, Gneissose
- Portskerra Psammite Formation - Migmatitic Psammite With Migmatitic Semipelite
- Strathy Complex - Gneiss

Linear Features

- Fault, inferred

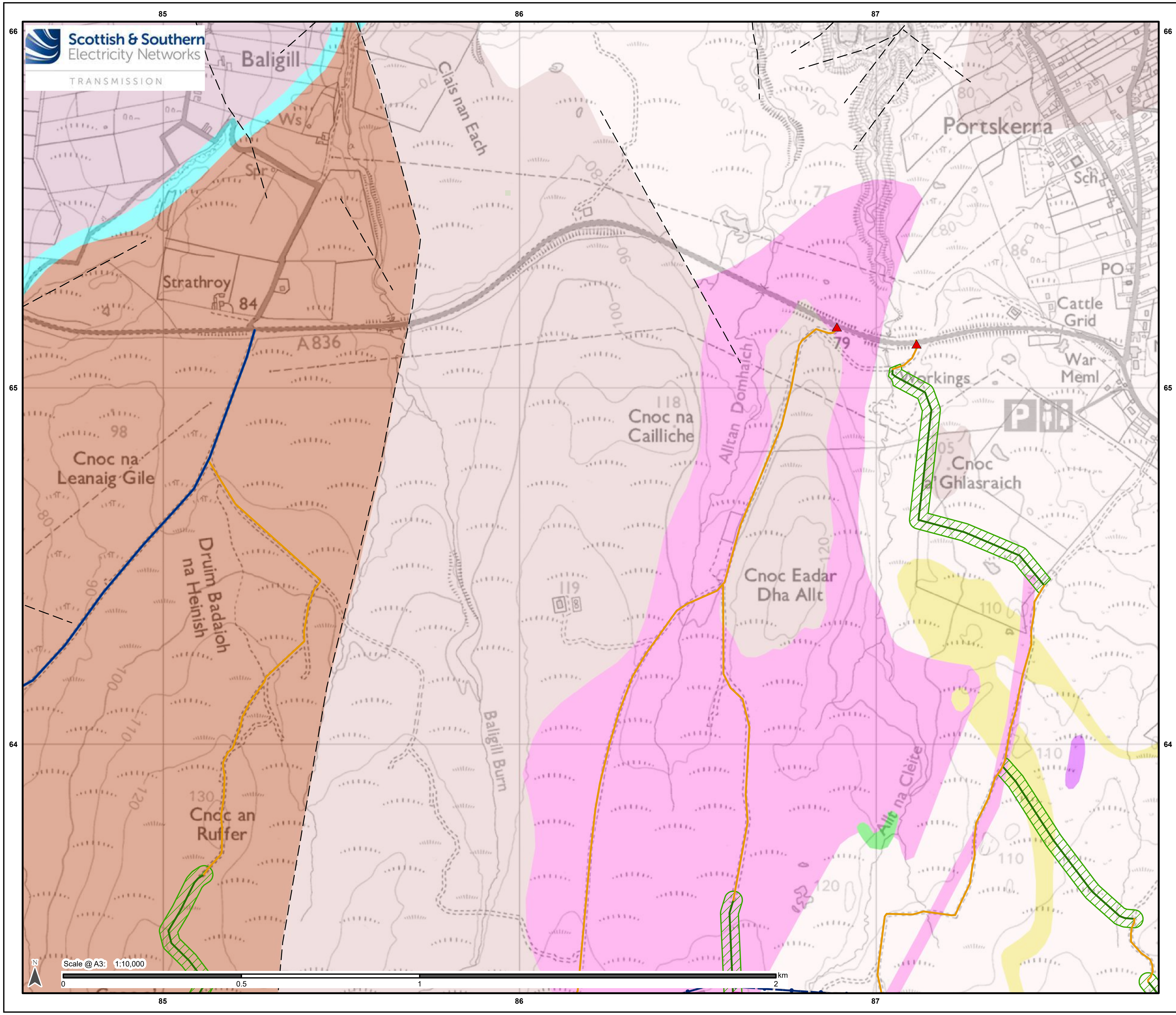
Project No: LT560

Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.4 - Bedrock Geology Map 2

Drawn by: MM Date: 29/01/2025

Drawing: 428.013137.00001.00076.0



Legend

- Limit of Deviation (OHL)
- Existing Bellmouth (To Be Upgraded)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)

Bedrock Geology

- Bighouse Formation - Sandstone, Conglomerate And Argillaceous Rocks
- Bighouse Formation - Siltstone, Calcareous
- Lower Old Red Sandstone Group - Conglomerate And Sandstone, Interbedded
- Sandside Sandstone Formation - Sandstone And Siltstone, Interbedded
- Sandside Sandstone Formation - Siltstone, Calcareous
- Portskerra Psammite Formation - Migmatitic Psammite With Migmatitic Semipelite
- Portskerra Psammite Formation - Quartzite

Igneous Rocks

- Strath Halladale Granite - Diorite
- Strath Halladale Granite - Granite, Biotite
- Unnamed Igneous Intrusion, Pre-caledonian - Amphibolite

Linear Features

- Fault, inferred

Project No: LT560

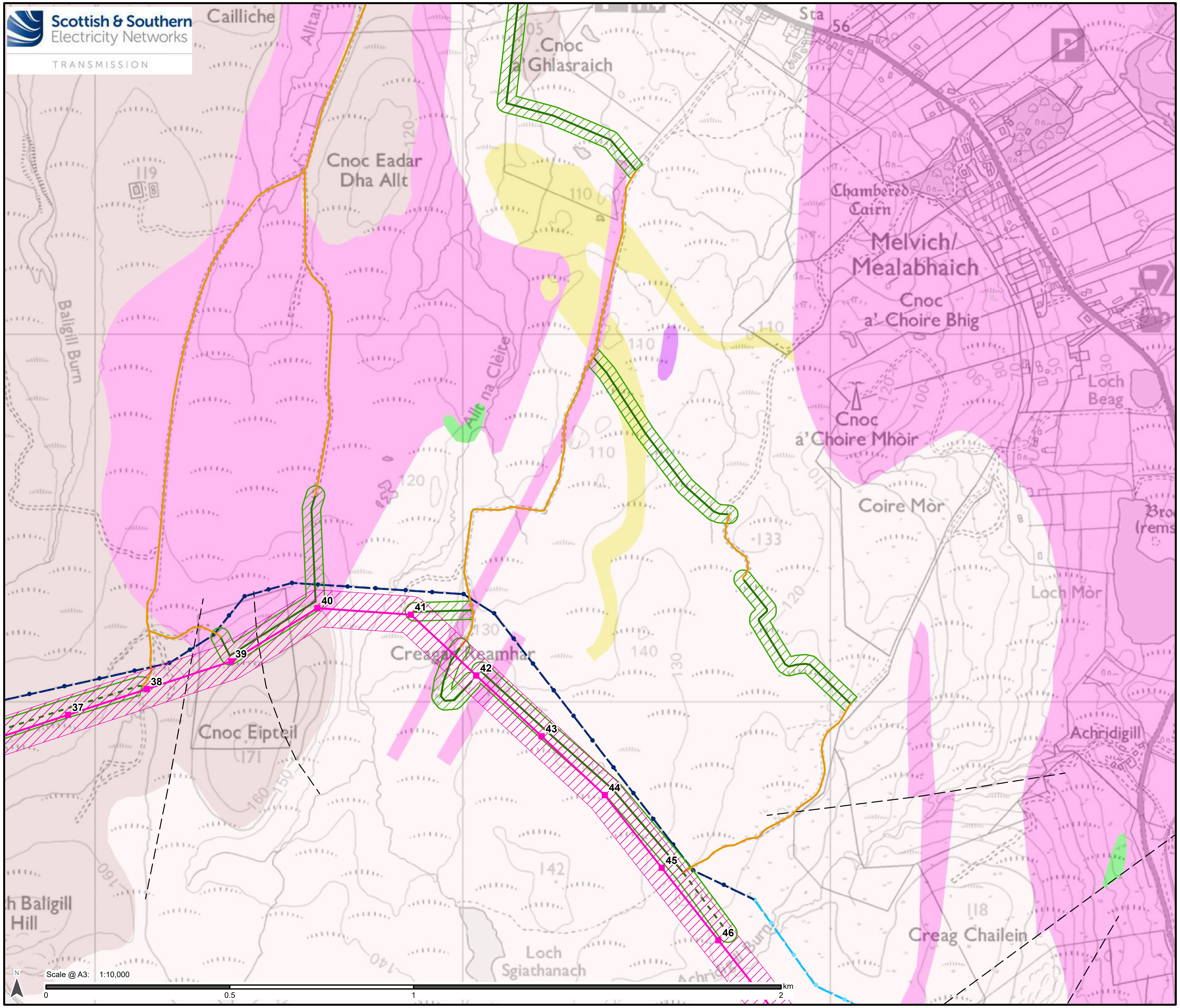
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.4 - Bedrock Geology Map 3

Drawn by: MM

Date: 29/01/2025

Drawing: 428.013137.00001.00076.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)

Bedrock Geology

- Lower Old Red Sandstone Group - Conglomerate And Sandstone, Interbedded
- Rubha Sandstone Member - Sandstone With Subordinate Conglomerate And Siltstone
- Portskerra Psammite Formation - Migmatitic Psammite With Migmatitic Semipelite
- Portskerra Psammite Formation - Quartzite

Igneous Rocks

- Strath Halladale Granite - Diorite
- Strath Halladale Granite - Granite, Biotite
- Unnamed Igneous Intrusion, Pre-caledonian - Amphibolite

Linear Features

- Fault, inferred

Project No: LT560

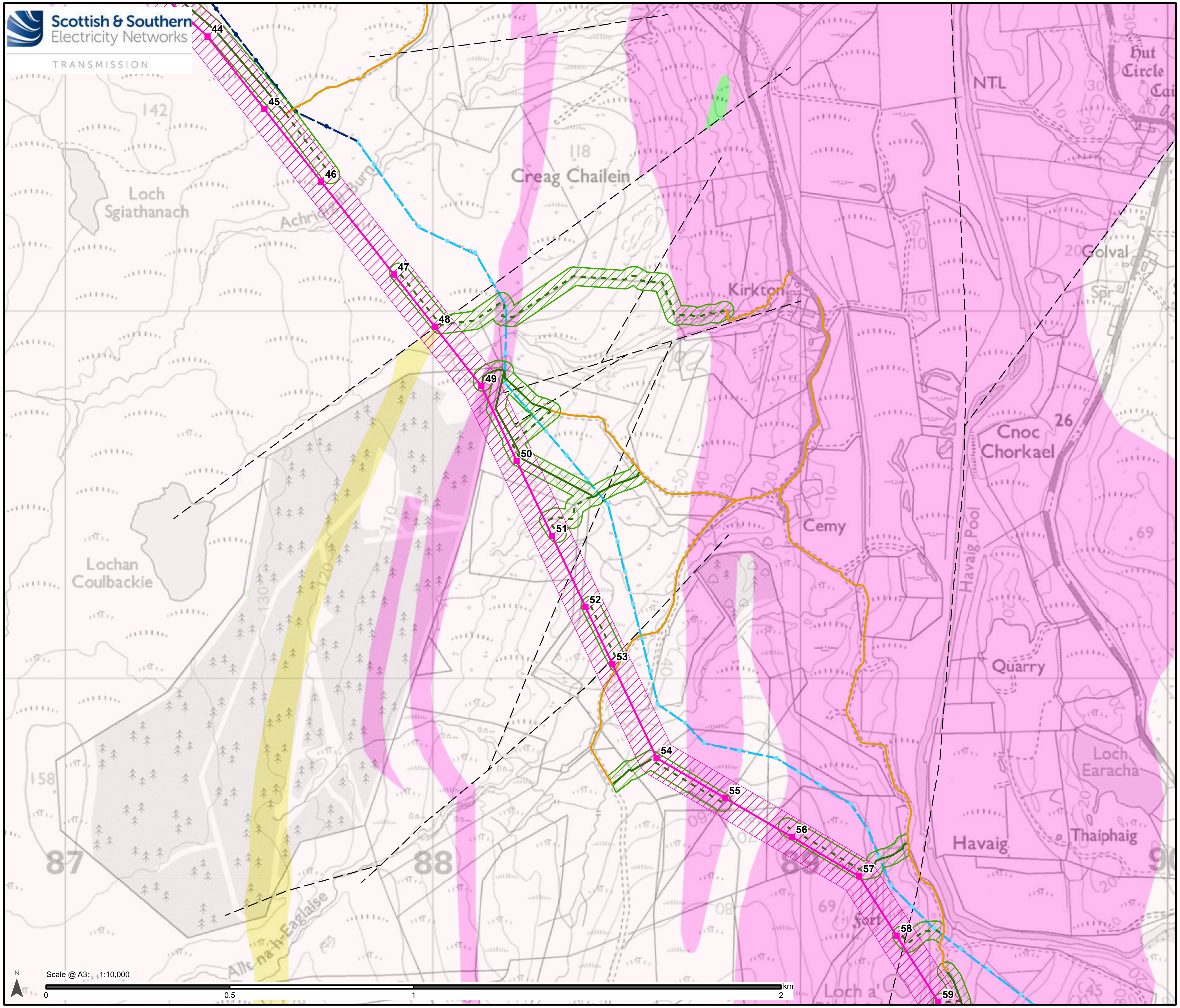
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.4 - Bedrock Geology Map 4

Drawn by: MM

Date: 29/01/2025

Drawing: 428.013137.00001.00076.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)

Bedrock Geology

- Portskerra Psammite Formation - Migmatitic Psammite With Migmatitic Semipelite
- Portskerra Psammite Formation - Quartzite

Igneous Rocks

- Strath Halladale Granite - Granite, Biotite
- Unnamed Igneous Intrusion, Pre-caledonian - Amphibolite

Linear Features

- Fault, inferred

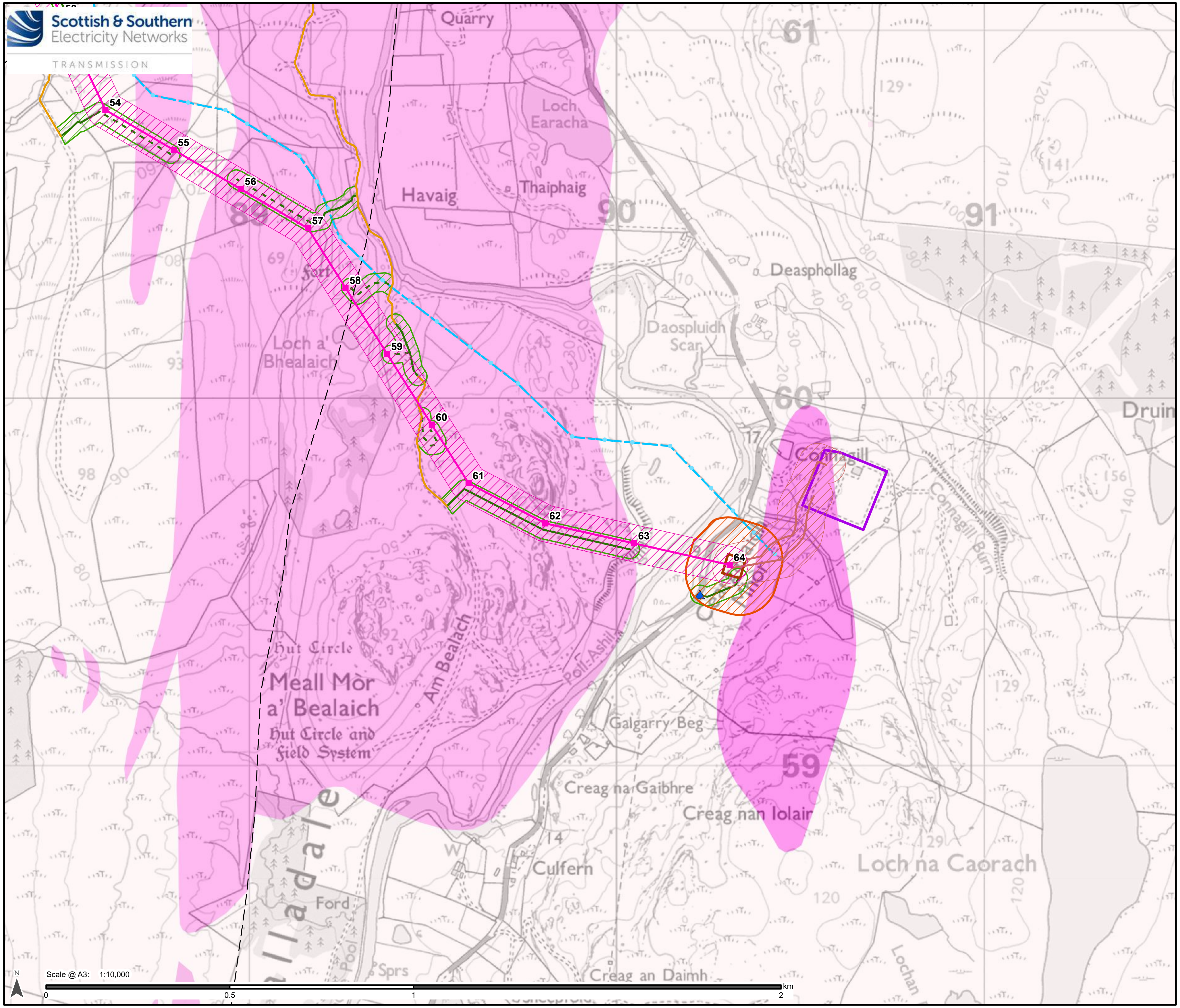
Project No: LT560

Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.4 - Bedrock Geology Map 5

Drawn by: MM Date: 29/01/2025

Drawing: 428.013137.00001.00076.0



Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Proposed Underground Cable (UGC)
- Limit of Deviation (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Limit of Deviation (CSE Compound)
- New Bellmouth
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)

Bedrock Geology

- Portskerra Psammite Formation - Migmatitic Psammite With Migmatitic Semipelite

Igneous Rocks

- Strath Halladale Granite - Granite, Biotite
- Badanloch Granite Sheets - Granite, Foliated-biotite
- Scottish Highland Ordovician Minor Intrusion Suite - Tonalite, Foliated

Linear Features

- Fault, inferred

Project No: LT560

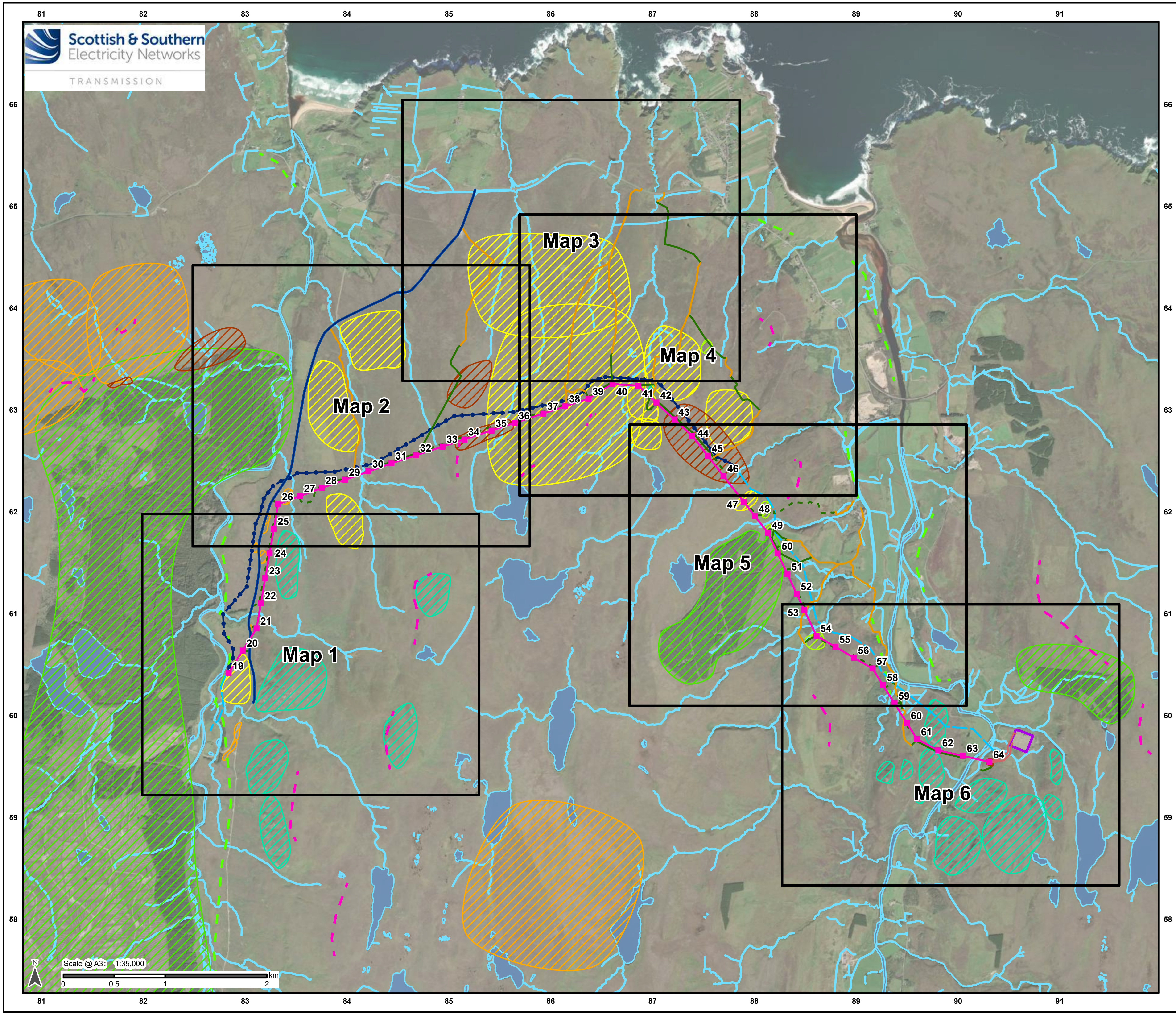
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.4 - Bedrock Geology Map 6

Drawn by: MM

Date: 29/01/2025

Drawing: 428.013137.00001.00076.0

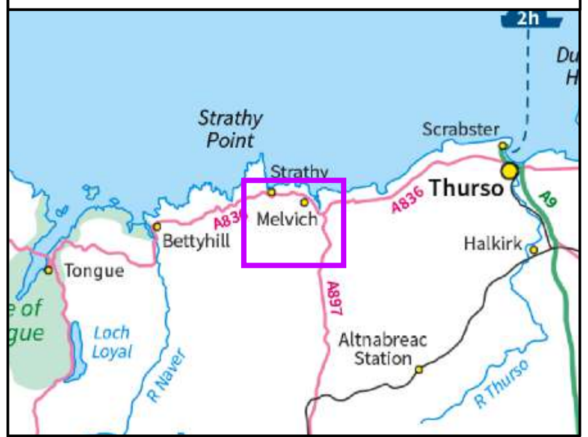


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Proposed Underground Cable (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing 132kV OHL (to be retained)
- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)

Geomorphology

- Bottom of Slope
- Top of Slope
- Blanket Bog
- Forestry
- Furrows
- Haggs
- Outcrop
- Peat Cuttings



Project No: LT560

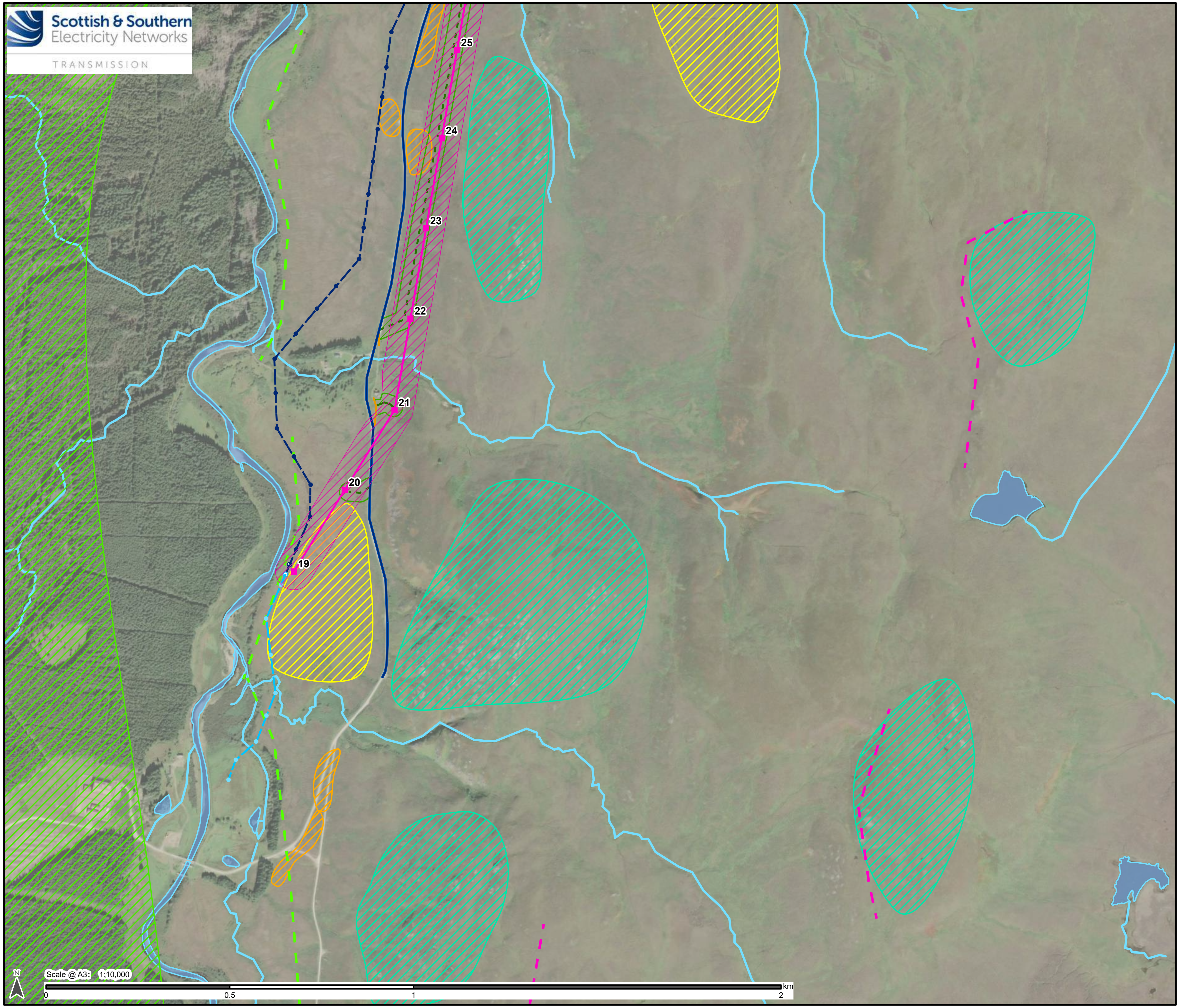
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.5 - Geomorphology Overview

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00088.0



Legend

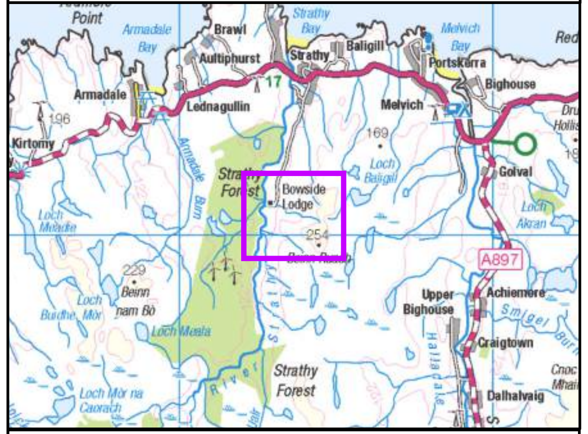
- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Proposed* Wood Pole (H pole) (to be retained)
- Proposed* Wood Pole (H pole) (to be dismantled)

*Proposed as part of Strathy Wood Wind Farm Grid Connection

- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)

Geomorphology

- Bottom of Slope
- Top of Slope
- Forestry
- Furrows
- Outcrop
- Peat Cuttings



Project No: LT560

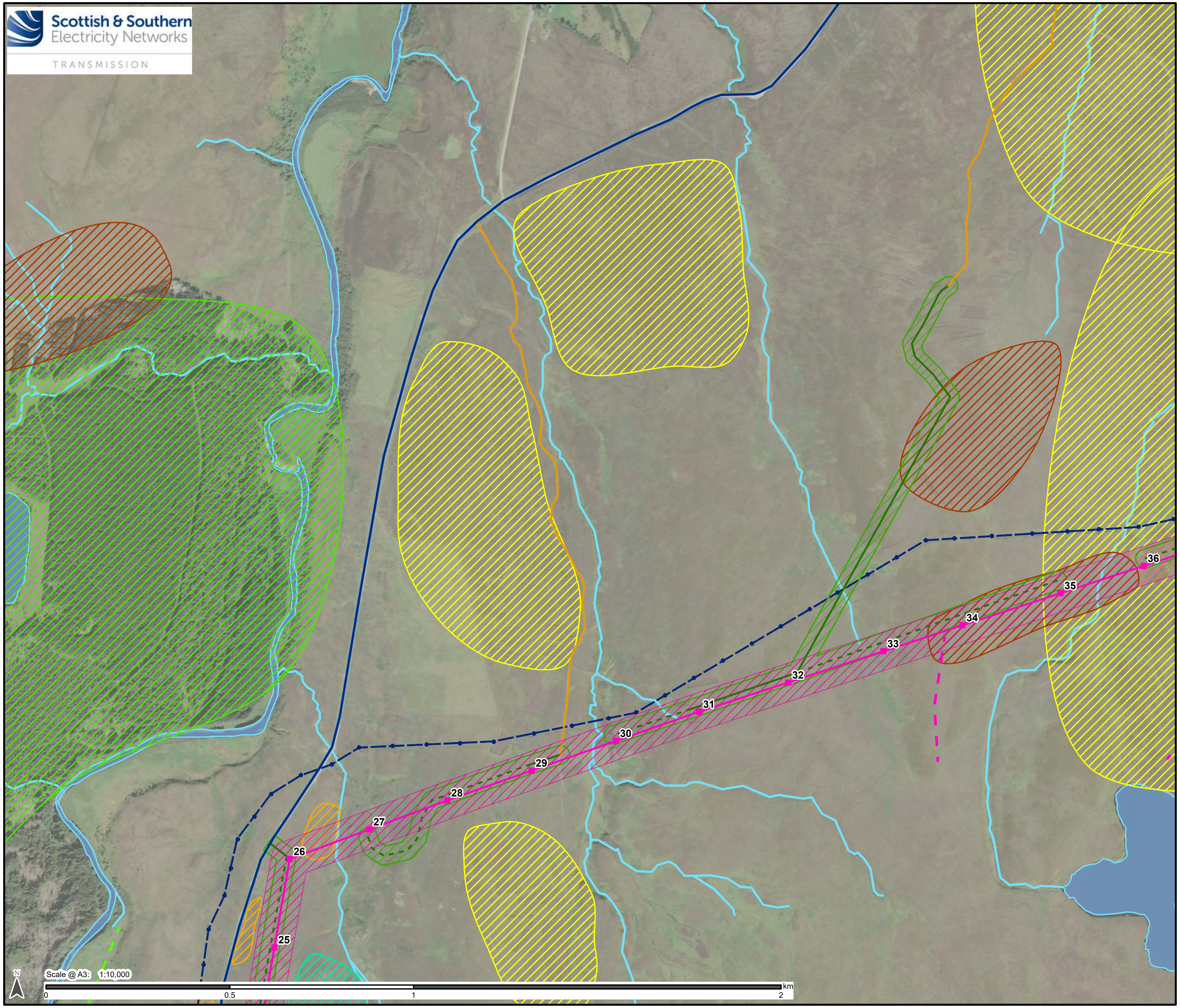
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.5 - Geomorphology Map 1

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00088.0

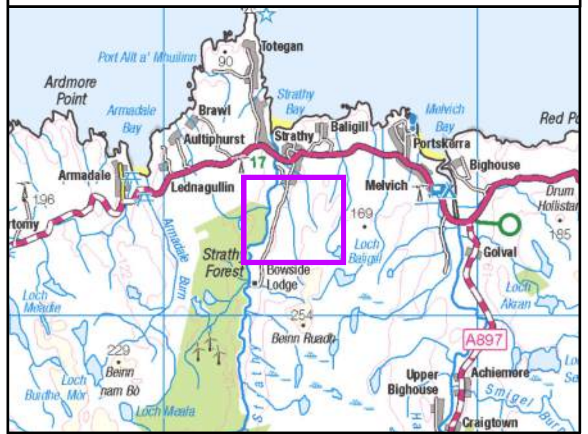


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)

Geomorphology

- Bottom of Slope
- Top of Slope
- Blanket Bog
- Forestry
- Furrows
- Outcrop
- Peat Cuttings



Project No: LT560

Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.5 - Geomorphology Map 2

Drawn by: MM

Date: 18/12/2024

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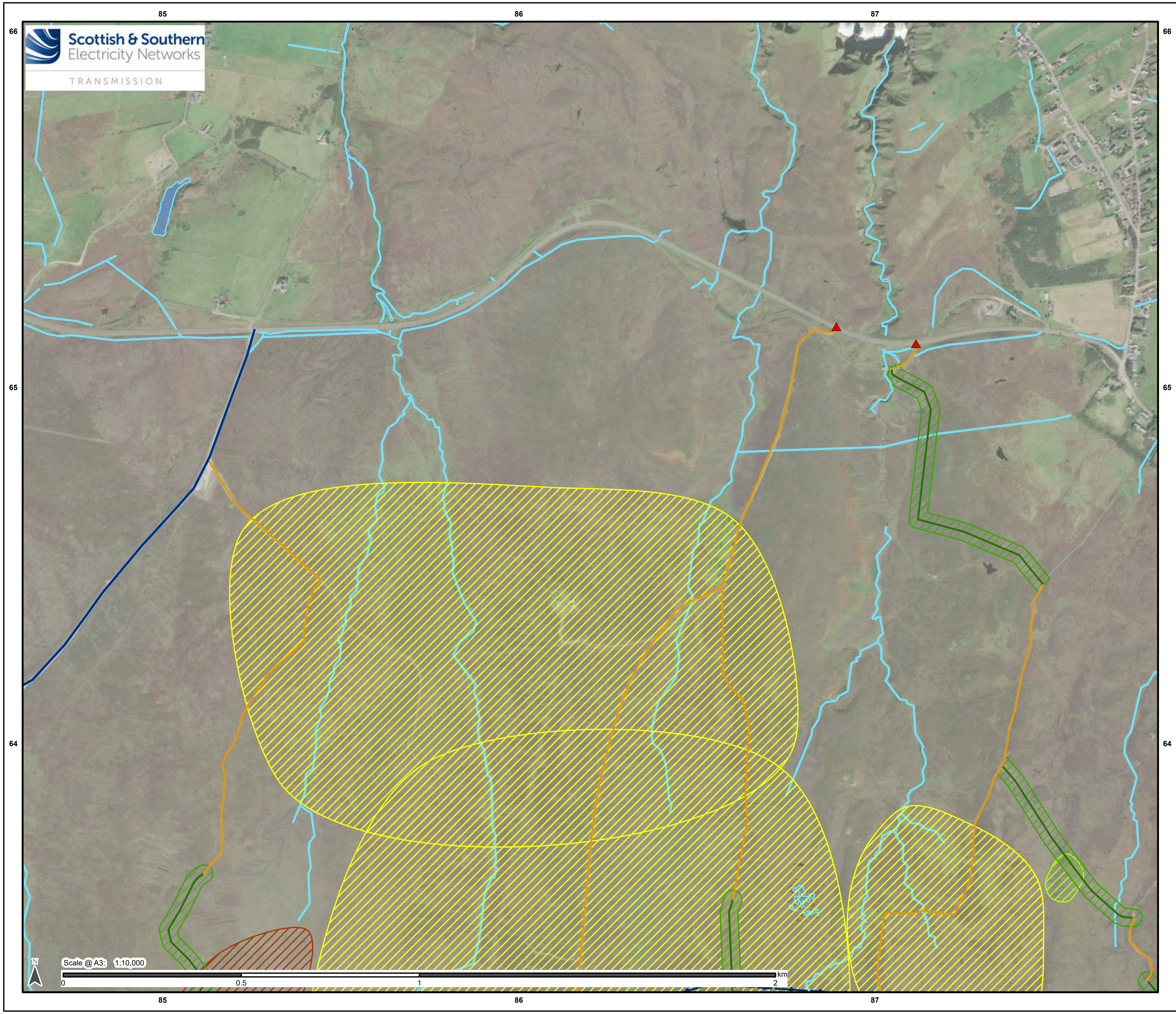
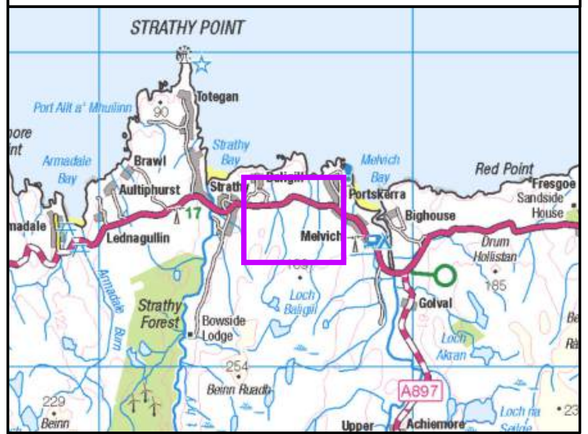


Legend

- Limit of Deviation (OHL)
- Existing Bellmouth (To Be Upgraded)
- Existing Access Track
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)
- Blanket Bog
- Haggs
- Peat Cuttings



Project No: LT560

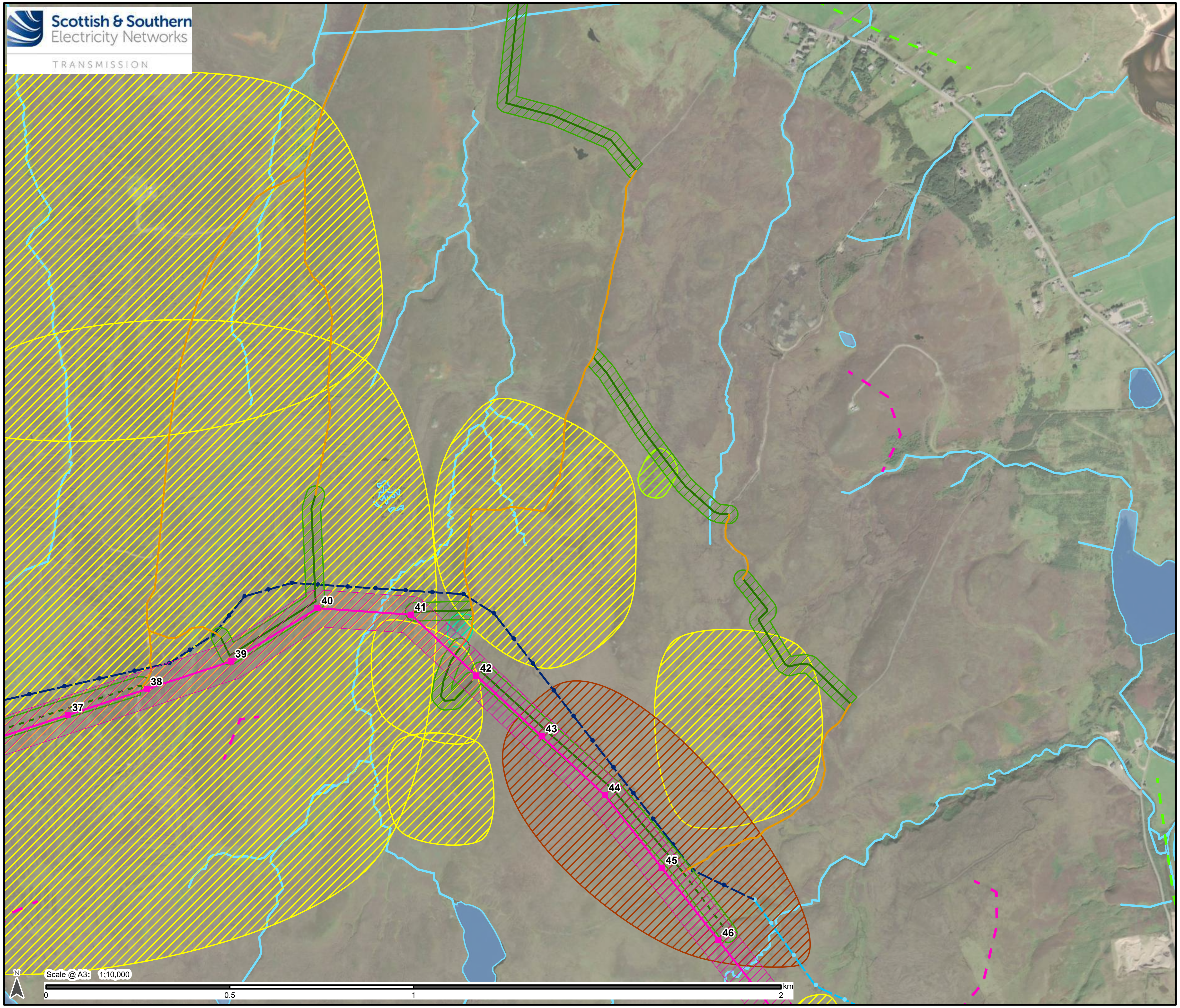
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

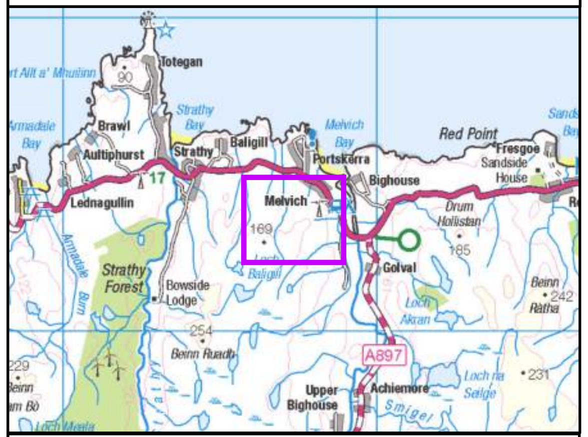
Title: Figure V1-9.1.5 - Geomorphology Map 3

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00088.0





Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)

Geomorphology

- Bottom of Slope
- Top of Slope
- Blanket Bog
- Haggs
- Outcrop
- Peat Cuttings

Project No: LT560

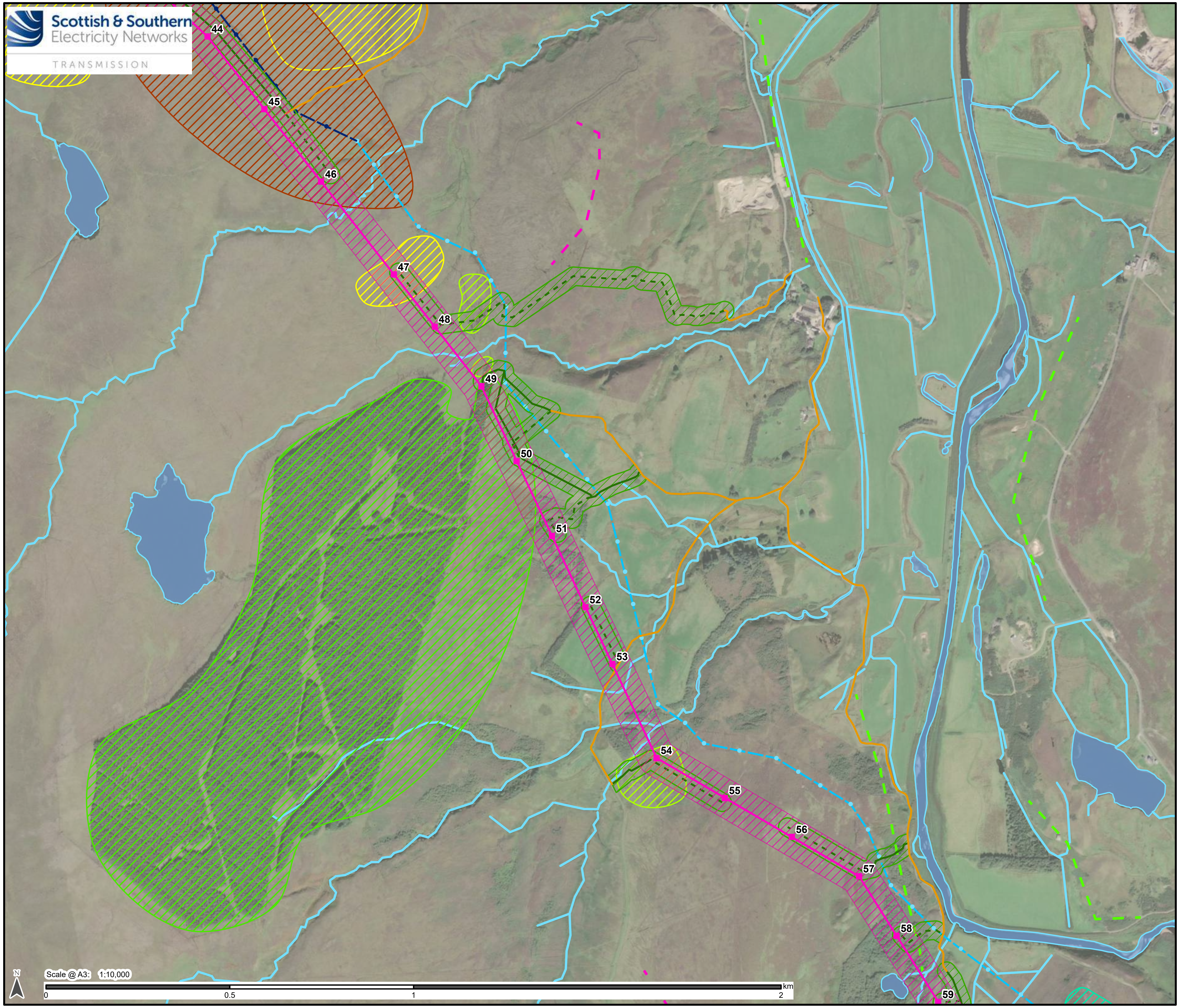
Project: Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.5 - Geomorphology Map 4

Drawn by: MM

Date: 18/12/2024

Drawing: 428.013137.00001.00088.0

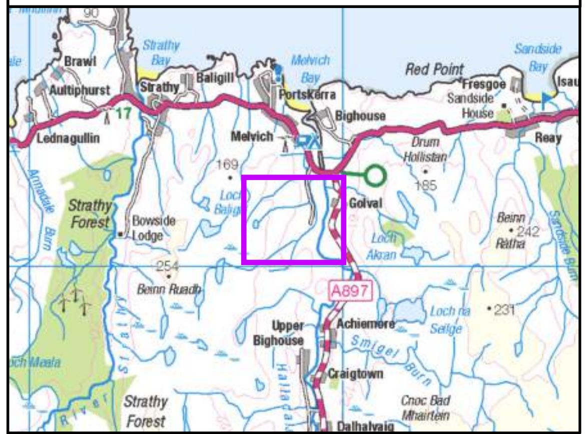


Legend

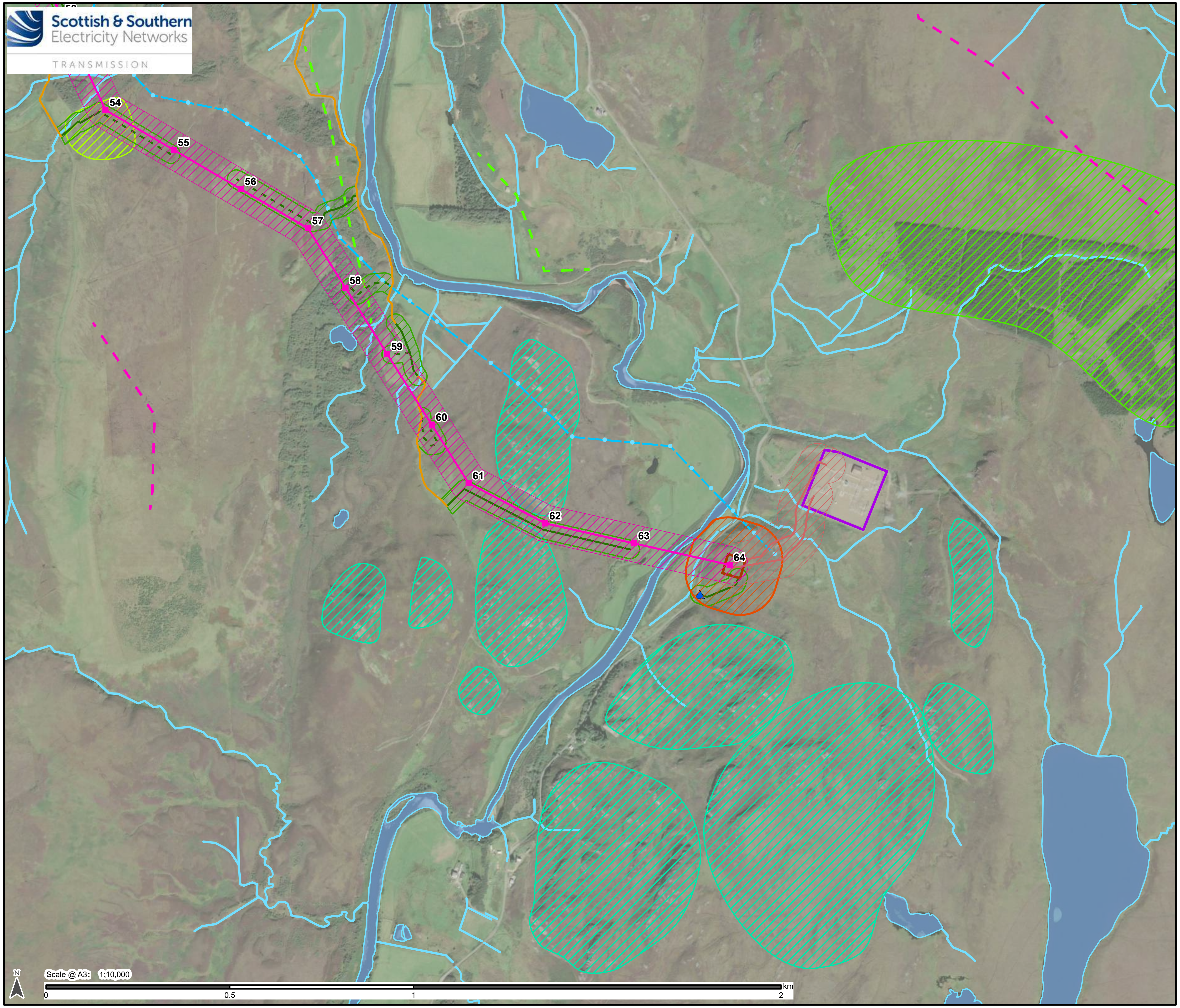
- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Existing Wood Pole (H pole) (to be dismantled)
- Existing 132kV OHL (to be dismantled)
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)

Geomorphology

- Bottom of Slope
- Top of Slope
- Blanket Bog
- Forestry
- Haggs
- Outcrop
- Peat Cuttings



Project No:	LT560
Project:	Strathy South Wind Farm Grid Connection Peat Landslide Hazard and Risk Assessment
Title:	Figure V1-9.1.5 - Geomorphology Map 5
Drawn by:	MM — Date: 18/12/2024
Drawing:	428.013137.00001.00088.0

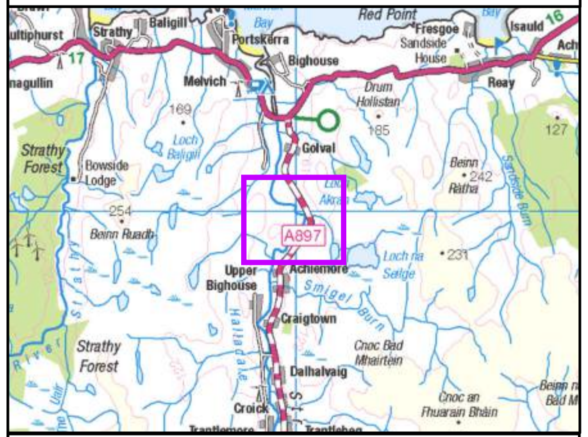


Legend

- Proposed Steel Lattice Tower
- Proposed OHL Alignment
- Limit of Deviation (OHL)
- Proposed Underground Cable (UGC)
- Limit of Deviation (UGC)
- Proposed Cable Sealing End (CSE) Compound
- Limit of Deviation (CSE Compound)
- New Bellmouth
- Existing Access Track (to be upgraded)
- Proposed Permanent Access Track
- Proposed Temporary Access Track
- Limit of Deviation (Access Tracks)
- Connagill 275/132 kV Substation
- Existing Wood Pole (H pole) (to be retained)
- Existing 132kV OHL (to be retained)
- Watercourse (OS OpenMap Local)
- Waterbody (OS OpenMap Local)

Geomorphology

- Bottom of Slope
- Top of Slope
- Forestry
- Haggs
- Outcrop



Project No: LT560
Project: Strathy South Wind Farm Grid Connection
Peat Landslide Hazard and Risk Assessment

Title: Figure V1-9.1.5 - Geomorphology Map 6

Drawn by: MM | Date: 18/12/2024

Drawing: 428.013137.00001.00088.0