Tony Gee
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Achany Extension Wind Farm

Technical Appendix 11.1: Borrow Pit Appraisal

SSE Renewables

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1. Introduction

1.1. Development Brief

Tony Gee and Partners LLP (TG) have prepared this Borrow Pit Appraisal document on behalf of SSE Renewables (SSER) for the proposed Achany Extension Wind Farm, near Lairg in the Scottish Highlands.

1.2. Development Description

The Proposed Development comprises the construction of:

- 20 No. wind turbine generators (WTG);
- Crane hardstanding and associated laydown area at each wind turbine location;
- On site access tracks (of which approximately 17.3km are new access tracks and approximately 6.6km are existing tracks where upgrades may be required to facilitate delivery of the wind turbine components);
- A new on-site substation, welfare building and store;
- Potential extension to the existing operations building at Achany Wind Farm to accommodate additional staff;
- A network of underground cabling to connect each wind turbine to the on-site substation;
- A LiDAR unit to collect meteorological and wind speed data, and associated hard stand; and
- Any associated ancillary works required.

In addition to the permanent components, the construction phase would comprise the following temporary facilities:

- Site compound areas, including welfare facilities, site cabins, and parking;
- Batching plant facilities for temporary concrete batching plants;
- Temporary telecommunications infrastructure; and
- 5No. borrow pits, comprising both new and reworking of borrow pits used for Achany Wind Farm.

On site rock treatment will be required for the construction of the proposed infrastructure. Where possible, site won rock should be used from on-site borrow pits to reduce the need to import material. Rock recovered from the borrow pits may also be suitable in providing aggregate for on-site concrete batching. It is therefore necessary to identify areas where good quality rock can be recovered on-site with ease.

The Site layout is shown in Figure 11.1.1: Site Layout.

1.3. Scope

The purpose of this document is to summarise the findings of both desk and preliminary field studies, utilising all available information which includes a site walkover survey and multiple phases of peat probing.

The aim of the report is to:

- Locate potential Borrow Pits;
- Determine the dimension of each Borrow Pit;
- Preliminary assess volumes of rock won from each Borrow Pit;
- Estimate the volumes of overburden at each Borrow Pit;
- Highlight potential extraction methods;
- Provide recommendations on ground investigations; and
- Suggest recommendations for reinstatement at each Borrow Pit location.

2. Desk Study

2.1. Topography and Geomorphology

The site topography varies significantly across the Site with elevations ranging from 60mAOD, at the Site's southern extents to an average of 250mOAD across much of the Site's remainder. Five peaks over 320mOAD scatter the Site with the highest being "Carn nam Bo Maola " at 494mOAD.

2.2. Site Geology

BGS GeoIndex[1], BGS Lexicon[2] and BGS 1:50,000 series sheet 102E "Lairg" map[3] were utilised to better understand the geological conditions on site. The BGS sources provide information relating to the superficial and bedrock geology as well as a brief description of the associated units and structural geological features in the area.

2.2.1. Superficial Geology

BGS shows varying superficial deposits at surface level across much of the Site. Quaternary peat blankets most of the Site, in a north-easterly trend along the centre of the Site and towards the eastern extent of the Site, where the topography begins to plateau surrounding the hill lochs. Towards the south/south-west of the Site, Glacial Till becomes more prevalent comprising undifferentiated till and hummocky ice-contact glacial deposits. The north-

[1] British Geological Survey (BGS) GeoIndex map viewer: https://www.mapapps2.bgs.ac.uk/geoindex/home.html
[2] British Geological Survey (BGS) Lexicon of Named Rock Units: https://webapps.bgs.ac.uk/lexicon/home.cfm?_ga=2.91227930.1282065189.1618233122-792810342.1582906720
[3] British Geological Survey, 2000, Lairg, Scotland Sheet 102E, Solid and Drift Geology, 1:50k Provisional Series.

western extent of the Site hosts no superficial deposits except for small amounts of peat in places. This suggests that bedrock is at or near surface level at these locations. Glacial till is anticipated beneath the peat where topographical lows are encountered. Alluvium deposits, comprising of clay, silt, sand and gravel are found within the valley basin that hosts the River Cassley, which borders the Site to the west, and in stream beds located across the Site.

Superficial material thickness would be confirmed once ground investigation works have been conducted, prior to construction.

The BGS mapped superficial geology for the Site has been included within Figure 11.1.2: Superficial Geology.

2.2.2. Solid Geology

BGS depicts the Site geology to be consistent across the entirety of the study area. The Site geology is pertinent to the Altnaharra Psammite Formation, a rock formed by low grade metamorphism. BGS lexicon infers the unit as being: *"Siliceous Psammite and micaceous Psammite; generally grey to buff. Medium-fine grained, but locally gritty or pebbly (clast size up to 30 mm) layers, especially lower down in the stratigraphy. Locally Pelite or Semipelite layers up to a few metres thick; these increase in abundance upwards in the formation. Commonly deformed, then with flaggy structure. Where un-deformed, locally well-preserved sedimentary structures that include planar crossbedding, trough crossbedding, channels and abundant soft-sediment deformation structures, e.g. water escape structures and slump folds. Bed thickness where un-deformed ranges from 0.2 to 4 m thick."* The Altnaharra Formation is thought to be deposited un-conformably upon the Lewisian Gneiss Complex.

Leucogranite igneous plutons are shown on the BGS maps to outcrop between the boundary of the proposed Site and the A839 towards the south-east and therefore may be encountered beneath the Psammite.

The mapped solid geology of the Site has been included within Figure 11.1.3: Solid Geology.

2.2.3. Structural Geology

Due to the regional bedrock geology being metamorphosed, the general bedding dip is difficult to distinguish across the Site as the units are heavily foliated. The study area is located within the confines of a thrust belt, developing as an imbricated fan across the north of Scotland in a south-east to north-westerly orientation.

BGS mapping indicates there to be minor faulting running parallel to the River Cassley, within the river valley's eastern side slopes. A significant fault has been recorded along the bed of Allt Bad an t-Sagairt, a minor tributary to the River Cassley situated to the north of the Site.

No fault lines are shown to be located on Site, however there may be faults encountered at depth.

2.2.4. Hydrogeology

The BGS GeoIndex was consulted in order to obtain information on the underlying aquifers and expected groundwater conditions.

According to the online BGS geohydrology mapping tool, the Site is underlain by the Morar Group which has been classified as a low productive aquifer. It is indicated that there may be small amounts of groundwater in near surface weathered zones and secondary fractures.

3. Borrow Pit Potential

3.1. Appraisal

A site walkover survey was conducted in 2020 by a Tony Gee geologist during the first and third phases of peat probing. Potential borrow pit locations were inspected visually with a view to assess ground conditions and help determine the borrow pits suitability for use during construction of the Proposed Development.

In exploring the five potential borrow pit locations, as defined in Figure 11.1.1: Site Layout consideration has been given with regards to the practical aspects of each borrow pit. The main aspects to consider are as follows:

- Ease of access;
- Rock type;
- Overburden Thickness;
- Gradient of surrounding hillsides;
- Proximity to construction activities;
- Visual impact; and
- Impact on environmentally sensitive areas.

Anticipated aggregate volumes along with indicative cross-sections through each proposed borrow pit have been included within Figure 11.1.4a-11.1.4e: Borrow Pit Cross-Sections.

It should be noted that no intrusive ground investigations have been undertaken at borrow pit locations other than peat probing. A site-specific ground investigation would be conducted as the project enters detailed design stage to confirm any assumptions made regarding ground conditions, soil parameters and suitability of all site won materials.

One borrow pit location is within the pre-existing Achany Wind Farm site (BP1) and has been identified as having potential to be re-opened to extract further material for use during construction. This will prove beneficial as access tracks have already been established to this location. The rock types identified at the borrow pit locations include Psammite, Semi-Pelite and Pelite. Towards the south of the Site, within the pre-existing borrow pit on Achany Wind Farm, Leucogranite and Gneiss may be encountered, however the vast majority of the rock is anticipated to comprise Psammite and Pelite.

These rock types have been assumed for the borrow pits where there were no rock exposures at the surface. The geology encountered on site is supported by BGS geological maps for the Site. Dimensions of the borrow pits, volume of superficial material to be

removed and volumes of site won rock for each borrow pit have been estimated based on cross-sections developed through a digital terrain model. These are required to be confirmed by future intrusive ground investigation works.

It has been estimated that approximately 250,000m^3 of suitable quality rock is required during construction of the Proposed Development. This includes SHW classes 6F2, 6N/ 6P and concrete aggregate. If rock quality is not suitable for each of these engineered materials then there may be a requirement for imported materials.

Detailed within Table 1 are the five potential borrow pit locations. Photo's 1 to 5 include pictures of the proposed borrow pits approximate location which were taking during the initial site walkover.

Table 1. Summary of Borrow Pit Locations.

BP No.	Location	Average Peat Thickness (m)	Percentage of estimated total earthworks fill available (%)	Geology	Environmental Considerations
BP1	South of site within pre-existing Achany wind farm. BP partially used during this development.	0.87m	up to 100%	Interbedded Psammite, Semi-Pelite and Pelite	BP 1 would be located 60m north-west of a stream at its nearest point and infringes on a forest, although it is not anticipated that any felling would be required. No rock outcrops are present. The potential BP location is located on the site of an old BP comprising primarily reclaimed/ disturbed ground grading into blanket bog and marshy grassland. The potential BP would be located within an area of class 2 and class 5 peatland.
BP2	Adjacent to Turbine 20 to the south of the turbine cluster.	0.94m	up to 100%		BP2 would be located 200m east and 90m north of two small streams which contribute to draining the main drainage basin on site. No rock outcrops are present within the potential BP site. The potential BP

BP No.	Location	Average Peat Thickness (m)	Percentage of estimated total earthworks fill available (%)	Geology	Environmental Considerations
					location comprises of wet heath and blanket bog. The potential BP is located in an area which largely comprises of class 1 peatland, with a small area of class 2 peatland along the eastern boundary of the BP.
BP3	Located between Turbine 10 and 11 towards the centre of the Site within a south facing hill side.	0.41m	up to 100%		BP3 would be located 150m south-west of peat marshland which is situated along the eastern extents of the Site. Rocks outcrop at surface in places across this potential BP location, with wet heath in between outcrops. Smaller areas of blanket bog and dry heath are also present. The potential BP would be located within an area of class 1 peatland.
BP4	At the end of the track from Turbine 7 within the northern flank of Carn nam Bo Maola.	0.45m	up to 100%		BP4 would be located in the flank of a named hill, within an area of class 1 and class 2 peatland. Peat thickness is expected to be minimal due to rock head being relatively shallow, as highlighted by the frequent rock outcrops in the vicinity. The potential BP location is comprised of wet heath and blanket bog.
BP5	At the north of the Site near	0.42m	up to 100%		BP5 would not be located near any streams.

BP No.	Location	Average Peat Thickness (m)	Percentage of estimated total earthworks fill available (%)	Geology	Environmental Considerations
	Turbine 2 within the lower flank of Beinn Sgeireach before the ground rises up towards Carn nam Bo Maola.				Rock outcrops are present at this potential BP location, with wet heath habitat between outcrops. Smaller areas of blanket bog and marshy grassland are also present. The potential BP would be located within an area of class 2 peatland.

Photo 1. Picture taken towards the north over the proposed location of BP1 which was worked during the construction of the pre-existing Achany Wind Farm, which can be seen in the background.

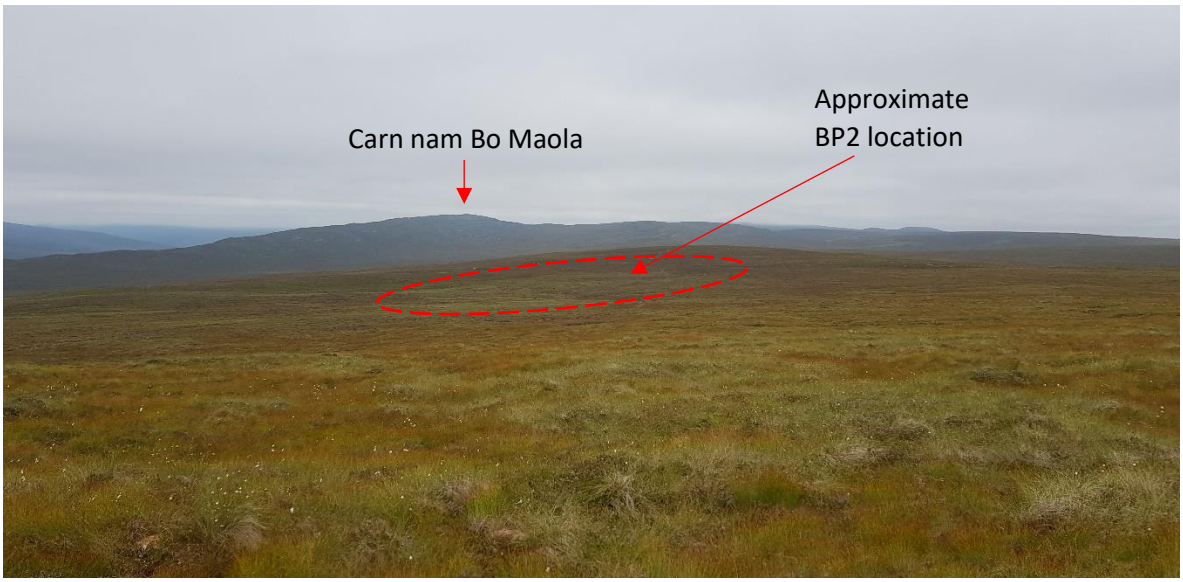


Photo 2. Picture taken towards the north-west from the southern end of the Site looking over BP2 in the foreground and Carn nam Bo Maola in the background.

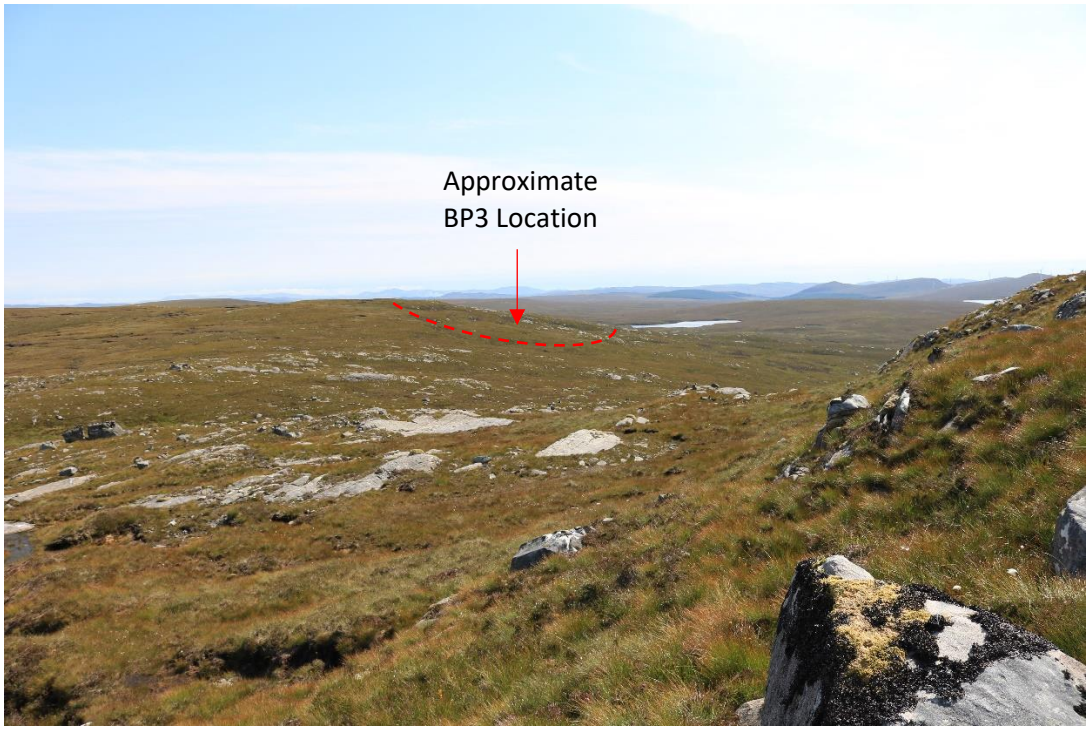


Photo 3. Picture taken towards the south-east of the Site from the eastern shoulder of Carn nam Bo Maola showing the approximate location of BP3.

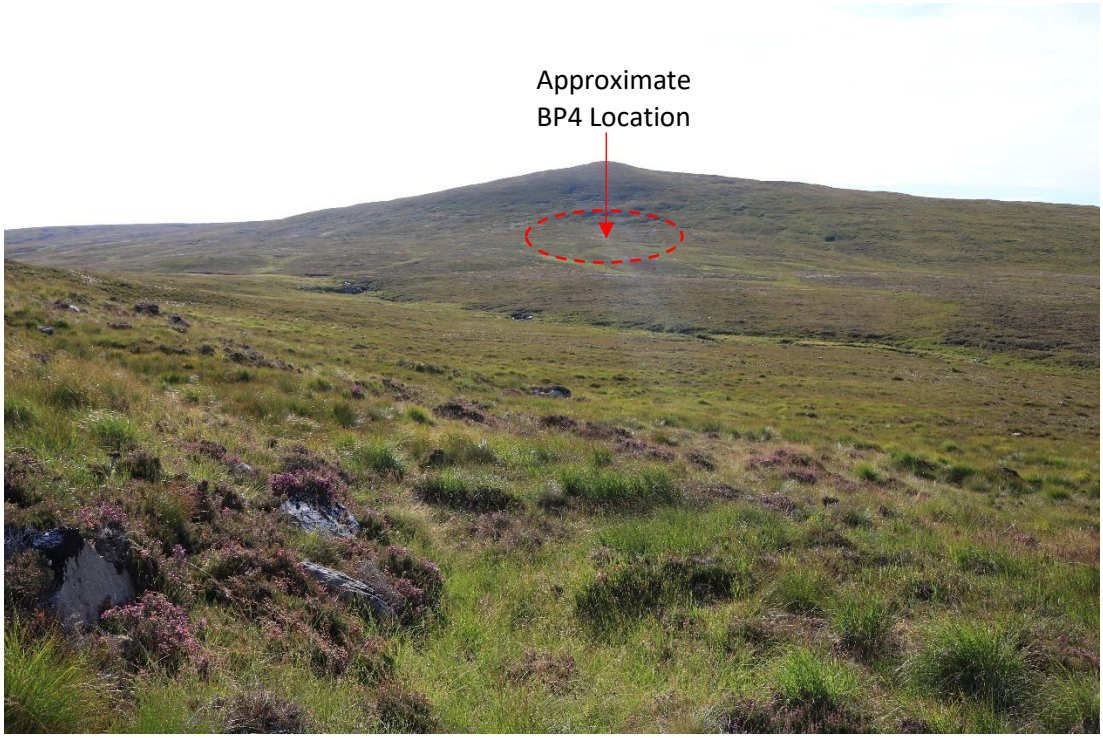


Photo 4. Picture taken towards the south-east from the north of the Site looking towards the northern flank of Carn nam Bo Maola where BP4 is located.

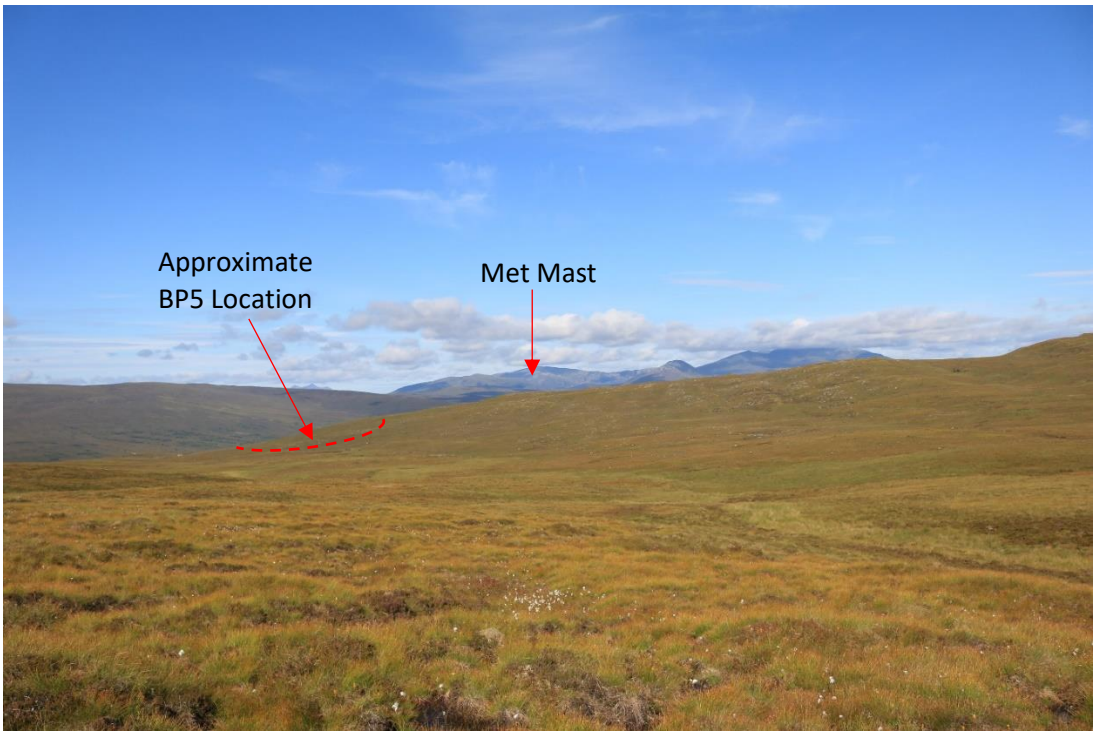


Photo 5. Photograph taken looking from the east to west within the northern section of the Site. Approximate BP5 located in the shoulder beneath the met mast.

Assuming a ground investigation was to prove that the rock encountered within every borrow pit location was of sufficient quality, BP1 and BP2 would be the two most favourable locations. Both locations do not present rock outcrops at the surface so there is a level of uncertainty with regards to the depth in which rock is encountered. However, both borrow pits are the two closest borrow pits to the south of the Site and subsequently the Site entrance allowing construction works to advance the wind farms infrastructure with material from these borrow pits. Additionally, a preliminary check, as highlighted in Table 1, indicates there to be enough rock volume within BP1 and BP2 to construct the entire wind farm. The volume of rock available is an estimation however as superficial cover cannot be determined at this stage in the project's development without intrusive GI information. Once a GI has been conducted, a more informed decision can be made regarding which of the Borrow Pits will be worked as not all Borrow Pit locations will be required during the construction of the Wind Farm.

The main benefit BP3, BP4 and BP5 have over BP1 and BP2 is that rock outcrops are at or near the surface at these locations and therefore recovering rock would be easier. BP3, BP4 and BP5 are located towards the northern half of the Site however and will therefore only be usable once construction activity extends from the south and past these locations meaning the borrow pits may only serve the northern half of the Site in providing engineered material.

3.2. Principles of Borrow Pit Design and Restoration

The technique of extracting rock from site may vary between borrow pit locations due to a variability in rock composition, the degree of weathering and fracture frequency/ orientation. A combination of digging, ripping and blasting may be required as a means of extracting rock from the borrow pits, followed by treating the rock to the specified engineering criteria. Site won soils should be separated based on distinct material changes and properties and stored separately for reinstatement.

When developing a borrow pit, caution should be taken to not destabilise any peat located adjacent to the borrow pit. The peat management plan should be abided by at all times to control the safe treatment of peat on site. The design of drainage, both temporary and permanent, will be required as part of the borrow pit design.

In order to maintain excavated rock face stability and prevent superficial material failing and slipping into the borrow pit, borrow pit design should take groundwater ingress and surface run off into consideration. Subsequently, drainage should be allowed for at each borrow pit location if the GI identifies groundwater or if the borrow pit is excavated into a hillside where there is an increased risk of superficial material slipping.

Borrow pits should be opened up and utilised only when rock extraction is required and should be restored following completion of extraction works. Reinstatement options may include complete, partial and minimal reinstatement based on site specific conditions and under the direction of an Ecological Clerk of Works.

For the purpose of restoration, peat may be re-used within borrow pits, providing that the method of re-use and final restoration profile are consistent with the habitat, meets environmental reinstatement objectives / requirements and prevents harm to human health or risk of pollution to the environment, as per SEPA's requirements.[4] The re-use of peat requirements will be provided in the Construction Environmental Management Plan (CEMP), which is outlined within Technical Appendix 3.1 Outline CEMP.

4. Conclusions and Recommendations

4.1. Conclusions

The quality of rock anticipated on site is inferred from a visual assessment of rock outcrops and published information. An intrusive ground investigation, sampling and material laboratory testing will be required to confirm ground conditions on site.

4.1.1. Quality and Rock Type Properties

In general, Psammite is the dominant rock type and is interbedded with Semi-pelite and Pelite. Where interbedded units are located, additional processing may be required to separate out the borrow pit material for different uses during construction.

Psammite

Psammite is a metasedimentary sandstone predominantly composed of quartz, feldspars and mica. Due to its abundance in quartz, Psammite has the potential to be strong to extremely strong. Psammite is therefore considered to be a potentially suitable rock for construction. The mica content will need to be explored during a ground investigation. Psammite with a high mica content would not be considered acceptable as a capping material due to possible weathering down to clay-based minerals such as smectite and vermiculite.

Semi-pelite

Semi-pelite is a metasedimentary fine-grained rock, derived from siltstone or mudstone and predominantly comprises of quartz, feldspars, micas and aluminous minerals. Semi-pelite is a potentially suitable rock for the construction of the majority of the proposed wind farm infrastructure however, due to its potentially argillaceous , its use in construction may be limited to general fill. Laboratory testing will be required to assess suitability. Where semi-pelite is micaceous, this would not be considered suitable for use as a capping material.

Pelite

Pelite is a metasedimentary fine-grained rock, such mudstone, and predominantly comprises of feldspars, micas and aluminous minerals with a lower quartz content than Psammite and Semi-pelite. Subsequently pelite may be less favourable as a construction material due to an abundance in mica and other clay minerals, limiting this material to a general fill. Laboratory

[4] Scottish Renewables & SEPA, Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste, January 2012

testing will be required to assess suitability. Pelite is argillaceous in nature and should therefore is limited to a general fill material and may not be suitable as a class 6 fill.

4.1.2. Limitations

It should be noted that the actual locations and extents of extraction within each borrow pit may change during the project development i.e. following a detailed intrusive ground investigation at the proposed borrow pit locations.

The volumes of each potential borrow pit may vary, depending on:

- Natural variations in rock quality;
- The presence and depth of weathered zones;
- Thickness of overburden;
- Access constraints to borrow pits;
- Environmental constraints; and
- Methods of excavation.

Rock outcrops were located across topographic highs. Borrow pit locations were selected based on rock exposure, geological desk-based review and their previous use where borrow pits are to be re-opened for working.

4.2. Summary

From the information gathered, it is concluded that:

- A total of 5 No. borrow pit search areas have been identified within the Site and have been assessed for use during construction of the Proposed Development.
- The prominent rock types that are anticipated from the borrow pits are Psammite, Semi-pelite and Pelite with Psammite being the dominant rock type.
- Rock only outcrops at BP5 and BP3 however BP4 is located within the flanks of a hill which features abundant rocky outcrops at the crest of the hill and rockhead is therefore anticipated at shallow depths. The locations of BP1 and BP2 were chosen due to the favourable location within the development, towards the southern end of the Site where the proposed Achany Wind Farm Extension will extend from during construction.
- Peat thickness at each borrow pit location is expected to vary from 0.42m to 0.94m thick. Pockets of deep peat cannot be discounted at these locations.
- Superficial material thickness is expected to vary at each borrow pit location but cannot yet be quantified at this stage prior to ground investigation works.
- The site won Psammite, at this stage in development, is considered a suitable source of rock aggregate which could be used for surfacing and as an upfill material. Psammite may be suitable for use as concrete aggregate but this is subject to geochemical laboratory testing. Semi-pelite and Pelite may be suitable for use as general fill but will require additional re-use testing to establish both rock types susceptibility to weathering.

- Weathering of rock and potential faulting, causing sheared/ weathered zones at depth, will impact the geotechnical properties and potential for re-use during construction. Unsuitable material will require managing and excavations may need to extend deeper to where rock is more intact and of sufficient quality.
- A ground investigation is required to determine the suitability and extents of the rock at each borrow pit location. This will aid in providing a better understanding of suitable rock volumes available for extraction. It was previously highlighted that approximately 250,000m^3 of site won rock is required in order to construct the proposed wind farm and therefore not all five borrow pit locations will be required. Five locations have instead been suggested as proposed search areas due to the potential for unsuitable rock being encountered during the ground investigation.
- If suitable rock is encountered in all five proposed borrow pit locations, the order of favourability in terms of developing each borrow pit is as follows: BP1, BP2, BP3, BP5, BP4.

4.3. Recommendations

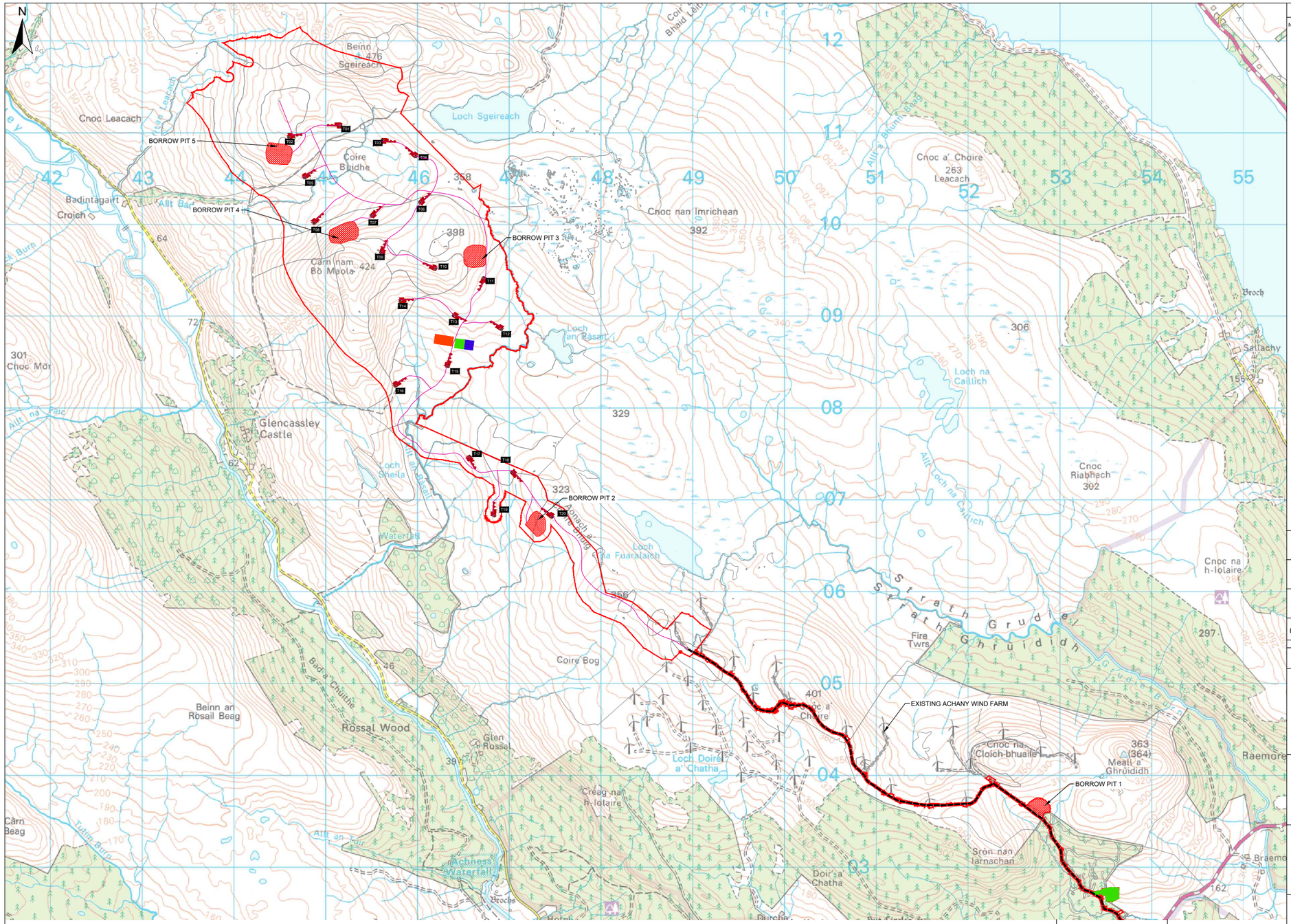
Prior to any further judgement being made regarding the quality and quantity of site won rock at each borrow pit location, an intrusive ground investigation is required.

The ground investigation should comprise of cable percussive with rotary follow-on boreholes in addition to trial pits to help determine the depth of superficial material and weathered rock.

Point load testing and uniaxial compressive strength testing should be conducted on samples of rock to help determine the strength of the rock and the excavational method required in order to recover the rock. Re-use testing such as aggregate crushing, Los Angeles coefficient and magnesium sulphate soundness tests should also be carried out on samples to establish material reusability.

Consideration should be given to the stability of the slopes formed during the development of the borrow pits, particularly in fractured/ weathered rock and overlying superficial material around the perimeter of the borrow pit. Additional testing of the superficial material at each borrow pit location is therefore advised to establish safe slope angles.

A geotechnical engineer should inspect the borrow pit during construction to ensure the excavation's overall stability and confirm depth to competent rock.



SITE LAYOUT

SCALE 1:20000

400m 0m 400m 800m 1200m 1600m 2000m

SCALE 1:20000

DO NOT SCALE FROM THIS DRAWING

NOTES

LEGEND:-

- SITE BOUNDARY
- TURBINE LOCATIONS
- LIDAR
- PROPOSED TRACK
- CRANE HARDSTANDING
- BORROW PITS
- TEMPORARY CONSTRUCTION COMPOUND, SECURITY, STORAGE AND BATCHING PLANT
- EXTENSION TO EXISTING OPERATIONS BUILDING
- SUBSTATION, WELFARE FACILITY AND STORE
- TEMPORARY CONSTRUCTION COMPOUND, SECURITY AND STORAGE

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P03	LQ	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P02	KM	KMcG	KMcG	25.05.21	LAYOUT UPDATED
P01	LQ	KMcG	KMcG	09.04.21	FIRST ISSUE

CODE	DRAWING STATUS
S2	FOR INFORMATION

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ON BEHALF OF

sse Renewables

ACHANY EXTENSION WIND FARM

FIGURE 11.1.1: SITE LAYOUT

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

DRAWING. No.
S119052-TG-XX-XX-DR-C-0001

DRAWN : LQ	DESIGNED : LR	REVISION
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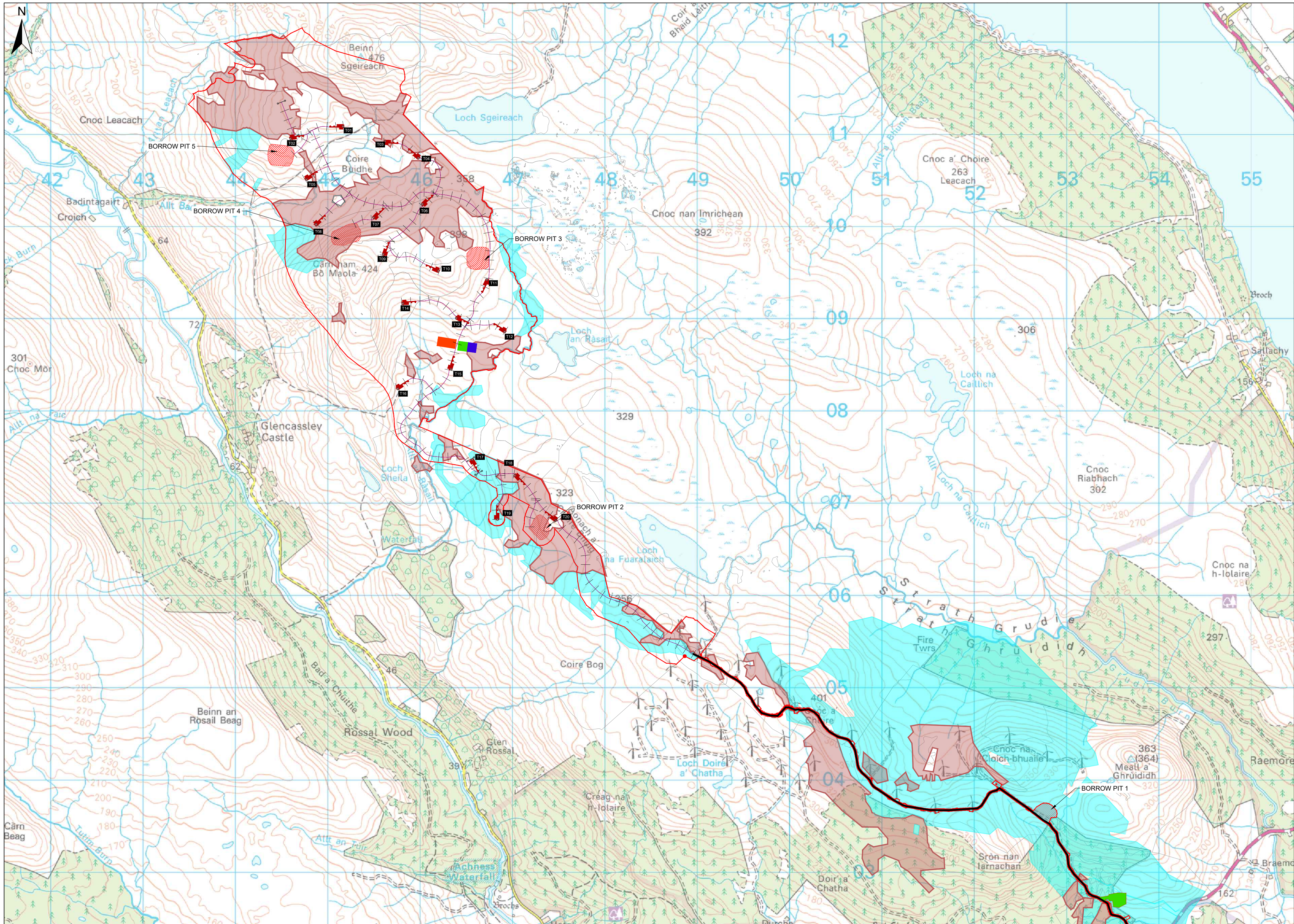

DO NOT SCALE FROM THIS DRAWING

NOTES

1. CHAINAGE TICK LINES ALONG ACCESS TRACK ARE AT 100m CENTRES.

LEGEND:

- SITE BOUNDARY
- TURBINE LOCATIONS
- LIDAR
- PROPOSED TRACK
- CRANE HARDSTANDING
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- EXTENSION TO EXISTING OPERATIONS BUILDING
- SUBSTATION, WELFARE FACILITY AND STORE
- TEMPORARY CONSTRUCTION COMPOUND, SECURITY AND STORAGE

GEOLOGY LEGEND:-

- GLACIAL TILL
- PEAT

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P02	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P01	LQ	KMcG	KMcG	28.04.21	FIRST ISSUE

CODE	DRAWING STATUS
S2	FOR INFORMATION

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ACHANY EXTENSION WIND FARM

FIGURE 11.1.2: DRIFT GEOLOGY

SHEET 1 OF 1

DRAWING. No. S119052-TG-XX-XX-DR-C-0002

DRAWN : LQ | DESIGNED : LR | REVISION P02

SCALE : 1:20000 | ORIGINAL SIZE : A1

SOURCE OF INFORMATION: BGS

DRIFT GEOLOGY

SCALE 1:20000

400m 0m 400m 800m 1200m 1600m 2000m
SCALE 1:20000

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

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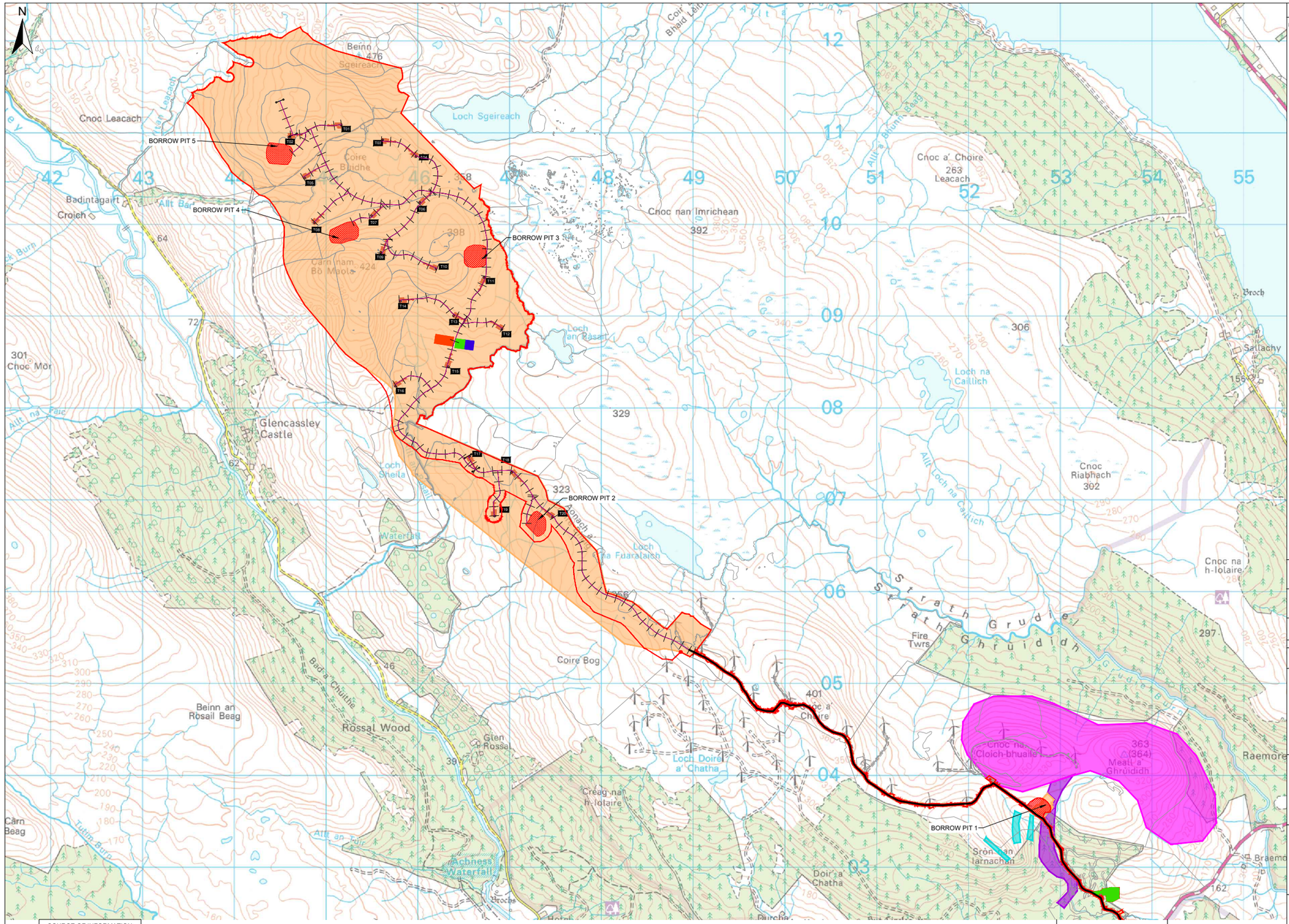

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- TEMPORARY CONSTRUCTION COMPOUND, SECURITY, STORAGE AND BATCHING PLANT
- EXTENSION TO EXISTING OPERATIONS BUILDING
- SUBSTATION, WELFARE FACILITY AND STORE
- TEMPORARY CONSTRUCTION COMPOUND, SECURITY AND STORAGE

GEOLOGY LEGEND:-

- ALTNAHARRA PSAMMITE FORMATION - PSAMMITE, SEMI-PELITE, PELITE
- GRUGIE PLUTON - LEUCOGRANITE
- LEWISIANOID GNEISS COMPLEX - ORTHOGNEISS, MAFIC
- LEWISIANOID GNEISS COMPLEX - ORTHOGNEISS

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P02	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P01	LQ	KMcG	KMcG	25.05.21	FIRST ISSUE

CODE	DRAWING STATUS
S2	FOR INFORMATION

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FIGURE 11.1.3: SOLID GEOLOGY

SHEET 1 OF 1

SOURCE OF INFORMATION: BGS

400m 0m 400m 800m 1200m 1600m 2000m

SCALE 1:20000

SOLID GEOLOGY

SCALE 1:20000

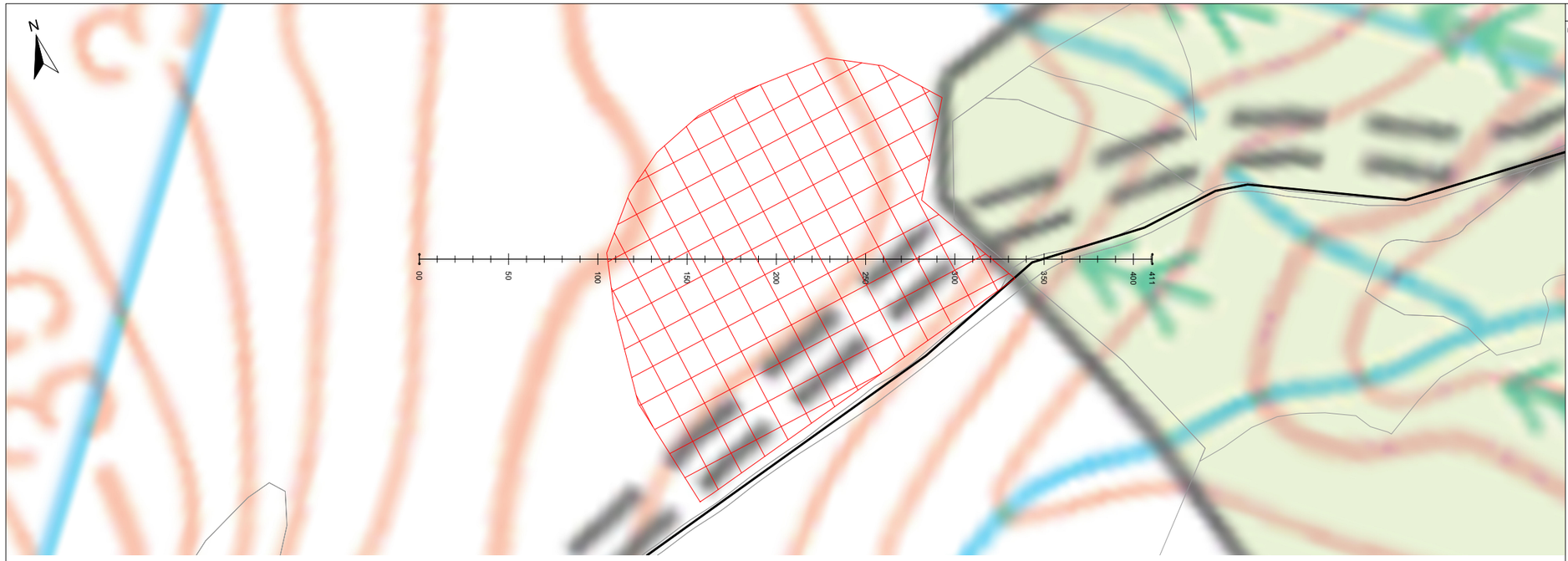
RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

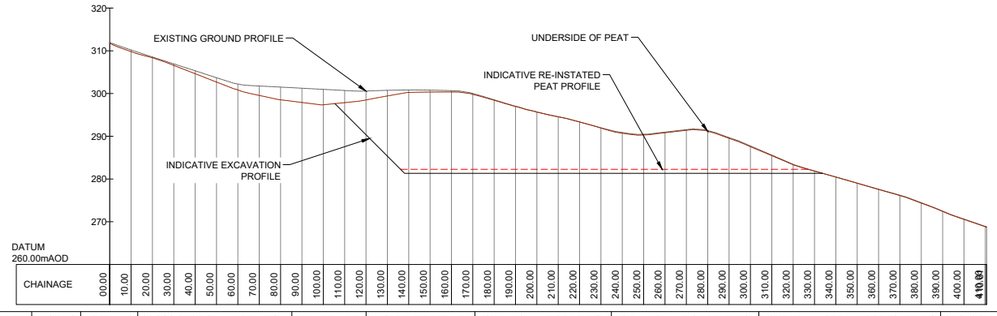
DRAWING. No. S119052-TG-XX-XX-DR-C-0003

DRAWN : LQ	DESIGNED : LR	REVISION
SCALE : 1:20000	ORIGINAL SIZE : A1	P02



BORROW PIT 1

SCALE 1:1250



BORROW PIT	EASTING	NORTHING	CROSS SECTIONAL AREA (m²)	BP WIDTH (m)	AVG. PEAT DEPTH (m)	TOTAL VOLUME OF BP (m³)	TOTAL VOLUME OF PEAT (m³)	POTENTIAL USEFUL AGGREGATE (m³)	GEOLOGY
BP1	251014	903735	5034	180	0.87	906043	29446	876597	ALTNAHARRA PSAMMITE FORMATION

BORROW PIT 1 VERTICAL 06

Scale: H 1:1250,V 1:625. Datum: 260.000

25m 0 25m 50m 75m 100m 125m

SCALE 1:1250

DO NOT SCALE FROM THIS DRAWING

NOTES

1. ALL DIMENSIONS ARE APPROXIMATE
2. THE BORROW PIT AREA SHOWN IS A SEARCH AREA, ACTUAL DIMENSIONS WILL DEPEND ON CONFIRMATION OF MATERIAL REQUIREMENTS AND GROUND INVESTIGATION.
3. THE PROPOSED WIND FARM LAYOUT INCLUDING BORROW PIT LOCATIONS, ARE INCLUDED WITHIN DRAWING S119052-TG-XX-XX-DR-C-0001.

LEGEND:-

BORROW PITS

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P03	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P02	KM	KMcG	KMcG	25.05.21	LAYOUT UPDATED
P01	LQ	KMcG	KMcG	28.04.21	FIRST ISSUE

CODE	DRAWING STATUS
S2	FOR INFORMATION

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

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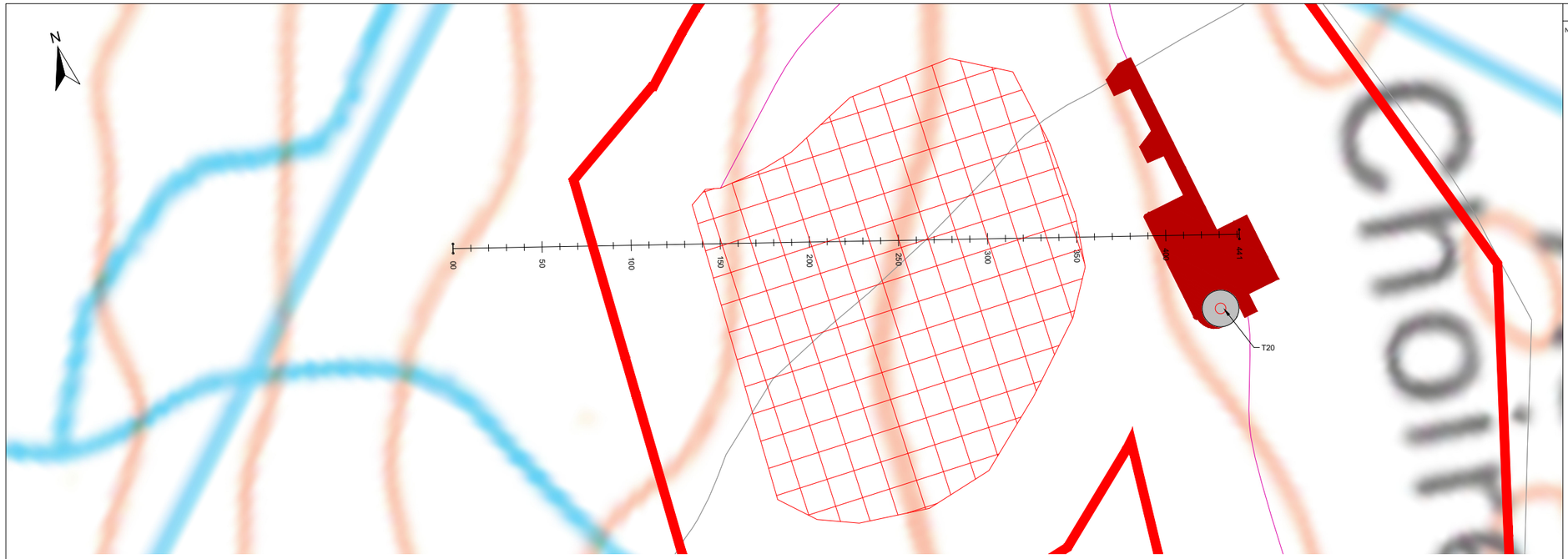
FIGURE 11.1.4a: BORROW PIT 1

DRAWING. No.

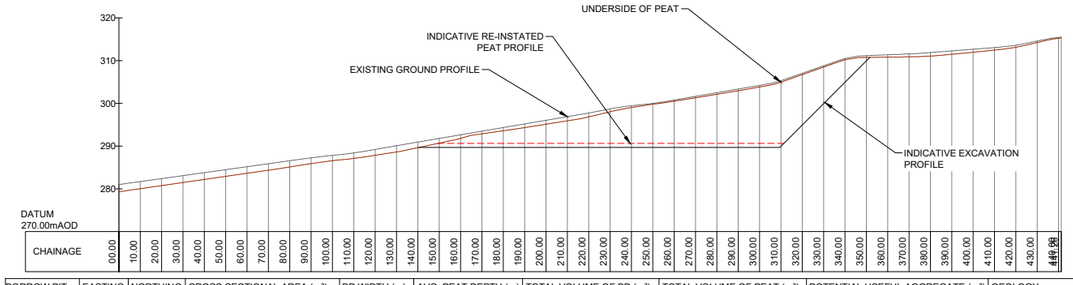
S119052-TG-XX-XX-DR-C-0004

DRAWN : LQ	DESIGNED : LR	REVISION
SCALE : 1:1250	ORIGINAL SIZE : A1	P03



BORROW PIT 2

SCALE 1:1250



BORROW PIT	EASTING	NORTHING	CROSS SECTIONAL AREA (m²)	BP WIDTH (m)	AVG. PEAT DEPTH (m)	TOTAL VOLUME OF BP (m³)	TOTAL VOLUME OF PEAT (m³)	POTENTIAL USEFUL AGGREGATE (m³)	GEOLOGY
BP2	247300	906734	3300	190	0.94	626963	37702	589262	ALTNAHARRA PSAMMITE FORMATION

BORROW PIT 2 VERTICAL 05
Scale: H 1:1250,V 1:625. Datum: 270.000

25m 0 25m 50m 75m 100m 125m
SCALE 1:1250

DO NOT SCALE FROM THIS DRAWING

NOTES

1. ALL DIMENSIONS ARE APPROXIMATE
2. THE BORROW PIT AREA SHOWN IS A SEARCH AREA, ACTUAL DIMENSIONS WILL DEPEND ON CONFIRMATION OF MATERIAL REQUIREMENTS AND GROUND INVESTIGATION.
3. THE PROPOSED WIND FARM LAYOUT INCLUDING BORROW PIT LOCATIONS, ARE INCLUDED WITHIN DRAWING S119052-TG-XX-XX-DR-C-0001.

LEGEND:-

- BORROW PITS
- TURBINE LOCATIONS
- CRANE HARDSTANDING

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P03	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P02	KM	KMcG	KMcG	25.05.21	LAYOUT UPDATED
P01	LQ	KMcG	KMcG	08.04.21	FIRST ISSUE

CODE	DRAWING STATUS
S2	FOR INFORMATION

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

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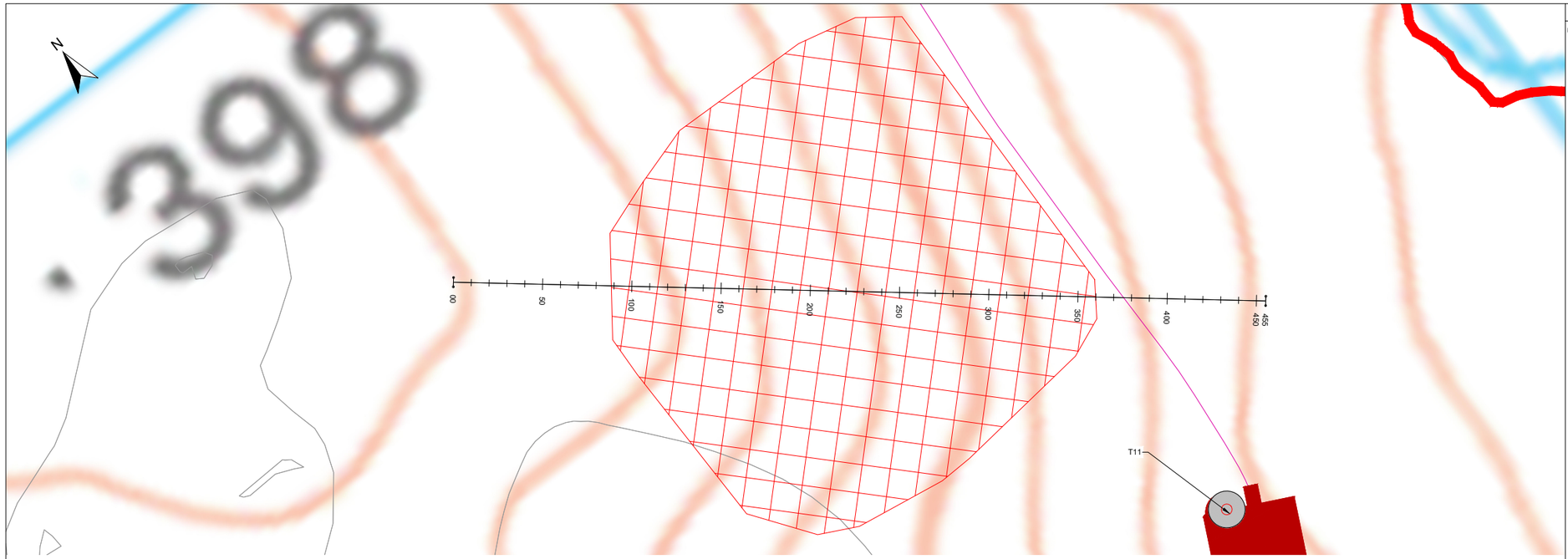
FIGURE 11.1.4b:
BORROW PIT 2

SHEET 1 OF 1

DRAWING. No.
S119052-TG-XX-XX-DR-C-0005

DRAWN : LQ	DESIGNED : LR	REVISION
SCALE : 1:1250	ORIGINAL SIZE : A1	P03



BORROW PIT 3

SCALE 1:1250

BORROW PIT	EASTING	NORTHING	CROSS SECTIONAL AREA (m²)	BP WIDTH (m)	AVG. PEAT DEPTH (m)	TOTAL VOLUME OF BP (m³)	TOTAL VOLUME OF PEAT (m³)	POTENTIAL USEFUL AGGREGATE (m³)	GEOLOGY
BP3	246628	909659	8512	285	0.41	242835	21493	2404342	ALTNAHARRA PSAMMITE FORMATION

BORROW PIT 3 VERTICAL 04
Scale: H 1:1250,V 1:625. Datum: 305.000

DO NOT SCALE FROM THIS DRAWING

NOTES

1. ALL DIMENSIONS ARE APPROXIMATE
2. THE BORROW PIT AREA SHOWN IS A SEARCH AREA, ACTUAL DIMENSIONS WILL DEPEND ON CONFIRMATION OF MATERIAL REQUIREMENTS AND GROUND INVESTIGATION.
3. THE PROPOSED WIND FARM LAYOUT INCLUDING BORROW PIT LOCATIONS, ARE INCLUDED WITHIN DRAWING S119052-TG-XX-XX-DR-C-0001.

LEGEND:-

- BORROW PITS
- TURBINE LOCATIONS
- CRANE HARDSTANDING

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P03	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P02	KM	KMcG	KMcG	25.05.21	LAYOUT UPDATED
P01	LQ	KMcG	KMcG	28.04.21	FIRST ISSUE

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FIGURE 11.1.4c:
BORROW PIT 3

SHEET 1 OF 1

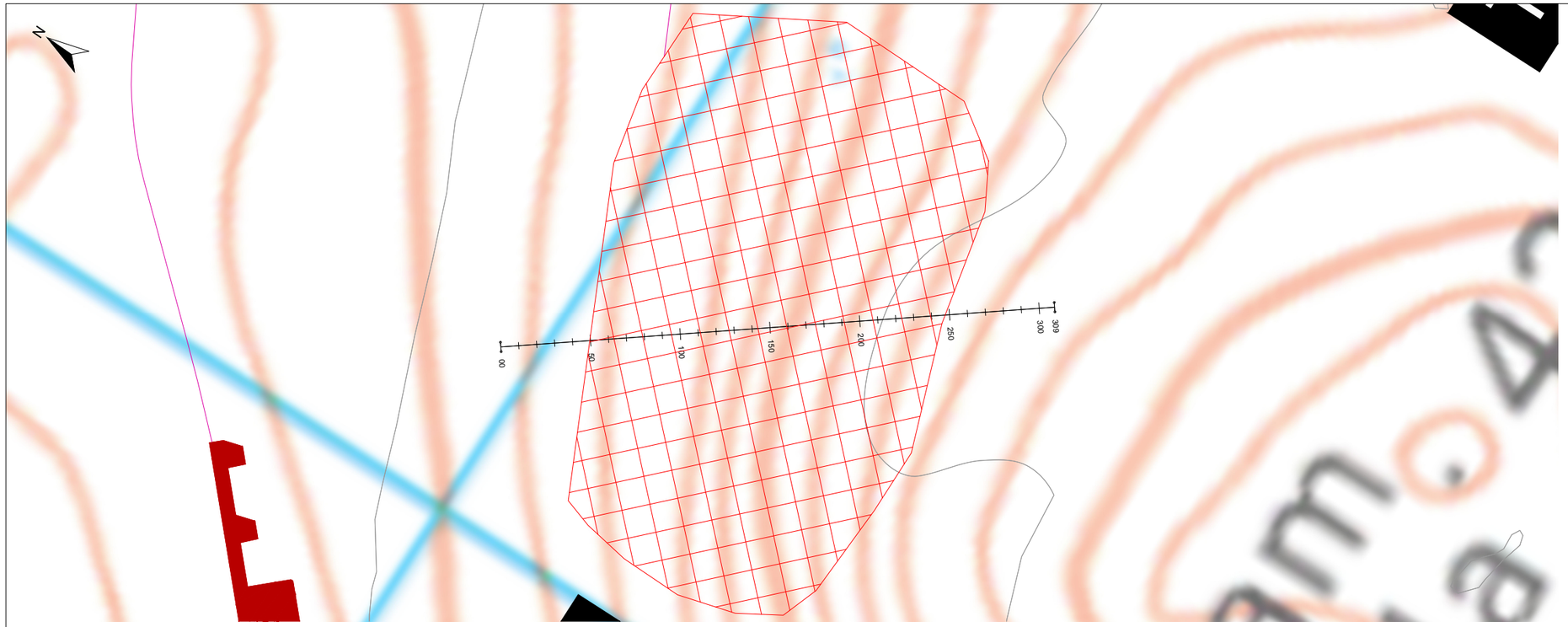
RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

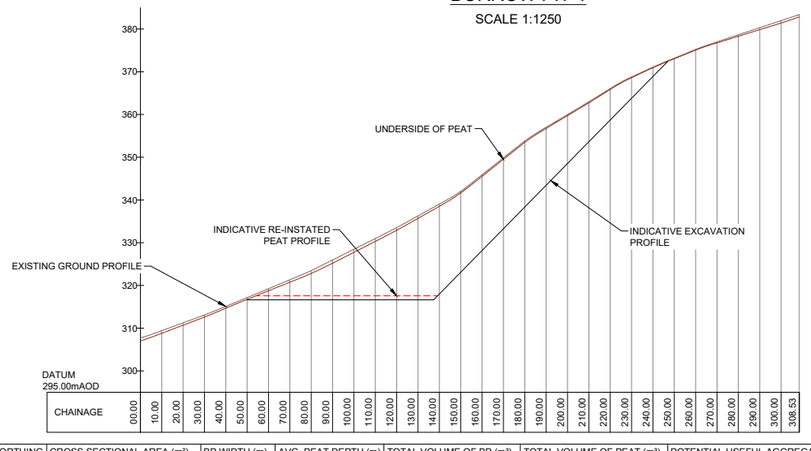
DRAWING. No.
S119052-TG-XX-XX-DR-C-0006

DRAWN : LQ	DESIGNED : LR	REVISION
SCALE : 1:1250	ORIGINAL SIZE : A1	P03



BORROW PIT 4

SCALE 1:1250



BORROW PIT	EASTING	NORTHING	CROSS SECTIONAL AREA (m²)	BP WIDTH (m)	AVG. PEAT DEPTH (m)	TOTAL VOLUME OF BP (m³)	TOTAL VOLUME OF PEAT (m³)	POTENTIAL USEFUL AGGREGATE (m³)	GEOLOGY
BP4	245192	909909	4336	338	0.45	1465639	25520	1440119	ALTNAHARRA PSAMMITE FORMATION

BORROW PIT 4 VERTICAL 03
Scale: H 1:1250.V 1:625. Datum: 295.000

25m 0 25m 50m 75m 100m 125m
SCALE 1:1250

DO NOT SCALE FROM THIS DRAWING

NOTES

1. ALL DIMENSIONS ARE APPROXIMATE
2. THE BORROW PIT AREA SHOWN IS A SEARCH AREA, ACTUAL DIMENSIONS WILL DEPEND ON CONFIRMATION OF MATERIAL REQUIREMENTS AND GROUND INVESTIGATION.
3. THE PROPOSED WIND FARM LAYOUT INCLUDING BORROW PIT LOCATIONS, ARE INCLUDED WITHIN DRAWING S119052-TG-XX-XX-DR-C-0001.

LEGEND:-

BORROW PITS

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P03	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P02	KM	KMcG	KMcG	25.05.21	LAYOUT UPDATED
P01	LQ	KMcG	KMcG	28.04.21	FIRST ISSUE

CODE	DRAWING STATUS
S2	FOR INFORMATION

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

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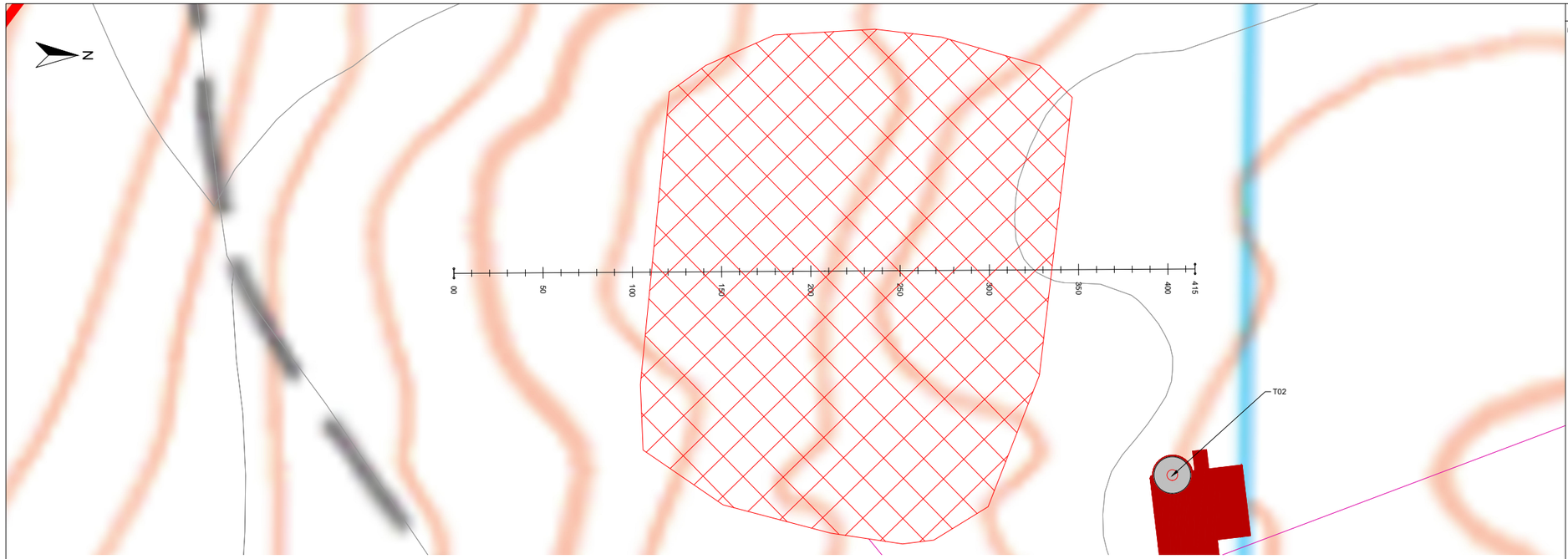
FIGURE 11.1.4d: BORROW PIT 4

SHEET 1 OF 1

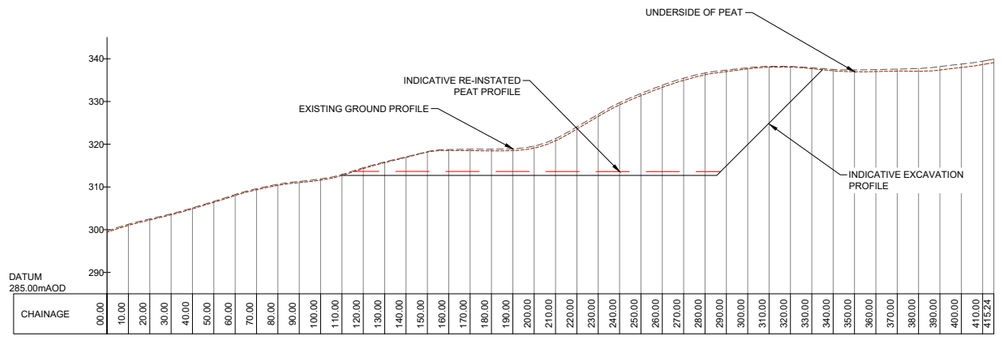
DRAWING. No.
S119052-TG-XX-XX-DR-C-0007

DRAWN : LQ	DESIGNED : LR	REVISION
SCALE : 1:20000	ORIGINAL SIZE : A1	P03



BORROW PIT 5

SCALE 1:1250



BORROW PIT	EASTING	NORTHING	CROSS SECTIONAL AREA (m²)	BP WIDTH (m)	AVG. PEAT DEPTH (m)	TOTAL VOLUME OF BP (m³)	TOTAL VOLUME OF PEAT (m³)	POTENTIAL USEFUL AGGREGATE (m³)	GEOLOGY
BP5	244485	910769	4839	286	0.42	1384013	23946	1360067	ALTNAHARRA PSAMMITE FORMATION

BORROW PIT 5 VERTICAL 02

Scale: H 1:1250,V 1:625. Datum: 285.000

25m 0 25m 50m 75m 100m 125m

SCALE 1:1250

DO NOT SCALE FROM THIS DRAWING

NOTES

1. ALL DIMENSIONS ARE APPROXIMATE
2. THE BORROW PIT AREA SHOWN IS A SEARCH AREA, ACTUAL DIMENSIONS WILL DEPEND ON CONFIRMATION OF MATERIAL REQUIREMENTS AND GROUND INVESTIGATION.
3. THE PROPOSED WIND FARM LAYOUT INCLUDING BORROW PIT LOCATIONS, ARE INCLUDED WITHIN DRAWING S119052-TG-XX-XX-DR-C-0001.

LEGEND:-

- BORROW PITS
- TURBINE LOCATIONS
- PROPOSED TRACK
- CRANE HARDSTANDING

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P03	KM	KMcG	KMcG	21.06.21	UPDATED AS PER COMMENTS
P02	KM	KMcG	KMcG	25.05.21	LAYOUT UPDATED
P01	LQ	KMcG	KMcG	28.04.21	FIRST ISSUE

CODE	DRAWING STATUS
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FIGURE 11.1.4e: BORROW PIT 5

SHEET 1 OF 1

RESIDUAL HAZARD	SUGGESTED CONTROL MEASURE

SIGNIFICANT RESIDUAL HAZARDS

NOTE: The above hazards do not include every hazard or assumption, but identify significant residual construction hazards that are not likely to be obvious to a competent contractor and those that could be difficult to manage effectively. Refer also to the designer's risk documentation.

DRAWING. No.
S119052-TG-XX-XX-DR-C-0008

DRAWN : LQ	DESIGNED : LR	REVISION
SCALE : 1:1250	ORIGINAL SIZE : A1	P03