Coille Beith Wind Farm

Technical Appendix 8.8: Borrow Pit Assessment

June 2025

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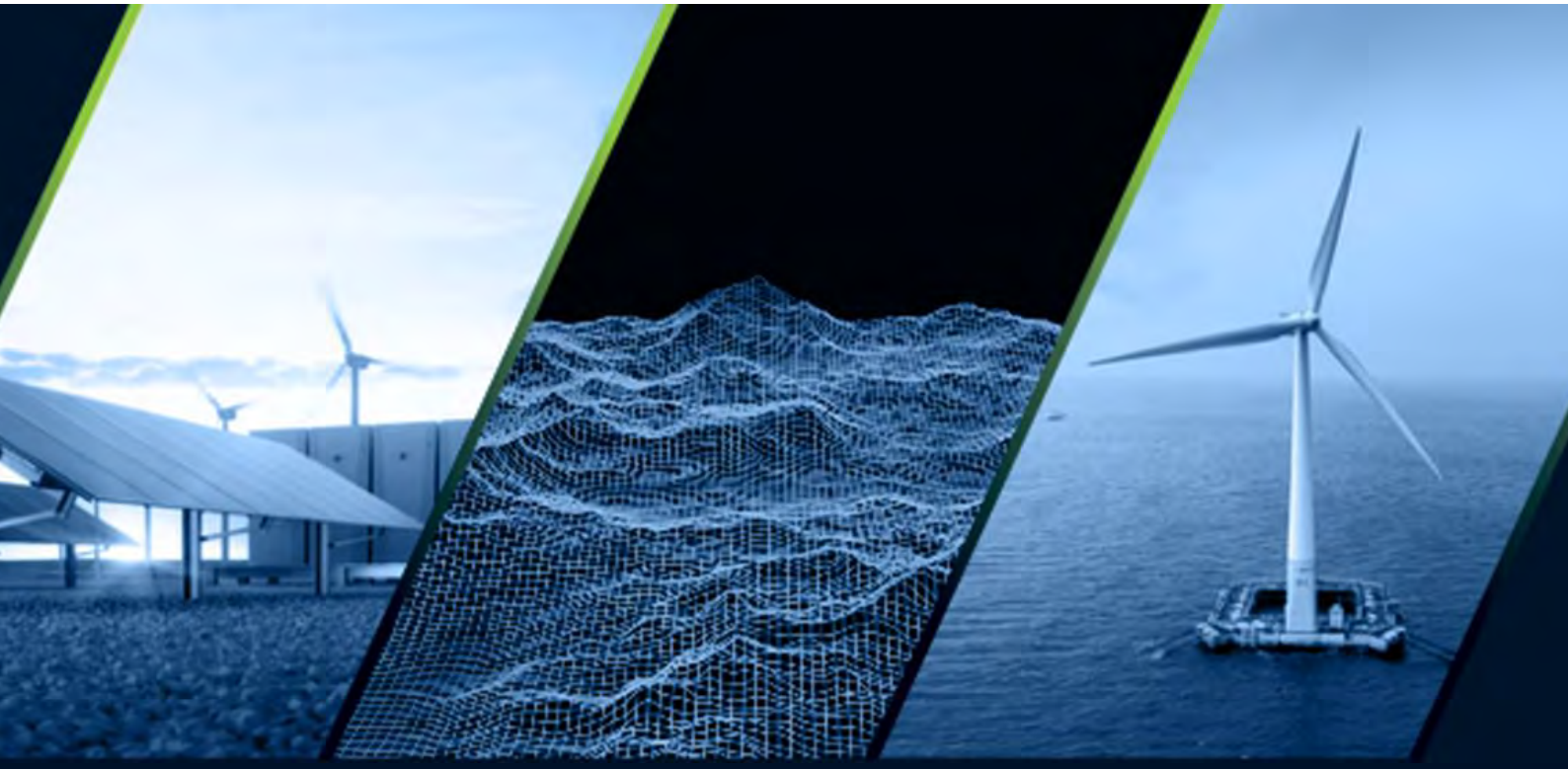
The **Renewable Energy** Consultants.



Coille Beith Wind Farm
Appendix 8.8 Borrow Pit Assessment

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A	2025-06-10	A. Smyth	S. Pearce	A. Mills	First Issue
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C	2025-06-19	S. Pearce	A. Mills	S. Pearce	Third Issue. Minor edits in response to Client comments.

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Acronyms

Acronym	Full Term
AOD	Above Ordnance Datum
BGS	British Geological Survey
BP	Borrow Pit
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EIA-R	Environmental Impact Assessment Report
FLS	Forestry and Land Scotland
GSI	Geological Strength Index
OS	Ordnance Survey
PLHRA	Peat Landslide Hazard and Risk Assessment

1 Introduction

This report forms an appendix to **Chapter 8** (EIA Report Volume 2) and should be read with reference to this chapter and associated figures. This appendix is supported by the following figures;

- **Figure 8.8.1: Site Layout;**
- **Figure 8.8.2: Superficial Geology;**
- **Figure 8.8.3: Bedrock Geology; and**
- **Figure 8.8.4: Indicative Borrow Pit Design.**

The Coille Beith Wind Farm ('the Proposed Development') is proposed to consist of 11 wind turbines and associated infrastructure, including hardstandings and access tracks. The Site covers an area of approximately 13.06 km^2 located due south of Rosehall and Oykel Bridge approximately 15 km west of Lairg in the Scottish Highlands. The site sits within the Beinn Chreagach wood, Cnoc nan Caorach wood, Langwell wood and Strath Oykel Forest which are commercial forestry. The Site is wholly within the Highland Council administrative area.

To minimise the volume of material imported to the Site and any associated environmental impacts associated with increased traffic, it is anticipated that stone will be sourced from an onsite borrow pit. It may be necessary to import some stone to the Site, dependent on post-consent verification and refinement of the findings of this initial assessment.

Aggregate will be required for the construction of access tracks (9.54 km of new track), crane pads, and compounds. Some material is expected to be gained from new cut and fill construction, but this is not expected to generate sufficient aggregate for all on-site requirements. There is therefore a need for additional excavation of aggregate material.

An existing excavation has been identified as the optimum source of aggregate on-site and it is intended that this will be expanded into an on-site borrow pit.

This report presents the findings of an initial desk study borrow pit assessment for the Proposed Development.

The preferred borrow pit location is summarised below:

Table 1-1: Borrow Pit location summary

Borrow Pit ID	Name	Location (BP centre)		Current status	Extension of existing/ historical pit?
		Easting [m]	Northing [m]		
BP01	*Expansion of existing excavation*	240669	899348	Used for forestry activities	Yes

The borrow pit search area is shown in **Plate 1-1**.

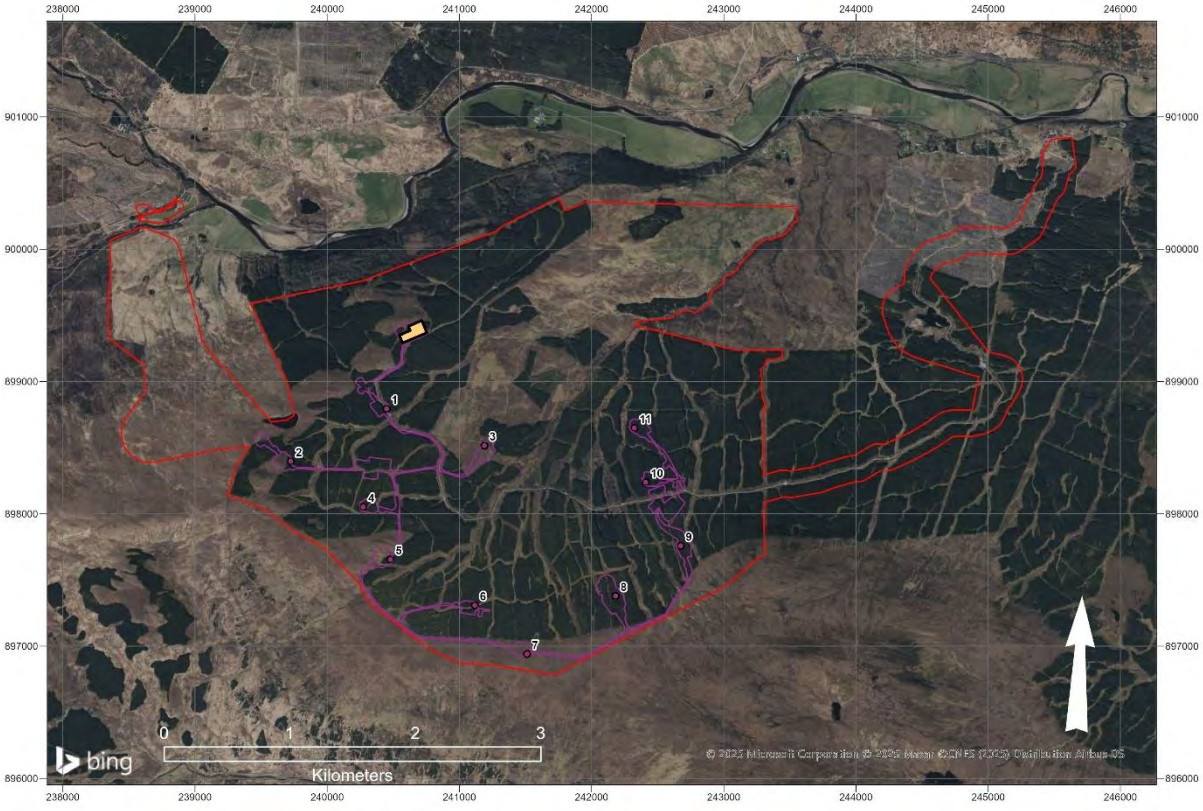

Plate 1-1: Site location showing the proposed borrow pit location (BP01) as an orange polygon. Also shown are the turbine locations (labelled 1 to 11)

2 Objectives

The primary aim is to identify potential borrow pit locations to support wind farm construction within the Site.

One borrow pit option has been considered in this review. It is at a site of existing or historical workings.

The scope of work involves the investigation of a potential borrow pit area to establish whether this is sufficient in size and suitable in expected quality to satisfy the anticipated aggregate requirements. The aim is to maximise use of site-won materials for the purpose of the construction of the Proposed Development.

Dependent on the degree of uncertainty in ground conditions following a pre-construction ground investigation, the number / cumulative area of borrow pit search areas may differ from those considered at this early stage. It would be preferable for the proposed borrow pit to service the entire aggregate requirement for construction, though this may not be possible.

It should be noted that all borrow pit information provided within this report is indicative only. It is based solely on available desk study information and a dedicated site visit has not yet been carried out though rock samples have been collected during related reconnaissance activities. Also, no intrusive investigation has been carried out for the purpose of assessing borrow pit suitability, so the suitability of rock, suggested extraction methods, and volumes are initial estimates and should not be unconditionally relied upon.

Peat probing has been carried out (see **Appendix 8.2** (EIA Report Volume 4)), including detailed probing within the borrow pit search area. The probing results have been incorporated as part of this assessment to understand potential overburden depths in the search area. Further intrusive investigation is expected to be carried out post consent.

3 Method

A desk study was carried out by an Engineering Geologist with 10 years' experience. Site visit photographs were provided by Fluid Environmental Consulting including outcrop observations. The desk study made use of a range of information sources, which were reviewed and interpreted as part of the assessment to provide a target search area for on-site observations. The following key sources were reviewed:

- British Geological Survey (BGS) 1:50,000 scale web mapping service [1]
- BGS GeoIndex online database and viewer [2]
- BGS 1:50,000 scale published map sheets (Solid sheet for Oykel Bridge, sheet 102W) [3]
- BGS rock lexicon [4]
- Ordnance Survey (OS) mapping and 5 m Digital Terrain Model (DTM) data

The desk study used these data sources to identify the likely ground conditions within the Site, including at existing borrow pits and in considering possible new borrow pit locations.

The Study Area for the assessment was considered to be the area enclosed by the Site red line boundary.

Table 3-1 summarises the aggregate requirements.

Table 3-1: Aggregate requirements for the Proposed Development.

Proposed Development Requirements [Volume, m^3]						**Total** excl. concrete aggregate	**Total** excl. concrete aggregate, lean mix concrete, and imported granular backfill
Access Tracks	Turbine Hardstand	Lean Mix Concrete For Cable Trenches	Imported Granular Backfill For Cable Trenches	Turning Head Volume	Concrete Aggregate		
29,546	79,688	5372	2686	3216	7150	**113,358**	**105,300**

4 Desk Study

4.1 Topography

The Site is located south of the A837 road, on the southern slopes of Strath Oykel and within an area of commercial forestry. The Site is located between the two NNE-SSW trending peaks within the Beinn Chreagach Wood and Strath Oykel Forest. Further south of the Site boundary lies the summit of Beinn Ulbhaidh which has an elevation of 496 m AOD.

From BGS slope data [2] (Ordnance Survey Terrain 50 Slope), the main infrastructure area above c. 150 m AOD comprises moderate (>5° and <15°) slopes, but is generally <10° across most of the Site. In the northwest, some slopes of Strath Oykel are >15°). Slopes at the borrow pit location are generally between 5 and 10°.

Bedrock is not commonly exposed at the ground surface within the Site, but satellite imagery shows some outcrops within the Site. Otherwise the bedrock is expected to be covered with till, peat, or a combination of the two.

4.2 Geology

This section summarises the geology based on desk study information, with particular focus on aspects of the geology of relevance for the borrow pit assessment, such as bedrock type and distribution, and extent of superficial cover. No intrusive investigation has yet been undertaken on-site other than peat probing (see **Appendix 8.2** (EIA Report Volume 4)), the results of which have been considered when assessing potential borrow pit suitability.

4.2.1 Superficial deposits

Published geological maps [1] [3] indicate the presence of Holocene and Pleistocene superficial deposits across most of the eastern extent of the Site. The BGS superficial geology map shows that peat is the dominant surficial cover in the south of the Site, with glacial till occupying the northern two thirds of the Site interspersed with smaller areas of peat and hummocky glacial deposits and till/diamicton. **Figure 8.8.3** shows the BGS superficial geology.

This is underlain by till (diamicton), as indicated by the BGS boreholes in the northwest of the Site (between ~2.5 m and 6 m thick). The till comprises of a mixed grain size sand and gravel glacial deposit. Only a small area of till at surface is shown within the Site on the BGS map.

Peat probing across the Site broadly correlates with BGS mapping with both sources indicating peat predominantly in the south of the Site. While the BGS map indicates an absence of peat at the borrow pit location, peat probing shows that some thin peat is present, thickening towards the northwest (upslope).

Thick superficial deposits should be avoided when identifying suitable borrow pit locations to minimise the amount of additional spoil excavation and storage that would be required prior to working a new pit. The proposed borrow pit (BP01) is located in an area where little to no superficial cover is indicated on the BGS surficial geology maps. There is however forestry surrounding the area and if the current excavated area needs to be enlarged, then trees and shallow soil will need to be removed. This shallow soil is close to an area of till/diamicton as mapped by BGS [2]]. **Table 4-1** summarises the anticipated superficial deposits at and in the vicinity of the Site.

Table 4-1: Summary descriptions of anticipated superficial deposits

Superficial deposit	Distribution	Summary geological description
Peat	Shown by the BGS surficial GeoIndex map and peat probing to be present in some parts of the Site	Organic accumulations rich in plant remains
Glacial till	Mapped by the BGS in the northern ~two thirds of the site.	Diamicton (unsorted sediment with sand and gravel in a fine mud/clay matrix) formed by glacial action (ice flows).
Hummocky glacial deposits	Found as a small isolated patch in the centre of the site	Lithologically diverse and complex glacial deposits that have characteristic moundy topographic form. Composed of rock debris, clayey till and poorly- to well-stratified sand and gravel.

4.2.2 Peat extent and stability

Peat probes carried out in the vicinity of the proposed borrow pit are summarised in **Table 4-2**.

Table 4-2: Summary of peat probe observations within Borrow Pit

Borrow Pit ID	Peat probe observations within Borrow Pit
BP 01	Typically less than 30 cm thick across most of the BP Not more than 100 cm thick (only a small central area lies in the 50-100 cm range) Thickest areas mainly restricted to the centre-north of BP

A Peat Landslide Hazard and Risk Assessment (PLHRA) (see **Technical Appendix 8.4** (EIA Report Volume 4) has been undertaken in support of the Proposed Development and has not highlighted any particular stability concerns at the proposed location, provided good practice construction measures are undertaken in line with recommendations in the report.

4.2.3 Bedrock formations

The 1:50,000 BGS Bedrock Geology Map [1] and BGS Solid Geology Map Sheet 102W [5] indicate that the solid geology underlying the Site comprises siliceous and feldspathic psammite with locally micaceous layers. The psammite is known as the Altnaharra (also called the A'Mhoine) Psammite Formation. This formation is part of the Morar Group. **Figure 8.8.2** shows the bedrock geology.

The upper part of the Altnharra Formation is the Glen Achall Psammite and Semipelite Member (GACH). A localised outcrop of Glen Achall psammite and semi-pelite is mapped to the west-south-west along the boundary of the Site. The Glen Achall deposits form the upper part of the Altnaharra psammite formation (i.e. is a member within the formation and is also part of the Morar Group).

The Morar Group is Precambrian in age (1,000 to 541 Ma) [4] [6] which is particularly old. These rocks are fine to medium grained metamorphics that were originally sedimentary (laid down in a braid plain environment) and are part of the low grade 'Amphibolite facies metamorphic zone' of the Northern Highlands.

North of the Great Glen Fault the Moine rocks were deposited during Late Precambrian times

as clastic sediments, resting unconformably on older gneiss (Lewisian). The Altnaharra Psammite is sedimentary rock deposited in a braid plain to tidal environment and subsequently metamorphosed, which transformed sandstone to psammite. The primary minerology is quartz + feldspar + mica (mica <20%), with local gritty or pebbly (up to 30 mm) layers.

Table 4-3 provides summary descriptions for the anticipated bedrock units.

Table 4-3: Summary geological descriptions of anticipated bedrock formations on Site

Bedrock Units	BGS lexicon [4] description	BGS map sheet description [5]
Altnaharra Psammite Formation	Siliceous to feldspathic psammite with micaceous psammite, grey to buff; locally with micaceous layers. Gritty psammite occurs in the lower part; higher up in the unit, thin semipelitic beds become more common. Generally, strongly deformed and flaggy ('bed' thickness 5 - 30 cm). In low strain zones, the psammite shows thick beds (0.5 - 5 m): sedimentary structures include channels with pebble lags, planar and trough cross-bedding, slump-like folds, dewatering pipes and oversteepened cross-beds (Krabbendam et al., 2008). Palaeo-currents are to east or NE.	Siliceous psammite and micaceous psammite, generally grey, locally with thin mica rich layers, variably flaggy, semi-pelite or biotite pelite at base (locally) or interbedded semipelite and micaeous psammite. Between the Achness and Ben Hope thrusts, sedimentary structures are well preserved and include planar and trough cross bedding, pebble lags and soft sediment deformation structures e.g. slump folding and dewatering structures, beds are up to 0.2m thick, generally coarser grained with more pebbly layers in the basal parts, and finer grained with more semipelitic layers in the upper parts.
Definitions: Semipelite - A type of metasedimentary rock composed largely of quartz, feldspar and mica. In the Rock Classification Scheme, it is one with mica component 20 - 40%, and quartz + feldspar 60 - 80% of quartz + feldspar + mica. The mica component includes all minerals other than quartz and feldspar, with the exception of calcsilicate and carbonate minerals [7] Psammite - A type of metasedimentary rock composed largely of quartz, feldspar and mica. In the Rock Classification Scheme, it is one with mica component <20%, and quartz + feldspar 80 - 100% of quartz + feldspar + mica. The mica component includes all minerals other than quartz and feldspar, with the exception of calcsilicate and carbonate minerals [8].		

4.2.4 Bedrock sampling and quarrying records

An existing excavation pit is present within the Site. This is apparent on aerial imagery and suggests that the Altnaharra Psammite Formation rocks have previously been extracted, likely providing aggregate for use in constructing and maintaining forestry tracks.

Based on this information, at least some of the bedrock at the Site is likely to be suitable. Post-consent detailed ground investigation will be required to verify the suitability of bedrock for aggregate, in particular to check whether any pelite exists at this location which can result in weaker foliated rock. This local variability will be difficult to fully predict prior to intrusive ground investigations and may mean that the percentage of useable material extracted from on-site borrow pits is relatively low.

4.2.5 Bedrock structure

The Coille Beith area is part of the Northern Highlands, bound by the Great Glen and Highland Boundary Faults to the south. These are major fractures which operated during the later stage of the Caledonian orogeny and has been subsequently re-activated during the Devonian and later periods. BGS maps indicate that the regional geological structure is predominantly aligned southwest-northeast with the same structural trend as the Highland Boundary Fault and the Great Glen Fault.

Faults are present cross cutting the Site, mainly oriented southwest to northeast although some of the smaller faults have a north-south alignment. Cross sections on the BGS sheet 102W solid geology map [5] indicate that the psammite beds dip to the south.

Given the strong trend of the regional geological structure and steeply dipping beds, it may be preferable to work borrow pits along-strike, once a good source of material is identified. This would minimise the likelihood of working up or down the stratigraphic sequence, thereby avoiding sudden changes in aggregate properties. The viability of this approach will depend on the exact geometry of the individual borrow pit, as well as rock properties, and other practical limitations, but should be considered during borrow pit design work.

4.2.6 Choice of location of BP01

The location of BP01 is shown in **Plate 1-1**. The location was provided to OWC for consideration in the Borrow Pit Assessment report. It is located on an existing track, where bedrock material is excavated at surface and peat deposits are generally <50 cm at this location. If the pit is to be extended, then forestry and associated shallow soil (glacial till/diamicton) will need to be removed. Given that there is an existing pit at this location, extension of the pit is a logical basis for this being the priority source of aggregate.

The existing pit at BP01 has the potential to be extended primarily in a north and west direction, away from the track.

Rock samples collected from the existing pit confirm the presence of psammite. The suitability of the wider resource for construction aggregate remains to be confirmed, and a site visit should be carried out to confirm the thickness and mineralogy of the psammite beds.

4.3 Site Photographs

Photographs taken during a visit by Fluid Environmental Consulting are included in this report.

The outcrops show two rock types present within the area, in the south of the borrow pit the rocks are blocky and sandy-grey in colour. In the north of the borrow pit the rocks are a blue grey colour and showing slickensides and an increased quartz content within the sample.

The photographs are broadly consistent with the expected psammite lithology, though there is also some evidence of more pelitic lithology. Slickensides were also noted, suggesting the possibility of one or more faults in the vicinity. Further investigation at site should be undertaken to confirm the lithologies, their spatial extent, and provide an indication of rock mass properties.

Photographic set 1 shows the current situation at BP01.

Photograph Set	Location Description	Bedrock Unit (based on BGS maps)
1	BP01 existing excavation site	Altnaharra Psammite Formation (photograph 2 and 3) Possible Glen Achall Semipelite Member (photograph 1)

Photographic set 1: Samples taken from existing excavation at BP01

5 Aggregate Resource and Suitability

Based on estimates by the design team, it expected that approximately 113,358 m^3 (excluding contingency) of suitable aggregate (excluding concrete aggregate) will be required for the construction and upgrading of access tracks, construction of crane pads and compounds. Typically a 20% contingency might be applied to the required volume when assessing aggregate resource and suitability from onsite borrow pits. If lean mix concrete for cable trenches and imported granular backfill for cable trenches are excluded from the requirements, then the total volume required would be 105,300 m^3 (again excluding contingency).

Table 5-1 provides summary descriptions of engineering properties based on regional BGS information.

Crushed psammites are known to be used as an aggregate; however their hardness and resistance are likely to be strongly affected by:

- % mica component (platy minerals e.g. biotite, muscovite) compared to harder blocky crystalline minerals (e.g. quartz, epidote, pyroxene),
- degree of weathering, and
- extent of foliation (mineral layering of platy minerals) within the rocks.

It is expected that the Altnaharra Psammite Formation will contain useable material though care will need to be taken to avoid or process out highly foliated or weathered zones. The Altnaharra Psammite Formation can be stratified between layers of higher and lower strength and durability as dictated by both their primary depositional origin (sedimentary braid plain to tidal to marine and availability of sand) and subsequent metamorphic overprint and weathering.

No Geological Strength Index (GSI) for the rock outcrops has been acquired. Rock material strength is expected to range from strong to very strong. However, fragmentation is controlled by the foliation.

It is most likely that BP 01 would provide stone for uses other than concrete aggregate. It is not expected that site-won materials will be used as concrete aggregate. Furthermore, it is noted that the potential for alkali silica reaction (ASR), a chemical reaction between pore solutions and aggregates used for concrete, cannot be ruled out for these rocks. The reaction product can in certain circumstances absorb water and swell, causing expansion and cracking. Suitable materials testing should be carried out to determine the suitability of the rock materials at all borrow pits as part of ground investigation works. If intended to be used as concrete aggregate, appropriate testing to assess the potential for ASR is recommended.

In general the bedrock is not well exposed in outcrop, other than at the existing excavation.

Table 5-1: Table of engineering properties summarised from the BGS GeoIndex 1:1M Bedrock Engineering Geology map

Bedrock Units	BGS lexicon [4] description	BGS map sheet description [5]	BGS Engineering Geology description	BGS Engineering Geology notes
Altnaharra Psammite Formation	Psammite	Siliceous psammite and micaceous psammite, generally grey, locally with thin mica rich layers, variably flaggy, semi-pelite or biotite pelite at base (locally) or interbedded semipelite and micaeous psammite.	Granofels: Strong to extremely strong medium to widely jointed non-foliated fine to coarse-grained GRANOFELS. Weathers to a sandy gravel or gravelly sand. Medium to very low permeability flow is through discontinuities. Includes QUARTZITE, GRANULITE, HORNFELS and AMPHIBOLITE.	**Foundations**: Potentially good foundation conditions, but may be dependent on degree of metamorphism and variability of interbedded metamorphic lithologies and associated weathering profiles. **Excavation**: Highly weathered zones may be excavatable by hard digging or ripping but blasting usually required for fresher material. **Engineered Fill:** Suitable as selected granular fill if care taken in selection and abstraction. **Site Investigation:** Important to determine spacing, orientation and nature of discontinuities, and depth and properties of weathered zone materials.

An estimated total volume has been presented. Simplifications have been made regarding assumed depth of cover (overburden), and excavation geometry. The percentage of material from BP 01 deemed suitable for its intended use as part of the Proposed Development construction is cautiously assumed to be 50% for the purpose of this assessment.

Borrow pit footprint dimensions and maximum depths are indicated in the borrow pit assessment in **Table 5-2.** The volumes given have been calculated from a simplified cut/fill calculation, considering the existing topography, borrow pit footprint dimensions, generalised floor level, and indicative face dimensions. A bench is not expected to be required as the maximum vertical elevation of the borrow pit does not exceed 12 m in height. This assumes that the floor of the pit would be split-level with a central ramp proving access between the two levels. This aims to minimise face height and the potential for instability along the track edge, without introducing an inclined pit floor and therefore limiting discharge of potentially sediment laden water.

It should be noted that the provided borrow pit dimensions and volumes are estimates and are likely to vary. The indicative borrow pit design (see **Figure 8.8.4**) includes a location map showing the borrow pit within the Site, an extract from OS mapping at the borrow pit search area, a plan view layout showing the proposed borrow pit footprint, and a schematic cross-section. They are produced using available data and are not to be used in place of detailed designs.

Probable extraction methods have been estimated based on anticipated rock mass properties. Aggregate suitability, extraction methods, and borrow pit design should be re-assessed following detailed ground investigations and geotechnical testing. It is anticipated that, upon completion of the Proposed Development, the borrow pit will be restored to a safe condition through translocation of excavated peat.

The proposed locations are in an area where the superficial deposits are expected to be minimal. A mean peat thickness of 0.23 m has been recorded within the borrow pit footprint. Where peat is expected to be <0.5 m thick, the overburden thickness has been assumed to be 0.5 m. In the localised areas where peat is expected to be >0.5 m thick, the overburden thickness is taken as the peat thickness. Forestry is also present at the borrow pit site. The assessment does not consider the potential for fortuitous ‘winning’ of rock during construction work elsewhere on the Site. The calculations provided in this report generally take a conservative approach to volume estimation. Where geometries have been simplified for ease of calculation this is expected to result in a slight under-estimate of the available aggregate.

5.1 BP 01

Table 5-2 presents the proposed dimensions and estimated extraction volumes for BP 01. **Figure 8.8.4** shows the proposed borrow pit in plan and section view.

Table 5-2: Indicative dimensions and extraction volumes for BP 01

Borrow Pit ID	Approx. working area footprint [m^2]	Max. depth [m]	Total volume (incl. overburden) [m^3]	Assumed overburden thickness [m]	Suggested extraction methods
BP 01	15,597	11.5	122,269	Min. 0.5 Mean 0.575	Blasting, hammer, ripping, digging
Estimated extraction volume (after overburden removal) [m^3]:					113,301
Estimated useable extraction volume (assuming 50% suitability and after overburden removed) [m^3]:					56,650

Notes:

1. Aggregate suitability is conservatively estimated to be 50% of the volume presented for wind farm use (i.e. 50% may be unsuitable for the intended application).
2. Bulking factors (i.e. volumetric increase following extraction) are not considered in this assessment. All volumes are subject to future refinement.

5.2 Aggregate availability

Based on the calculations above, an estimated 56,650 m^3 of useable stone material will be available from BP 01. This is notably less than the estimated 113,358 m^3 required for the Proposed Development (excluding concrete aggregate), even without any contingency volume added to the requirement. Notably, were the rock to be 100% suitable (excluding 0.5 m overburden) then BP01 could potentially provide the full aggregate requirement for the proposed development. However, whilst 50% may be a cautious estimate of useability, it is unlikely that the resource will be 100% useable.

There are three options available to source additional aggregate if required:

I. Extend the proposed borrow pit area further into the hillside, or along the track upslope, avoiding areas of increased peat thickness.

II. Locate an additional borrow pit on-site, which will require an additional consent application

III. Import material from outside, this will require consideration in the traffic and transport planning.

The key uncertainty lies in the percentage of suitable aggregate. This is currently assumed to be 50%, but the actual percentage could be higher or lower this in some areas. Site-specific intrusive ground investigation will help to reduce this uncertainty and refine the borrow pit design.

6 Conclusions and Recommendations

Based on the available information, a potentially suitable borrow pit search area has been assessed. The proposed borrow pit has the potential to provide the required aggregate but only if the excavated material proves to be 100% suitable, which is considered unlikely. Accordingly, if 50% of the extracted material proves to be useable, then BP01 would provide 50% of the required aggregate volume for the Proposed Development (minus concrete aggregate). This may be a cautious approach, but given that no contingency has been applied to the required volume, and ground investigation is yet to be carried out, it is considered appropriate at this stage.

Geotechnical hazards that require consideration by further investigation and/or design are summarised as follows:

1. Potential for variable / unexpected thickness of superficial deposits;
2. Potential for unsuitable aggregate properties;
3. Potential for insufficient yield (e.g. unfavourable rock mass restricting slope geometry);
4. Uncertain groundwater conditions;
5. Need for rock slope stability assessment, including imposed loads along the track edge; and
6. Change in aggregate requirements (e.g. due to Proposed Development layout change).

For Hazards 1 to 5, intrusive ground investigation is strongly recommended, followed by design refinement. In the case of Hazard 6, expansion of the proposed pits or importing of additional aggregate from off site may be required to meet demand.

The borrow pit assessment presented in this report is indicative, based on desk-based study only, supported by peat probing data. No other ground investigation has been carried out to date. This indicative assessment will therefore require refinement following ground investigation and testing. Geotechnical testing may include (but not necessarily be limited to) the following:

- Unconfined Compressive Strength;
- Point Load;
- Slake Durability Index;
- Los Angeles Abrasion Coefficient; and
- Sulphate Soundness.

Geophysical profiles may also be of value.

As part of borrow pit design refinement, consideration should be given to ground investigation results (including materials testing to confirm suitability), management of surface water runoff, management of groundwater, processing and storage of excavated materials, slope stability (including bench design), earthworks, and restoration options. Borrow pits should be designed and operated in accordance with the HSE Quarry Regulations (1999, updated 2013).

7 References

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Legend

- Study Area
- Proposed Turbine
- Existing Access Track - No Upgrade
- Existing Access Track To Be Upgraded As Required
- Proposed Access Track
- Access Track Widening
- Floating Track
- Proposed Turning Head
- Proposed Substation
- Proposed Hardstanding
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Earthworks

Figure Title
Site Layout

Project Name
Coille Beith Wind Farm

Project No./Filery ID
1620016742 / REH2024N00315

Date	Figure No.	Revision
June 2025	8.8.1	C

Prepared By	Scale
OWC-NT	1:17,500 @A3

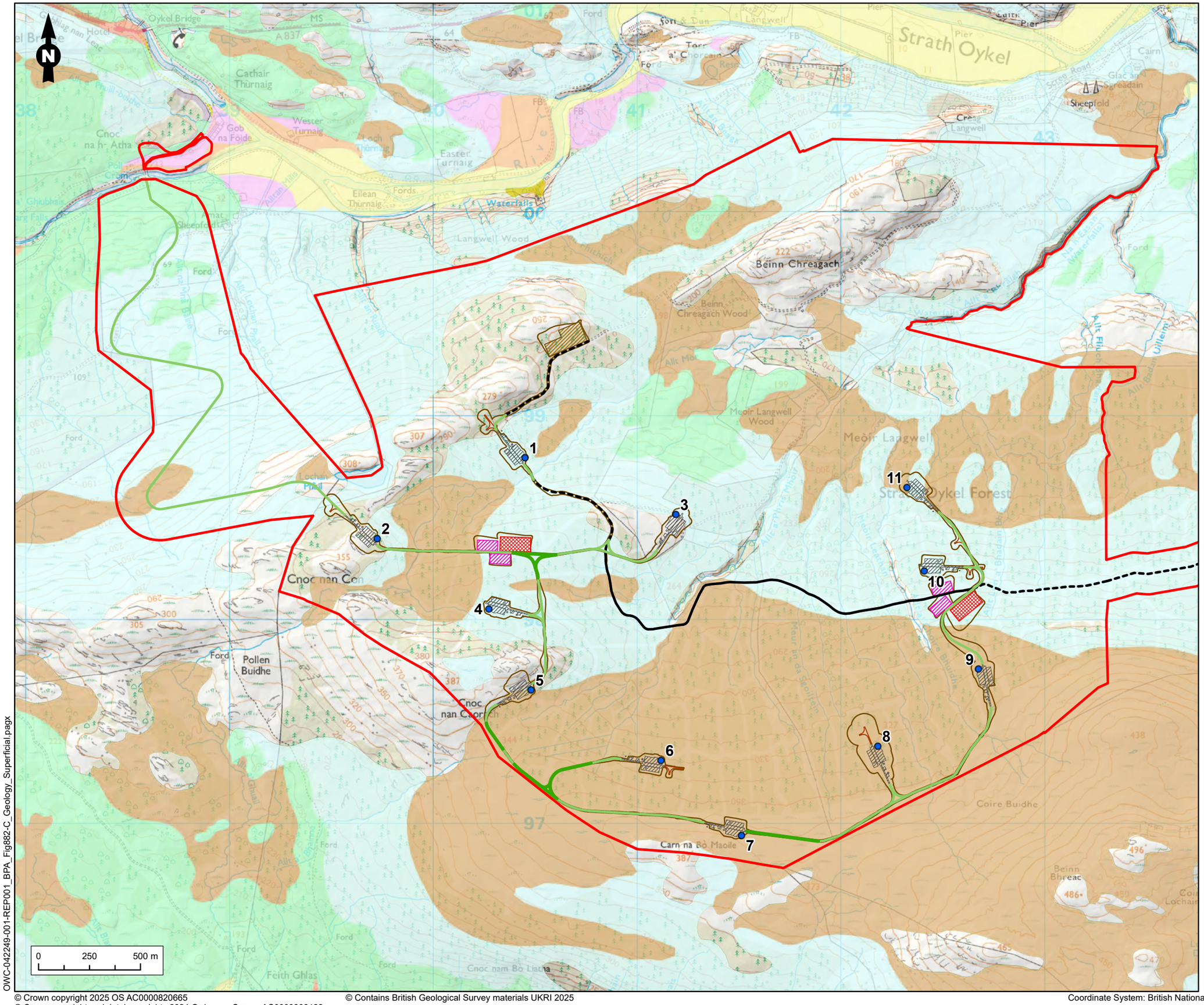
Client
Statkraft

Statkraft RAMBØLL

0 250 500 m

OWC-042249-001-REP001_BPA_Fig881-C_SiteLayout.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.



Legend

- Study Area
- Proposed Turbine
- Floating Track
- Existing Access Track - No Upgrade
- Existing Access Track To Be Upgraded As Required
- Proposed Access Track
- Proposed Turning Head
- Proposed Substation
- Proposed Hardstanding
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Access Track Widening
- Proposed Earthworks

BGS Superficial

- Peat
- Till - Devensian
- Glaciofluvial Deposits, Devensian
- Hummocky Glacial Deposits - Devensian

Figure Title
Superficial Geology

Project Name
Coille Beith Wind Farm

Project No./Filery ID
1620016742 / REH2024N00315

Date	Figure No.	Revision
June 2025	8.8.2	C

Prepared By	Scale
OWC-NT	1:17,500 @A3

Client
Statkraft

Statkraft RAMBOLL

OWC-042249-001-REP001_BPA_Fig882-C_Geology_Superficial.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.

Legend

- Study Area
- Proposed Turbine
- Floating Track
- Existing Access Track - No Upgrade
- Existing Access Track To Be Upgraded As Required
- Proposed Access Track
- Proposed Turning Head
- Proposed Substation
- Proposed Hardstanding
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Access Track Widening
- Proposed Earthworks

BGS Bedrock

- Altnaharra Psammite Formation Metamorphic
- Glen Achall Psammite and Semipelite - Metamorphic

Figure Title
Bedrock Geology

Project Name
Coille Beith Wind Farm

Project No./Filery ID
1620016742 / REH2024N00315

Date	Figure No.	Revision
June 2025	8.8.3	C

Prepared By	Scale
OWC-NT	1:17,500 @A3

Client
Statkraft

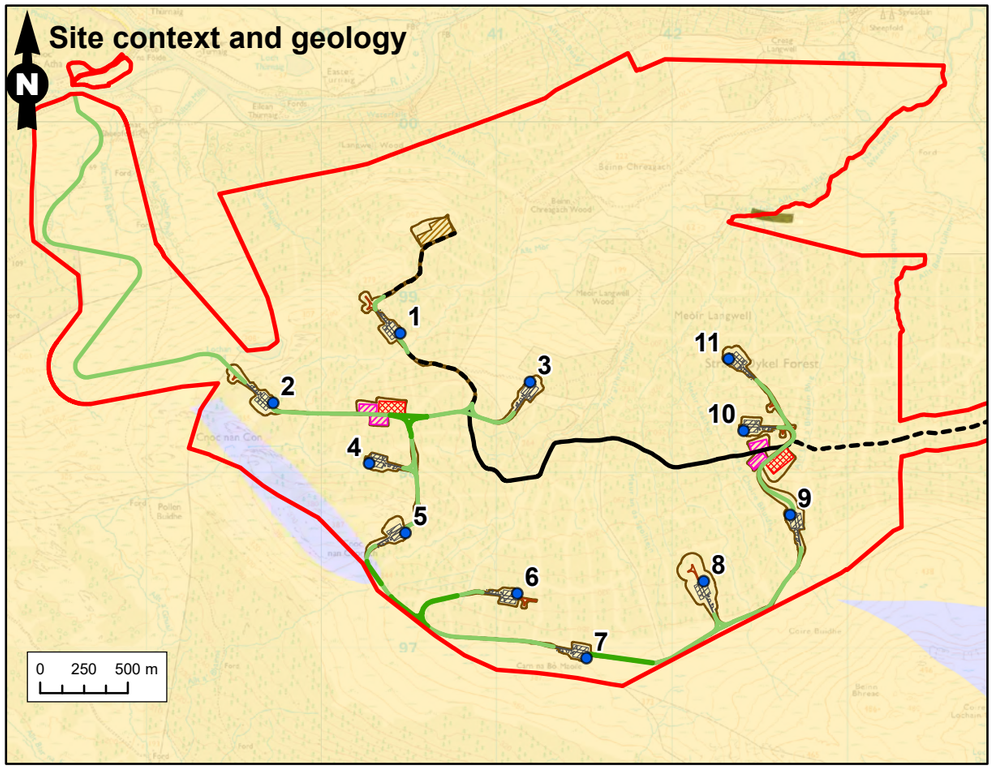
Statkraft RAMBOLL

0 250 500 m

OWC-042249-001-REP001_BPA_Fig883-C_Geology_Bedrock.pagx

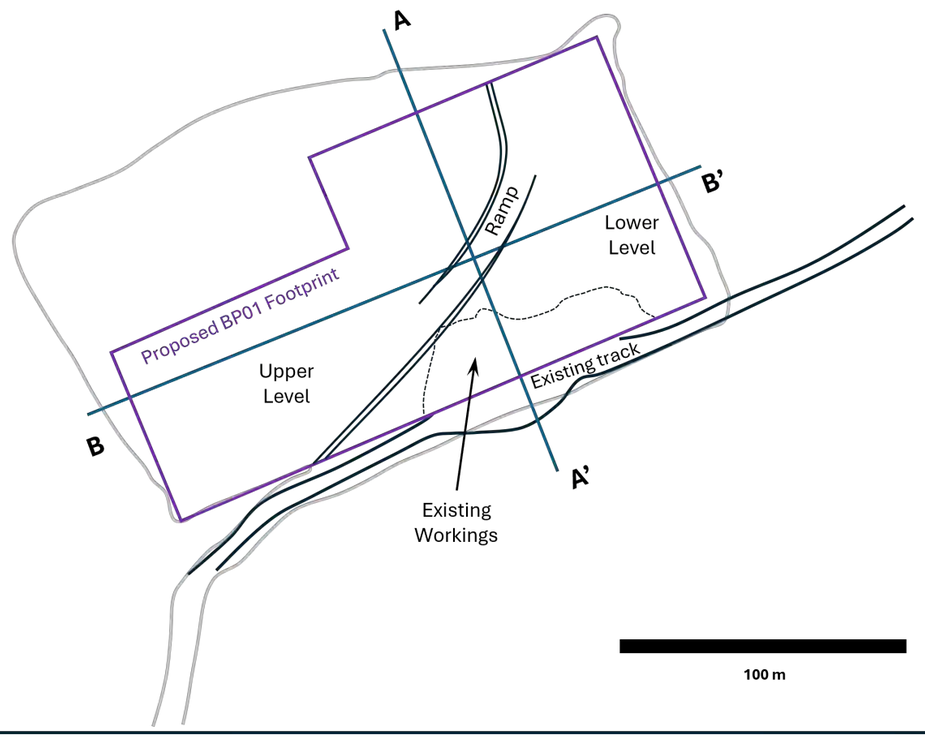
Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.

Site context and geology

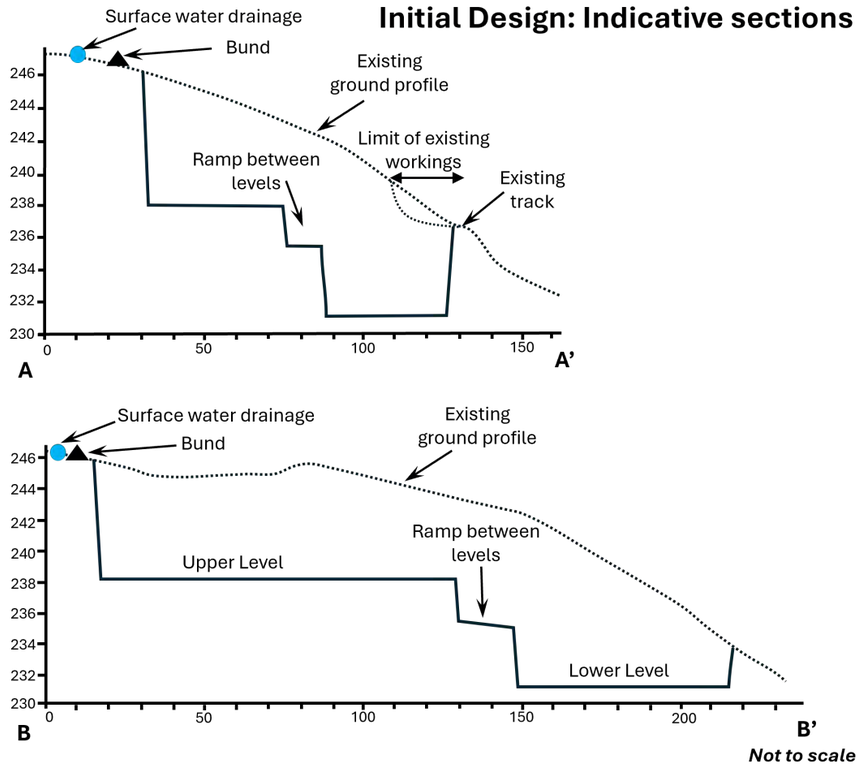


Existing Situation

Initial Design: Plan



Initial Design: Indicative sections



Legend

- Study Area
- Proposed Turbine
- Floating Track
- Existing Access Track - No Upgrade
- Existing Access Track To Be Upgraded As Required
- Proposed Access Track
- Proposed Turning Head
- Proposed Substation
- Proposed Hardstanding
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Access Track Widening
- Proposed Earthworks

BGS Bedrock

- Altnaharra Psammite Formation Metamorphic
- Glen Achall Psammite and Semipelite - Metamorphic

Figure Title
Indicative Borrow Pit Design

Project Name
Coille Beith Wind Farm

Project No./Filery ID
1620016742 / REH2024N00315

Date	Figure No.	Revision
June 2025	8.8.4	C

Prepared By	Scale
OWC-NT	1:35,000 @A3

Client
Statkraft

Statkraft RAMBOLL

OWC-042249-001-REP001_BPA_Fig884-C Indicative Design.pagx

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.