TECHNICAL APPENDIX 10.2: PEAT MANAGEMENT PLAN

Balmeanach Wind Farm

Prepared for: **Balmeanach Wind Farm Limited**

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BASIS OF REPORT

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1.0 Introduction

This Peat Management Plan (PMP) has been undertaken by SLR Consulting Ltd (SLR).

The Proposed Development is located on moorland approximately 3km to the south of the settlement of Edinbane, approximately 8km to the east of Dunvegan and approximately 7km to the north of Struan on the Isle of Skye (**Figure 10.2.1**). Access to the site would be via the existing Ben Aketil Wind Farm access track from the A850, and then south east via the consented Ben Sca Wind Farm site access track onto the hillside.

The Applicant is currently seeking planning permission for an onshore wind farm comprising ten wind turbines with associated infrastructure. The Proposed Development would include the following key components:

- ten wind turbines;
- one met mast;
- turbine foundations and hardstanding areas;
- onsite tracks with associated turning heads;
- underground cabling along access tracks;
- one onsite substation;
- up to four borrow pits;
- one construction compound; and
- associated ancillary works.

The site layout is detailed on **Figure 10.2.2**. For a full description of the Proposed Development, please refer to **Chapter 3: Description of the Development** (EIA Report, Volume 2).

1.1 Scope of Assessment

A comprehensive programme of soils and peat probing has been completed at the site, detailed within **Technical Appendix 10.1: Peat Landslide and Hazard Risk Assessment (PLHRA)**. This document uses this information and provides indicative volumes for peat extraction and outlines recommendations for the handling, re-use and storage of peat during construction and operation of the site. Areas of the site where soils are less than 0.5m thick are considered to be too thin to be classified as peat and are therefore classified as soils. The purpose of this report is to ensure that there has been a systematic consideration of peat management and a quantitative assessment throughout the development process.

This assessment should be read in conjunction with **Technical Appendix 10.1: Peat Landslide and Hazard Risk Assessment (PLHRA)** and the recommendations provided within.

1.2 Methodology

1.2.1 Requirements of National Planning Policy 4

The intent of Policy 5 (Soils) of National Planning Policy 4 (NPF4)[1] is "*to protect carbon rich soils, restore peatlands and minimise the disturbance of soils from development*".

The Policy states [5(a)] that development proposals should only be supported if they are designed and constructed:

1 Scottish Government (2023). https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2022/11/national-planning-framework-4-revised-draft/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4-revised-draft.pdf

- in accordance with the mitigation hierarchy by first avoiding and then minimising the amount of disturbance to soils on undeveloped land; and
- in a manner that protects soils from damage including from compaction and erosion, and that minimises soils sealing.

Further [5(c)] confirms that development proposals on peatland, carbon rich soils, and priority peatland will only be supported the following is proposed:

- essential infrastructure and there is a specific locational need and no other suitable site;
- the generation of energy from renewable sources that optimises the contribution of the area to greenhouse gas emissions reductions targets;
- small-scale development directly linked to a rural business, farm or croft;
- supporting a fragile community in a rural or island area; or
- restoration of peatland habitats.

And [5(d)] confirms that where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required to identify:

- the baseline depth, habitat condition quality and stability of carbon rich soils;
- the likely effects of the development on peatland, including on soil disturbance; and
- the likely net effects of the development on climate emissions and loss of carbon.

Policy 5 also confirms that the site specific (above) assessment [5(d)] "*should inform careful project design and ensure, in accordance with relevant guidance and the mitigation hierarchy, that adverse impacts are first avoided and then minimised through best practice. A peat management plan will be required to demonstrate that this approach has been followed, alongside other appropriate plans required for restoring and/ or enhancing the site into a functioning peatland system capable of achieving carbon sequestration*".

This stage 1 PMP considers the protection and safeguarding of peat and seeks to fulfil the requirements of Policy 5(d).

1.2.2 Mitigation Hierarchy

SEPA[2,3] has published guidance regarding the mitigation hierarchy which is summarised below:

- Prevention – avoiding generating excess peat during construction (e.g., by avoiding peat areas or by using construction methods that do not require excavation such as floating tracks);
- Re-use – use of peat produced on site in restoration or landscaping, provided that its use is fully justified and suitable;
- Recycling / Recovery / Treatment – modify peat produced on site for use as fuel, or as a compost / soil conditioner, or dewater peat to improve its mechanical properties in support to re-use; and
- Storage – storage of peat up to a depth of 2 m is not classified as a waste and does not require authorisation from SEPA, however care must be taken to ensure that it does not cause environmental pollution.

2 Scottish Environment Protection Agency. 2010. Regulatory Position Statement – Developments on Peat.

3 Scottish Renewables, Scottish Environment Protection Agency. 2012. Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

1.2.3 Relevant Legislation, Policy and Guidance

Policy and legislation relevant to the management of peat includes the following:

- The UK Climate Change Act 2008 (c 27);
- Environmental Protection Act 1990 (as amended);
- Landfill (Scotland) Regulations 2003 (as amended); and
- The Waste Management Licensing (Scotland) Regulations 2011.
- National Planning Framework for Scotland 4 (NPF4) (Scottish Government, February 2023);

Relevant guidance includes:

- SEPA Regulatory Position Statement - Developments on Peat (Scottish Environment Protection Agency, 2010);
- Good Practice during Windfarm Construction, 4th Edition (Scottish Renewables, Scottish Natural Heritage (now NatureScot), Scottish Environment Protection Agency, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW, 2019);
- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, January 2017);
- SNH Carbon and Peatland Map 2016;
- Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with reference to Wind Farm Developments in Scotland (Forestry Commission Scotland & Scottish Natural Heritage, 2010);
- Managing Geotechnical Risk: Improving Productivity in UK Building and Construction (Institution of Civil Engineers, 2001);
- Ground Engineering Spoil: Good Management Practice CIRIA Report 179 (CIRIA, 1997);
- Scottish Roads Network Landslides Study Summary Report (Scottish Executive, 2005); and
- Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low-Cost Roads on Peat (Forestry Commission, 2006).

1.2.4 Definition of Peat

Peat is defined as a material consisting of the partially decomposed remains of plant material and organic matter preserved over a period in a waterlogged environment resulting in anaerobic conditions, and is of depths > 0.5m.

Peat can be classed as two principal types, the acrotelm layer, and the catotelm layer as shown on **Plate 1-1**.

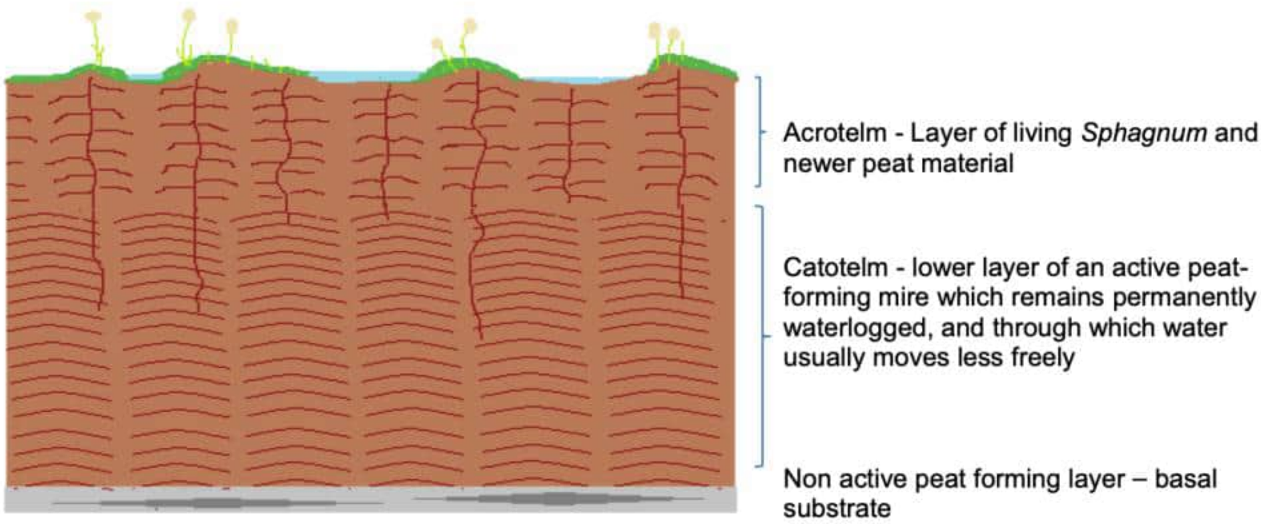


Plate 1-1 Drawing of two layered Structure of Active Bog Peatlands above Non-Active Peat

The acrotelm layer is found in the upper layer of peat where conditions are relatively dry and comprises living vegetation and partially decomposed plant material. Hydraulic conductivity in this layer tends to be higher in relation to distance from the water table. The thickness of the acrotelm layer varies depending on topography such as steepness of slope, peat haggs, and hummocks. In particular, the acrotelm layer can be affected during periods of drought or as a consequence of drainage. Fibrous in texture, the acrotelm layer has some tensile strength and is generally considered to be stable for storage and re-use.

The catotelm layer is found under the acrotelm layer and comprises decayed plant material and organisms and is denser and with a very low hydraulic conductivity. The catotelm layer sits below the water table resulting in permanent anaerobic conditions. The catotelm layer is amorphous and has very low tensile strength making it less suitable for storage and re-use.

2.0 Site Work

2.1 Peat Depth Survey

Peat depth surveys were undertaken by SLR in October 2020 (Phase 1), November 2022 (Phase 2) and March 2023 (Phase 2 follow up) to ensure that the footprint of the Proposed Development was fully covered. The surveys carried out followed best practice guidance for developments on peatland[4,5].

Phase 1 peat probing resulted in probing on a 100m grid to allow for initial assessment of the site which was used in preliminary site layout designs. Phase 2 probing included detailed probing across the proposed infrastructure layout, focussing on access tracks, turbine locations and other site infrastructure.

Peat is generally defined as an organic soil in excess of 0.5m, if the soil is less than 0.5m, then it is considered peaty soil. The peat was found to vary across the site in terms of thickness and coverage.

Thin peat was classed as being 0.5m to 1.5m thick, with deposits in excess of this being classed as thick peat. The thickness ranges used were intended to reflect the probability of instability associated with both peat slides (in thin peat) and bog slides. Where the probing recorded less than 0.5m thick, this has been considered to be an organic/peaty soil rather than peat.

The thickness of the peat was assessed using a graduated peat probe, approximately 6mm diameter and capable of probing depths of up to 10m. 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 ±2m, 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.

An assessment of the substrate was made and recorded at each probe hole.

The relative stiffness of the peat was also assessed from the resistance to penetration of the probe and to the effort required to extract the probes. In all instances refusal was met on obstructions allowing identification of subsurface geology.

2.2 Peat Depth Results

The results from all probing exercises listed above are detailed in the following sections and the peat depths identified onsite are shown on **Figure 10.2.3** and **Figure 10.2.4**.

A total of 1,596 probe holes were undertaken across all survey phases, with the results summarised in **Table 2-1**.

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

5 Scottish Natural Heritage (SNH), SEPA, Scottish Government & James Hutton Institute. (2014)' Peat Survey Guidance; Developments on Peatland: Site Surveys'.

The peat geomorphology and site observations are provided within **Technical Appendix 10.1: Peat Landslide and Hazard Risk Assessment (PLHRA)** with the main relevant findings summarised below.

Table 2-1
Peat Probing Data

Peat **Thickness** (m)	No. of Probes	Percentage (of total probes undertaken on-site)
0 (no peat)	100	6.3
0.01 – 0.49 (peaty soil)	1231	77.1
0.50 – 0.99	171	10.7
1.00 – 1.49	41	2.6
1.50 – 1.99	33	2.1
2.00 – 2.49	15	0.9
2.50 – 2.99	5	0.3
3.00 – 3.49	0	0.0
3.50 – 3.99	0	0.0
> 4.0	0	0.0

In summary the peat depth probing and surveying has shown that:

- the peat was found to vary across the site in terms of thickness, surface slopes and apparent characteristics;
- peat thickness varies from zero to 2.7m with an average depth of 0.3m;
- the geomorphology of the peat areas varies between large, flat expanses of apparently thick peat with high moisture content and smaller areas of thinner drier deposits blanketing the moderate undulating slopes; and
- Peat erosional features were present as Peat haggs at the location of the proposed substation and the proposed construction compound in the north western section of the main site down slope of Ben Sca summit. Deeply eroded peat, and large haggs are present near to the plateau between Ben Aketil and Ben Sca.

2.3 Peat Condition

Peat is described using the von Post[Error! Bookmark not defined.] classification. Peat samples were collected by SLR in March 2023, using a peat auger and used to inform interpretations of the peat condition and underlying substrate.

Based on field descriptions, most of the shallow peat would be classified as predominantly fibrous between H2 and H3 in the von Post classification, showing slight decomposition with some limited amorphous material. The deeper peat, in excess of 1.5m is typically more decomposed and generally H5.

The peat augering logs and photographs are provided within **Technical Appendix 10.1: Peat Landslide and Hazard Risk Assessment (PLHRA)**.

Accumulations of peat up to 0.5m thick are considered to be too thin to be classified as true peat deposits and are often classified as organic soils or peaty soils.

2.4 Substrate

Where possible, in the SLR investigation, an assessment of the substrate was made, as described previously. From the evidence of the probing and sampling where available, the substrate falls into one of two principal categories:

- Granular (sand and/or gravel/weathered rock), of glacial origin and occasionally interbedded with silty sands;
- Rock, no rock samples were recovered from the probe locations although where exposed, the rock is seen to be strong to very strong metasedimentary rocks ranging from psammites through to gneisses and granites. The bedding dip and discontinuity spacing could not be determined at this stage but evidence from outcrops confirms the metasediments are folded and exhibit variable bedding orientations and should be subject to further investigation for the design of the turbine foundations; and
- No clay horizons were encountered and evidence from site walkovers did not encounter cohesive clay materials on-site.

Photo 2-1 shows the granular substrate within an area of Peat hagging.

Photo 2-1 Peat Hagging and Granular Substrate

2.5 Wind Turbines

The peat thickness, substrate and slope at each proposed turbine location is summarised in **Table 2-2.**

Table 2-2
Ground Conditions at Each Wind Turbine Location

Turbine No.	Peat Depth (m)	Substrate
T1	0.3	Granular
T2	0.5	Rock
T3	0.3	Granular
T4	0.7	Granular
T5	1.2	Granular
T6	0.4	Granular
T7	1.2	Rock
T8	0.5	Rock
T9	1.1	Granular
T10	1.1	Granular

2.6 Hardstandings

The peat thickness, substrate and slope at each proposed hardstanding location is summarised in **Table 2-3.**

Table 2-3
Ground Conditions at Each Hardstanding

Hardstanding No.	Peat Depth (m)	Substrate
T1	0.4	Granular
T2	0.5	Rock
T3	0.4	Granular
T4	0.9	Granular
T5	0.5	Granular
T6	0.8	Granular
T7	1.4	Rock
T8	0.5	Rock
T9	0.5	Granular
T10	1.0	Granular

3.0 Potential Impacts on Peat from Construction Activities

3.1 Wind Turbines

Wind turbine foundations in peatlands would normally require full and permanent excavation of peat to competent strata, with temporary excavation of peat from a wider diameter to enable safe access to the base of the excavation.

The resulting peat generated could be considered as a permanent loss, unless satisfactory re-use could be achieved within the development site. The peat would normally be used to reinstate track shoulders, around crane hardstandings and turbine bases.

3.2 Crane Hardstanding

In order to assemble the wind turbine and enable servicing during operation, crane pads are constructed adjacent to each wind turbine. These must be sufficient to take the weight of both the crane and turbine components, and therefore excavation to underlying competent strata is required. Without adequate drainage controls, permanent excavation may disrupt natural hydrological pathways.

Crane pads must remain in place for the life of the Proposed Development to enable routine inspection and maintenance. Peat generated from these excavations would be considered a permanent loss, unless satisfactory re-use could be achieved within the development site.

3.3 Construction Compound

Construction compounds are provided during the construction phase to enable storage of construction materials, turbine components and fuel, concrete batching plant, siting of welfare facilities and site offices.

3.4 Borrow Pits

Where access track and hardstanding construction materials are required, it is intended to source an amount of material for the subbases from borrow pits onsite.

Peat overlying glacial till, weathered rock and bedrock is normally excavated and temporarily stored for the duration of construction, and then re-used for borrow pit restoration and landscaping post construction, and therefore re-use is required.

Borrow pits have been located to ensure that peat is shallow and therefore minimal peat would need to be excavated at each locations.

For further information on proposed borrow pits, refer to the **Technical Appendix 3.2: Borrow Pit Appraisal** (BPA).

3.5 Access Tracks

Access tracks are required to enable passage of construction and servicing traffic around the site. Over peatlands, the choice of access track design normally reflects the peat depths along the route, with shallow peat/organic soils <1m deep excavated to competent strata (cut and fill tracks), and deeper peats overlain by floating tracks (with no excavation) when slope gradients are suitable.

Access tracks are permanent infrastructure, peat excavated for cut and fill would be considered a permanent loss, unless the peat can be re-used elsewhere on site.

In excavated tracks, the surface vegetation (i.e. habitat) would be lost unless stored and reinstated elsewhere, however the intention would be to re-use excavated turves and peat on verges and track shoulders (including along the verges of floated track sections) and verges of hardstandings for landscaping and restoration purposes.

Both types of access track have the potential to disrupt natural hydrological drainage pathways, appropriate drainage would be designed to mitigate this. For further information, see **Technical Appendix 3.1: Outline CEMP**.

3.6 Cable Trenching

Electrical cabling is typically buried or ducted adjacent to the access track network where practicable (cable trenching), either into existing peat (requires excavation, laying and backfilling) or wherever possible ducts are laid within reinstated material at the sides of floated tracks (no excavation of in-situ peat required). Where excavation is required, peat generated from cable trenching is normally replaced to an appropriate level.

4.0 Proposed Mitigation During Construction

There are a number of ways in which detailed design and construction activities can be specified to minimise impacts on peatlands. The following section outlines briefly the likely mitigation required to minimise impact, based on the re-use of peat specific to key elements of the site.

4.1 Wind Turbine Foundations

Wind turbine foundations represent permanent excavation and the primary mitigation measure is to locate the wind turbines to avoid the areas of deepest peat, thereby reducing excavated volumes. Five of the proposed turbines are located on peaty soil (< 0.5m) and five located on thin peat (0.5 m - <1.5 m). The average peat depth is 0.75m, ranging from 0.3 m to 1.2 m.

4.2 Hardstandings and Compounds

In relation to the crane hardstandings, full reinstatement post-construction is not proposed, given that they would be used for maintenance activities associated with the wind turbines. The construction compound area would also not be reinstated due to its potential for future use for alternative technologies such as battery storage. No peat re-use is therefore proposed.

4.3 Borrow Pits

Peat may be re-used within Borrow Pits for the purpose of their restoration provided the method of re-use is consistent with the environmental reinstatement objectives of the site and presents no residual risks from pollution of the environment or harm to human health. Key issues for Borrow Pit restoration are:

- prevention of desiccation and carbon losses from peat used in the restoration;
- development of complete vegetation cover through emplacement of peat turves or seeding with an appropriate species; and
- fencing where required, to exclude grazing stock and to encourage vegetation establishment.

4.4 Access Tracks

In comparison to infrastructure specific to wind turbines, there is considerably more guidance[6,7] available to support access track design in peatlands. Guidance is generally focused on floating tracks and excavated tracks and is summarised below.

4.4.1 Floating Access Tracks

Over deeper peat (typically >1.0m), floating tracks may be used to remove the requirement for peat excavation and limit disruption of hydrological pathways. The success of construction requires careful planning to take account of the unique characteristics of peat soils. Specific guidance is available on design, the duration and timing of construction, the sequence of construction and the re-use of peat on the shoulders of the floating access track. If applicable, floated tracks would be utilised when peat depths of greater than 1m are identified along with shallow topography in the area (generally below 5%) and the section is long enough to make floating track appropriate.

6 Scottish Renewables, Scottish Natural Heritage, Scottish Environmental Protection Agency, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland, AEECoW (2019)., Good Practice During Wind Farm Construction. 4th Edition.

7 Scottish Natural Heritage, Forestry Commission (August 2010)., Floating Roads on Peat

Design of Floating Access Tracks

The following issues should be considered during detailed design of floating access tracks:

- adopting conservative values for peat geotechnical properties during detailed design (post-consent);
- applying a maximum depth rule whereby an individual layer of geogrid and aggregate should not normally exceed 450mm without another layer of geogrid being added;
- on gently sloping ground and where the access track runs transverse to the prevailing slope, accommodating natural hydrological pathways such as flushes and peat pipes through installation of a permanent conduit within or underneath the track and allowing for as much diffuse discharge (while minimising disturbance to existing peatland) on the downslope as possible;
- ensuring transitions between floating tracks and excavated tracks (or other forms of track not subject to long term settlement) are staged in order to minimise likelihood of track failure at the boundary between construction types;
- scheduling access track construction to accommodate for, and reduce peat settlement characteristics; and
- re-use of existing roads (with upgrading if required), where possible.

Duration and Timing of Construction of Floating Access Tracks

The critical factor in successful construction of floating access tracks is the timescale of construction, and the following good practice guidance is provided:

- the settlement characteristics of peat; should be accommodated by appropriate scheduling of access track construction, as follows:
    - prior to construction works, the setting out the centreline of the proposed access track to identify any ground instability concerns or particularly wet zones;
    - identifying ‘stop’ rules, i.e. weather dependent criteria for cessation of access track construction based on local meteorological data; and
    - maximising the interval between material deliveries over newly constructed access tracks that are still observed to be within the primary consolidation phase.

Sequence of Construction

The sequence of construction is normally stipulated in guidance provided by the supplier of the geotextile or geogrid layer, and suppliers are often involved in the detailed access track design. Good practice in relation to the sequence of access track construction is as follows:

- retaining rather than stripping the vegetation layer (i.e. the acrotelm, providing tensile strength), and laying the first geotextile/geogrid directly on the peat surface;
- adding the first rock layer;
- adding the second geotextile/geogrid, and add overlying graded rock fill as a running surface;
- heavy plant and Heavy Goods Vehicles (HGV) using the access tracks during the construction period should be trafficked slowly in the centre of the track to minimise dynamic loading from cornering, breaking and accelerating;
- ensuring wheel loads should remain at least 0.5m from the edge of the geogrid, markers should be laid out, monitored and maintained on the access track surface to clearly emphasise these boundaries; and

- ongoing 'toolbox' talks and subsequent feedback to construction and maintenance workers and drivers to emphasise the importance of the implementing the above measures.

Use of Peat as Trackside Shoulders

A key opportunity to re-use peat is to employ it in landscaping of constructed access tracks. Wedge-shaped reinstatement at the margins of a floating access track (which is elevated above the peat surface) is termed shoulders, and good practice guidance is as follows:

- re-using peat excavated from elsewhere on site as shoulders adjacent to the floating track;
- peat shoulders should taper from just below the track sides (thereby preventing over high shoulders from causing ponding on the track surface) to join the surrounding peat surface, keeping as natural a profile as possible to tie in with existing slope profiles;
- limiting the width of peat shoulders to avoid unnecessary smothering of intact vegetation adjacent to the floating track;
- peat must not be laid too thinly (minimum 0.5m) to avoid drying out;
- peat must not be compressed during reinstatement to prevent cracking; and
- where possible these should be capped with turves or seeded as quickly as possible to prevent run off erosion and should not be left bare for excessive periods.

4.4.2 Excavated Access Tracks

Excavated tracks require complete excavation of soil/peat to a competent substrate. Excavated tracks would generally be created where peat depths are less than 1m although may also be constructed in slightly deeper peat depths where considered appropriate, if floating track is not deemed to be suitable. The peat/soil that is excavated would require storage ahead of re-use elsewhere on site. Good practice guidance relates mainly to drainage in association with excavated tracks:

- trackside ditches should capture surface water (within the acrotelm) before it reaches the road;
- interceptor drains should be shallow and flat bottomed (and preferably entirely within the acrotelm to limit drawdown of the water table);
- any stripped peat turves should be placed back in the invert and sides of the ditch to assist regeneration and prevent erosion to the peat and wash out that could occur; and
- culverts and cross drains should be installed under excavated tracks to maintain subsurface drainage pathways (such as natural soil pipes or flushes). Discharge from constructed drainage should allow for as much diffuse dispersion of clean (silt free) water as possible while minimising disturbance to existing peatland as far as possible. Silt mitigation measures will be incorporated into all constructed drainage as per the requirements of the CEMP.

Although excavation is normally undertaken in peat of minor thickness (< 1.0m), there is a possibility of minor slippage from the cut face of the peat mass. Accordingly:

- free faces should be inspected for evidence of instability (cracking, bulging, excessive discharge of water or sudden cessation in discharge); and
- where significant depths of peat are to be stored adjacent to an excavation, stability analysis should be conducted to determine Factor of Safety (FoS) and an acceptable FoS adopted for loaded areas.

As with floating tracks, regular routine monitoring should be scheduled post-construction to ensure that hydrological pathways and track integrity have been suitably maintained.

4.5 Cable Trenches

Cable trenches either require peat excavation specifically for this purpose, or they can be constructed within landscaping of shoulders adjacent to floating tracks. Guidance[6] is as follows:

- utilise peat shoulders for cable lays where possible to minimise peat excavations specifically for this purpose, in this case, peat shoulders should be 1.0m to 1.5m thick;
- minimise time between excavation of the cable trench and peat reinstatement, preferably avoiding excavation until the electrical contractor has cables onsite ready for installation; and
- specific cable trench materials to be placed within trench.

4.6 Peat Excavation, Storage and Transport

Where peat is to be re-used or reinstated with the intention that its supported habitat continues to be viable, the following good practice outlined below applies.

4.6.1 Excavation

Excavated peat should be excavated as turves, including the acrotelm (surface vegetation) and a layer of adjoining catotelm (more humified peat) typically up to 500mm thick in total, or as blocks of catotelm; the acrotelm should not be separated from its underlying peat;

- the turves should be as large as possible to minimise desiccation during storage, though the practicalities of handling should be considered;
- contamination of excavated peat with substrate materials to be avoided at all times; and
- consider timing of excavation activities to avoid very wet weather and multiple handling to minimise the likelihood of excavated peat losing structural integrity.

If possible, extract intact full depth acrotelm layers from the top surface of the peat deposit. This technique will maintain connectivity between the surface vegetation and the partially decomposed upper layers of the catotelm.

4.6.2 Storage

The following good practice applies to the storage of peaty soils/peat:

- stripped materials should be carefully separated to keep peat and other soils apart;
- to minimise handling and haulage distances, excavated material should be stored local to the site of excavation or end point of restoration;
- peat turves should be stored in wet conditions or irrigated in order to prevent desiccation (once dried, peat will not rewet);
- stockpiling of peat should be in large volumes to minimise exposure to wind and sun (and desiccation), but with due consideration for slope stability, but should not exceed 1m in height to maintain stability of stockpile;
- stockpiles should be isolated from watercourses or drains with appropriate bunding to minimise pollution risks;
- excavated peat and topsoil stored separately, should be stored to a maximum of 1m thickness;
- stores of non-turf (catotelm) peat should be bladed off to reduce the surface area and desiccation of the stored peat; and

- peat storage areas should be monitoring during periods of very wet weather, or during snowmelt, to identify early signs of peat instability.

4.6.3 Temporary Storage

Any peaty soils/peat to be removed during construction would require a temporary storage area near to the construction works/area of re-use. Where peat cannot be transferred immediately to an appropriate restoration area, short term storage will be required. In this case, the following good practice applies:

- peat should be stored around the turbine perimeter at sufficient distance from the cut face to prevent overburden induced failure,
- local gullies, diffuse drainage lines (or very wet ground) and locally steep slopes should be avoided for peat storage; and
- drying of stored peat should be avoided by irrigation or by seeding (although this is unlikely to be significant for peat materials stored less than 2 months).

For crane pads, borrow pits and compounds (with longer term storage requirements), the following good practice applies:

- peat generated from crane pad locations should be transported directly to its allocated restoration location, to minimise the volume being stockpiled with the possibility of drying out;
- stores of catotelmic peat should be bladed off to reduce their surface area and minimise desiccation;
- where transport cannot be undertaken immediately, stored peat should be irrigated to limit drying and stored on a geotextile mat to promote stability; and
- monitoring of large areas of peat storage during wet weather or snowmelt should be undertaken to identify any early signs of peat instability.

4.6.4 Transport

The following good practice applies to transport:

- movement of turves should be kept to a minimum once excavated, and therefore it is preferable to transport peat planned for translocation and reinstatement to its destination at the time of excavation; and;
- if HGVs/dump trucks that are used for transporting non-peat material are also to be used for peat materials, measures should be taken to minimise cross-contamination of peat soils with other materials.

4.6.5 Handling

Following refinement of the wind farm peat model, a detailed storage and handling plan should be prepared as a detailed PMP forming part of the detailed CEMP, including:

- best estimate excavation volume at each infrastructure location (including peat volumes split into area/volume of ‘acrotelm’ or ‘turf’, and volume of catotelm) which would be achieved by undertaking additional probing in line with current guidance following removal of trees post-consent;
- volume to be stored locally and volume to be transferred directly on excavation to restoration areas elsewhere (e.g. disused quarries, borrow pits or forest drains) in order to minimise handling;
- location and size of storage area relative to turbine foundation, crane hardstanding and natural peat morphology / drainage features; and

- irrigation requirements and methods to minimise desiccation of excavated peat during short term storage.

These parameters are best determined post-consent in light of detailed ground investigation with the micro-siting areas for each element of infrastructure.

4.7 Restoration

During restoration, the following best practice should be followed:

- carefully evaluate potential restoration sites, such as borrow pits for their suitability, and agree that these sites are appropriate with the ECoW, landowners and relevant consultees;
- undertake restoration and revegetation or reseeding work as soon as possible;
- where required, consider exclusion of livestock from areas of the site undergoing restoration, to minimise impacts on revegetation; and
- as far as reasonably practicable, restoration should be carried out concurrently with construction rather than at its conclusion.

5.0 Site Based Peat Excavation and Management Assessment

This Stage 1 PMP has been undertaken as part of the EIA Report for the Proposed Development to ensure that there is an understanding of the extent of peat on site, the total amount of peat that might be excavated, a demonstration that the current design avoids areas of deep peat where possible and that the reuse of the excavated materials is certain and minimised where possible, and in line with updated industry good practices and guidance.

The Proposed Development comprises 10 wind turbines and associated crane hardstandings, a single access point for construction traffic, on-site access tracks of cut construction, construction compound and substation compound with operations building and underground cabling.

Table 5-1
Indicative Excavation Materials Management Plan

Method	Volume of Excavated Material (m^3)	How much of this can be re-used on site (%)	Opportunity for Avoidance or Minimisation of Excavated Material	Re-use Requirements	Hierarchy Adherence	Limitations and Considerations
Access Track (Excavated) Total length of the excavated tracks would be 9.4 km with an average peat depth of 0.61 m.	27,084 m^3	100%	The access track route has been subject to a number of design iterations to avoid deeper peat and steep slopes.	Verge restoration and visual screening, particularly along access track. Sections of the route may require cut and fill and these slopes would require restoration to minimise visual impact **28,212 m^3** of excavated peat and peaty soil would be used along access tracks.	Avoidance was first level of screening to avoid areas of thicker peat. Routing has been planned on thinner peat or peaty soils where possible. The layout design has been guided by constraints which highlight ecological, hydrogeological and geomorphological - all of which identify the peat areas to avoid.	Requires detailed ground investigation to fully characterise peat. Detailed assessment may identify further lengths of floating access tracks, which would further reduce requirement for excavation.
Turning Heads 9 No. Turning Heads have been proposed.	16,583 m^3	8%	Tracks have been subject to several design iterations, to avoid thick peat where possible.	Verge restoration around turning heads **1,350m^3**	Avoidance was first level of screening to avoid areas of thicker peat.	Requires detailed ground investigation to fully characterise peat.
Turbine Foundations 10 No. turbines with average excavation of 23 m diameter and 0.75 m	3,114 m^3	26%	Turbine locations have been subject to a number of design iterations to avoid thicker peat and steep slopes.	At turbine foundations topsoil would be stripped keeping top 200mm of turf intact. This would be stored adjacent to the base working area and would be limited to 1m height.	Avoided areas of thick peat for turbine bases where possible to minimise removal of excessive materials.	Requires detailed ground investigation to fully characterise peat.

Method	Volume of Excavated Material (m^3)	How much of this can be re-used on site (%)	Opportunity for Avoidance or Minimisation of Excavated Material	Re-use Requirements	Hierarchy Adherence	Limitations and Considerations
thickness of peat.				800m^3		
Hardstandings 10 No. hardstandings with an average excavation of 68 m x 38 m. 0.75 m thickness of peat at hardstanding locations.	17,571 m^3	14%	Hardstanding locations have been influenced by the turbine design iterations to avoid thicker peat and steep slopes.	At crane hardstandings topsoil would be stripped keeping top 200 mm of turf intact. This would be stored adjacent to the base working area and would be limited to 0.5 m height. 2,400m^3	Avoided areas of thick peat for turbine bases to minimise removal of excessive materials. Orientation of crane hardstandings to be designed following detailed ground investigation, to avoid constraints and minimise requirement for peat excavation.	Requires detailed ground investigation to fully characterise peat.
Cable Routes	-	-	Minimised disturbance to drainage by taking cable route along existing access track and around the turbines adjacent to new access tracks	Suitable excavated materials would be re-used to backfill trenches	Avoided areas of thick peat for turbine bases to minimise removal of excessive materials.	Requires detailed ground investigation to fully characterise peat.
Met mast with an approximate area of 100 m^2 and 1.2 m	120 m^3	33%	The proposed met mast would largely be located on peaty/glacial soils adjacent to the	Materials would be re-used on site to reinstate working areas and for appropriate landscaping. 40 m^3	Avoided siting met mast on thick peat areas where possible.	Requires detailed ground investigation to fully characterise ground conditions.

Method	Volume of Excavated Material (m^3)	How much of this can be re-used on site (%)	Opportunity for Avoidance or Minimisation of Excavated Material	Re-use Requirements	Hierarchy Adherence	Limitations and Considerations
thickness of peat.			proposed access track.			
Substation compound with an approximate area of 1050 m^2 and 0.48 m thickness of peat.	536 m^3	24%	The proposed substation compound would largely be located on peaty/glacial soils adjacent to the proposed access tracks.	Materials would be re-used on site to reinstate working areas and for appropriate landscaping. 130 m^3	Avoided siting substation on thick peat areas where possible.	Requires detailed ground investigation to fully characterise ground conditions.
Construction Compound with an approximate area of 8000 m^2 and 0.24 m thickness of peat.	1,920 m^3	19%	The proposed construction compound would largely be located on peaty/glacial soils adjacent to the proposed access tracks.	Materials would be re-used on site to reinstate working areas and for appropriate landscaping. 360 m^3	Avoided siting Construction Compound on thick peat areas where possible.	Requires detailed ground investigation to fully characterise ground conditions.
Borrow Pits There are 4 No. borrow pit options, generally with limited peat cover.	Borrow Pit 1: **4,066 m^3** Borrow Pit 2: **5,046 m^3** Borrow Pit 3: **11,544 m^3** Borrow Pit 4: **3,450 m^3**	100%	There is limited peaty soils/peat overlying the selected borrow pits.	Limited peaty topsoil can be stockpiled and used for restoration. Peat/peaty soils from elsewhere on-site could be used to restore the proposed borrow pits with the following volumes: Borrow Pit 1: **30,492 m^3**	Site selection avoided areas of peat for borrow pits, identified sites on bedrock or close to minimise removal of excessive materials.	Current calculations are based on conservative re-use and based on the use of all four borrow pits. Detailed ground investigation is required to assess the ground conditions at each site.

Method	Volume of Excavated Material (m^3)	How much of this can be re-used on site (%)	Opportunity for Avoidance or Minimisation of Excavated Material	Re-use Requirements	Hierarchy Adherence	Limitations and Considerations
				Borrow Pit 2: **13,761 m^3** Borrow Pit 3: **14,430 m^3** Borrow Pit 4: **22,500 m^3**		
Total Excavated	91,033 m^3		Total Re-use	114,475 m^3		

Based on the values indicated, there is a surplus of 23,442 m^3 of peat that could be used for habitat restoration – See Annex 01.

Should further ground investigation information become available, the figures would need to be re-calculated, the figures in the table are indicative only.

6.0 Peat Excavation Considerations

This section of the stage 1 PMP includes the method for dealing with peat which could potentially be classified as waste (only if the above volumes estimate significant quantities of catotelmic peat, which cannot be re-used).

Table 6-1 outlines where those materials that are likely to be generated on-site, they fall within the Waste Management Licensing (Scotland) Regulations 2011.

Based on the results presented in **Table 6-1**, it has been concluded that all of the materials to be excavated onsite would fall within the non-waste classification as most of the topsoil and peaty soils would be re-used on site. Based on a detailed probing exercise and visual inspection of the peat, it is predominantly fibrous peat which would be suitable to be re-used on site. Typically the peat was found to be fibrous and fairly dry within the top metre before becoming slightly more amorphous with depth.

The majority of the excavated peat is therefore entirely re-useable as it is predominantly fibrous and easily re-used on-site. Areas of deep peat have been avoided by design, where possible.

Table 6-1
Excavated Materials – Assessment of Suitability

<table>
<tr><th>Excavated Material</th><th>Indicative Volume on Site by % of total excavated soils</th><th>Is there a suitable use for material</th><th>Is the Material required for use on Site</th><th>Material Classified as Waste</th><th>Re-use Potential</th><th>Re-use on Site</th></tr>
<tr><td>Mineral Soil</td><td>25</td><td>Yes</td><td>Yes</td><td>Not classified as waste</td><td>Yes</td><td rowspan="2">Would be re-used in reinstatement of cut and fill verges, road verges, side slopes and check drains. Peripheral embankments of turbine bases, crane hardstandings and restoration of borrow pits</td></tr>
<tr><td>Turf (Surface layer of vegetation and fibrous matt)</td><td>35</td><td>Yes</td><td>Yes</td><td>Not classified as waste</td><td>Yes</td></tr>
<tr><td>Acrotelmic peat</td><td>35</td><td>Yes</td><td>Yes</td><td>Not classified as waste</td><td>Yes</td><td>Would be re-used in reinstatement of floated access track verges, cut and fill verges, road verges, side slopes and check drains. Peripheral embankments of turbine bases, crane hardstandings and restoration of borrow pits.</td></tr>
<tr><td>Catotelmic Peat (amorphous material unable to stand unsupported when stockpiled >1 m)</td><td>5
Very limited as it has been avoided by design.</td><td>Potentially</td><td>Potentially *</td><td>Potentially if not required as justifiable restoration of habitat management works</td><td>Limited</td><td>If peat does not require treatment prior to re-use it could be used on-site providing adequate justification and method statements are provided and approved by SEPA.

If the peat is unsuitable for use without treatment then it could be regarded as a waste. However, every attempt to avoid this type of peat has been incorporated into the design.</td></tr>
</table>

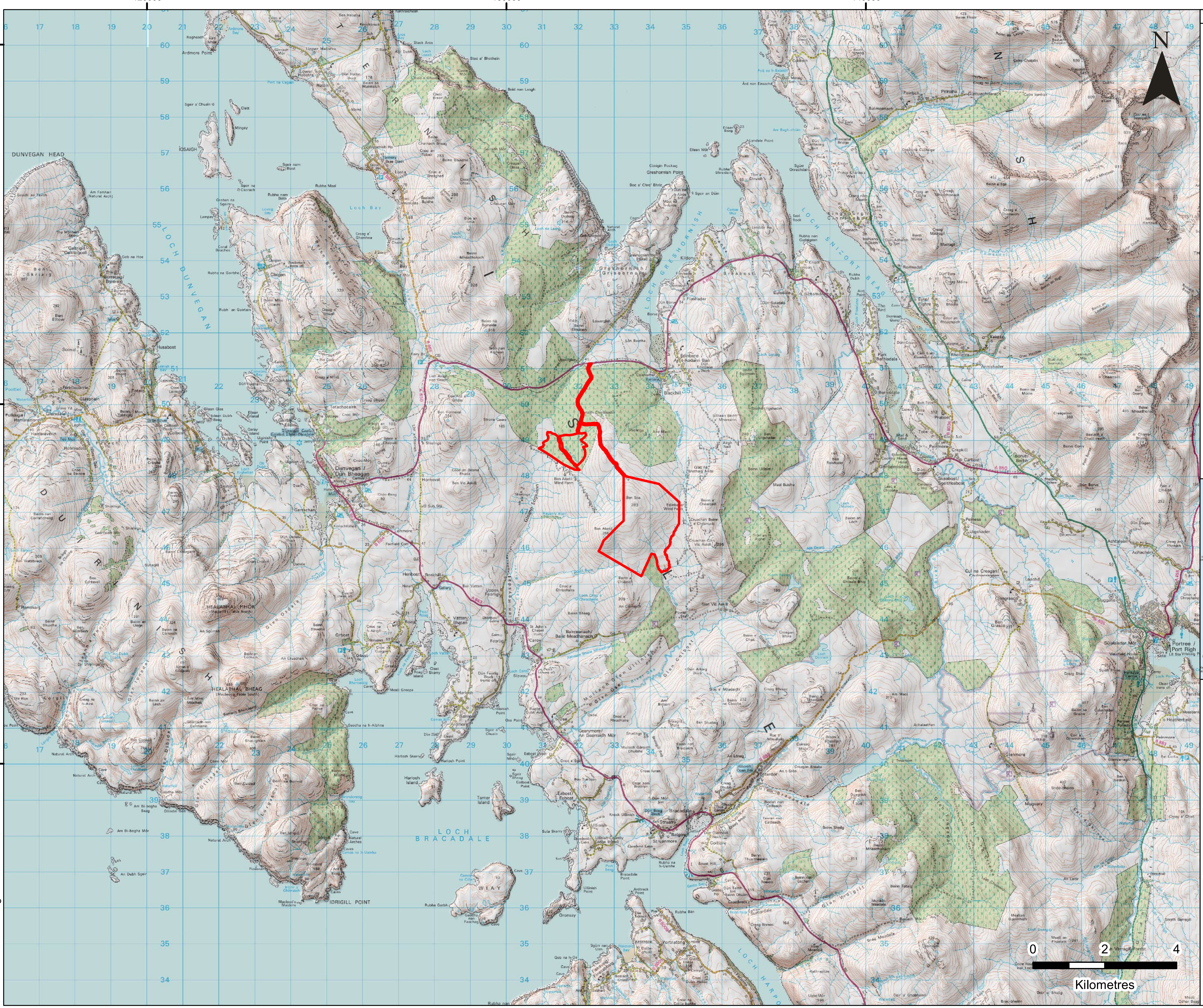
*Such uses for this type of material are limited, however there could be justification for use in the base of borrow pits to maintain waterlogged conditions and prevent desiccation of restored area and in some habitat management works such as gully or ditch blocking where saturated peat is required to mimic mire type habitats and encourage establishment of sphagnum.

7.0 Conclusion

The figures detailed within this report are to be considered indicative at this stage. The total peat volumes are based on a series of assumptions for the layout of the Proposed Development and peat depth data averaged across discrete areas of the site. Such parameters can still vary over small scale areas and therefore topographic changes in the bedrock profile could impact the total accuracy of the volume calculations. The accuracy of these predictions would be improved and updated with the results of further detailed peat probing data, to be carried out during refinement in accordance with 2017 guidelines, as part of detailed ground investigation to be undertaken post-consent. The figures shown in the tables suggest that the volumes of peat excavated onsite create surplus materials which could be used within habitat restoration areas. Post-consent, the Stage 1 PMP and the Outline CEMP would be updated with information obtained during detailed ground investigations and design stage.

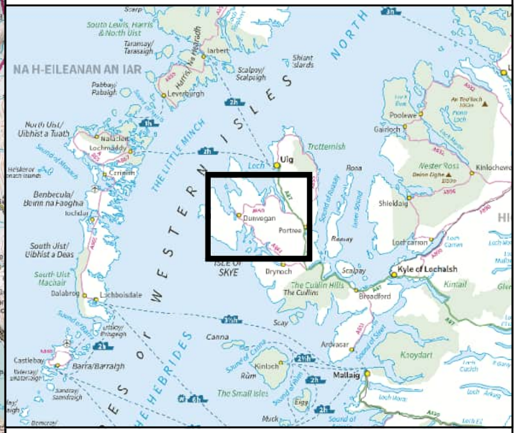
These plans would be developed to update the Outline CEMP, with post-construction restoration plans. This would be reviewed and monitored along with the updated PMP and CEMP to ensure compliance with method statements and to keep track of volumes.

FIGURES



LEGEND

Application Site Boundary



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TA 10.2 – PMP

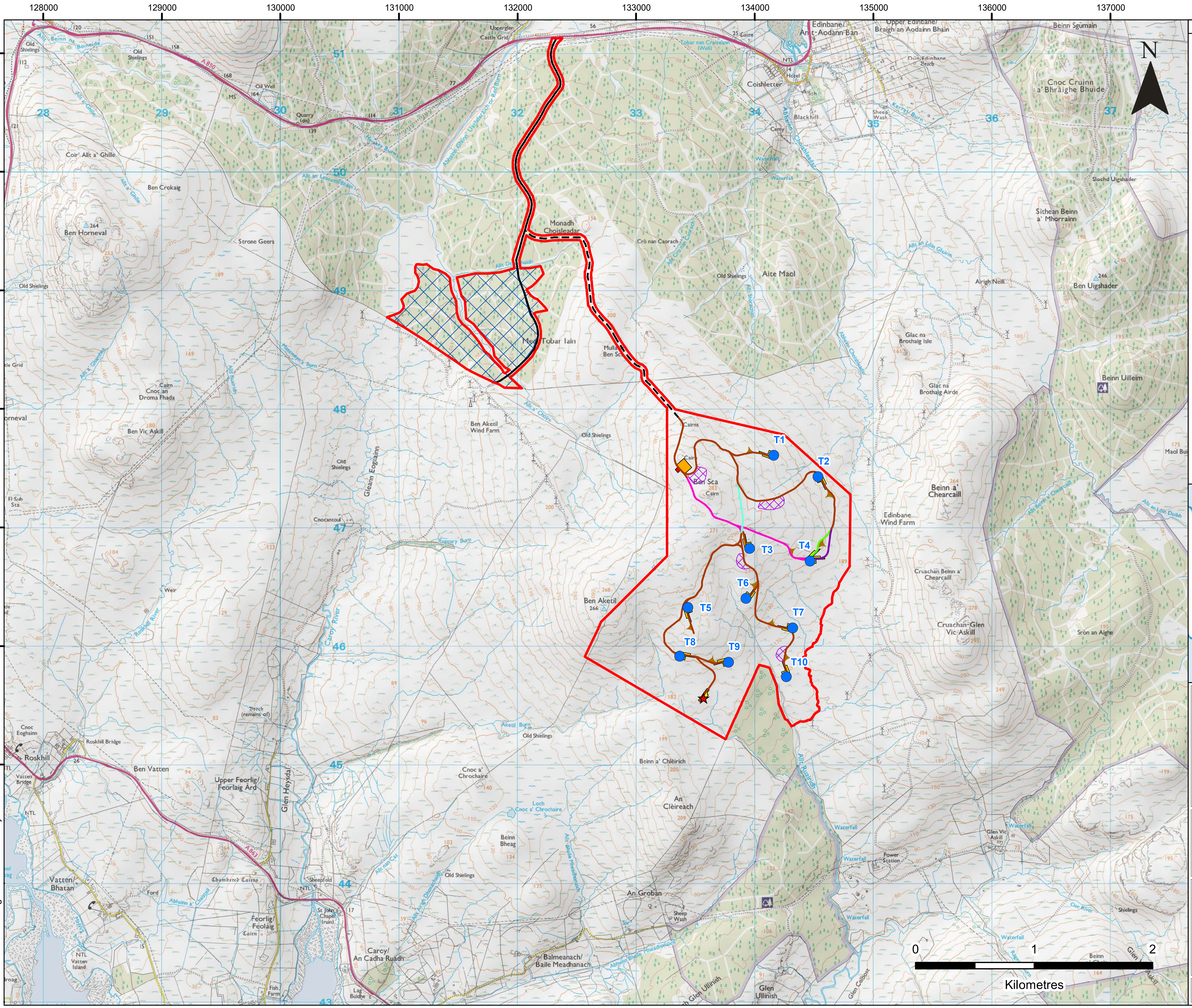
SITE LOCATION

FIGURE 10.2.1

Scale 1:100,000 @ A3

Date JULY 2023

11223.00001.0287.0 Figure 10.2.1 Site Location



LEGEND

- Application Site Boundary
- Proposed Turbine Location
- Proposed Permanent Met Mast
- Proposed Crane Hardstanding
- Proposed Construction Compound
- Proposed Substation
- Proposed Turning Head
- Potential Borrow Pit
- Proposed Habitat Management Area
- Existing Access Track
- Consented Access Track

Proposed Track Alignment

- Proposed
- Proposed Option A
- Proposed Option A1
- Proposed Option A2
- Proposed Option B

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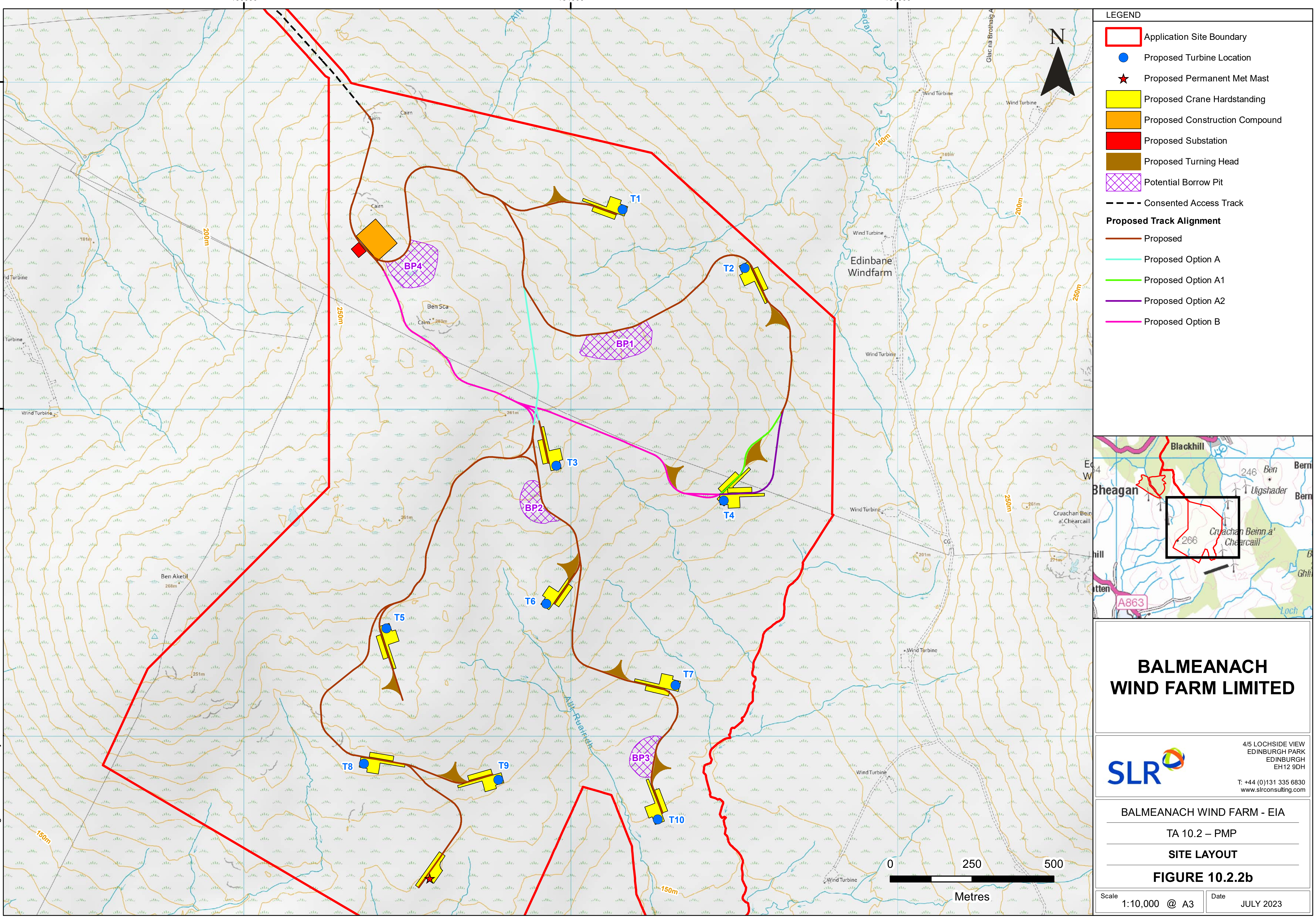
TA 10.2 – PMP

SITE LAYOUT

FIGURE 10.2.2a

Scale	Date
1:30,000 @ A3	JULY 2023

11223.00001.0288.0 Figure 10.2.2 Site Layout



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TA 10.2 – PMP

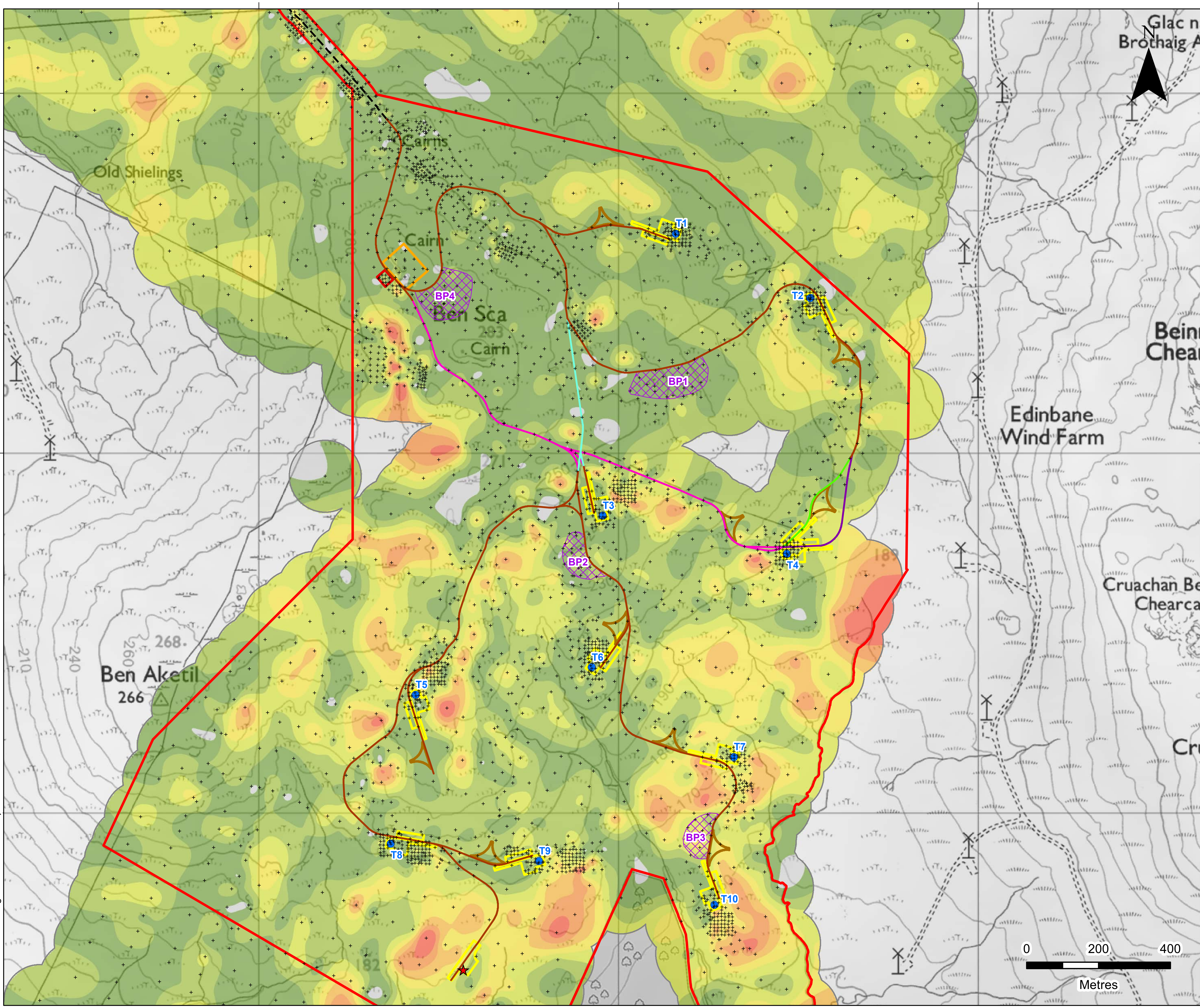
SITE LAYOUT

FIGURE 10.2.2b

Scale 1:10,000 @ A3

Date JULY 2023

11223.00001.0288.0 Figure 10.2.2 Site Layout



LEGEND

- Application Site Boundary
- Proposed Turbine Location
- Proposed Permanent Met Mast
- Proposed Crane Hardstanding
- Proposed Construction Compound
- Proposed Substation
- Proposed Turning Head
- Potential Borrow Pit
- Existing Access Track
- Consented Access Track

Proposed Track Alignment

- Proposed
- Proposed Option A
- Proposed Option A1
- Proposed Option A2
- Proposed Option B
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3

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TA 10.2 – PMP

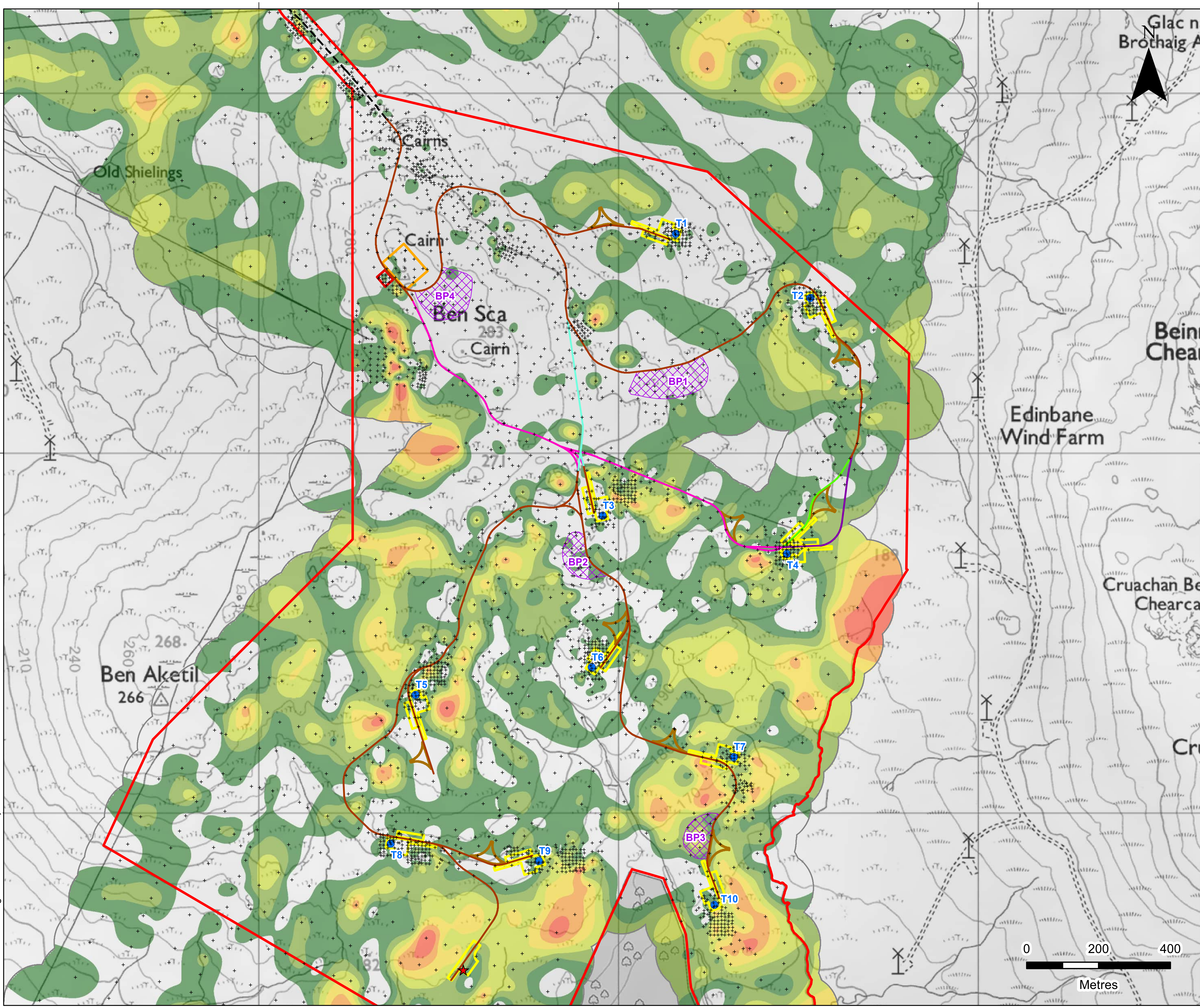
PEAT DEPTH

FIGURE 10.2.3

Scale 1:10,000 @ A3

Date JULY 2023

11223.00001.0289.0 Figure 10.2.3 Peat Depth



LEGEND

- Application Site Boundary
- Proposed Turbine Location
- Proposed Permanent Met Mast
- Proposed Crane Hardstanding
- Proposed Construction Compound
- Proposed Substation
- Proposed Turning Head
- Potential Borrow Pit
- Existing Access Track
- Consented Access Track

Proposed Track Alignment

- Proposed
- Proposed Option A
- Proposed Option A1
- Proposed Option A2
- Proposed Option B
- Peat Probe Location

Peat Depth (m)

- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3

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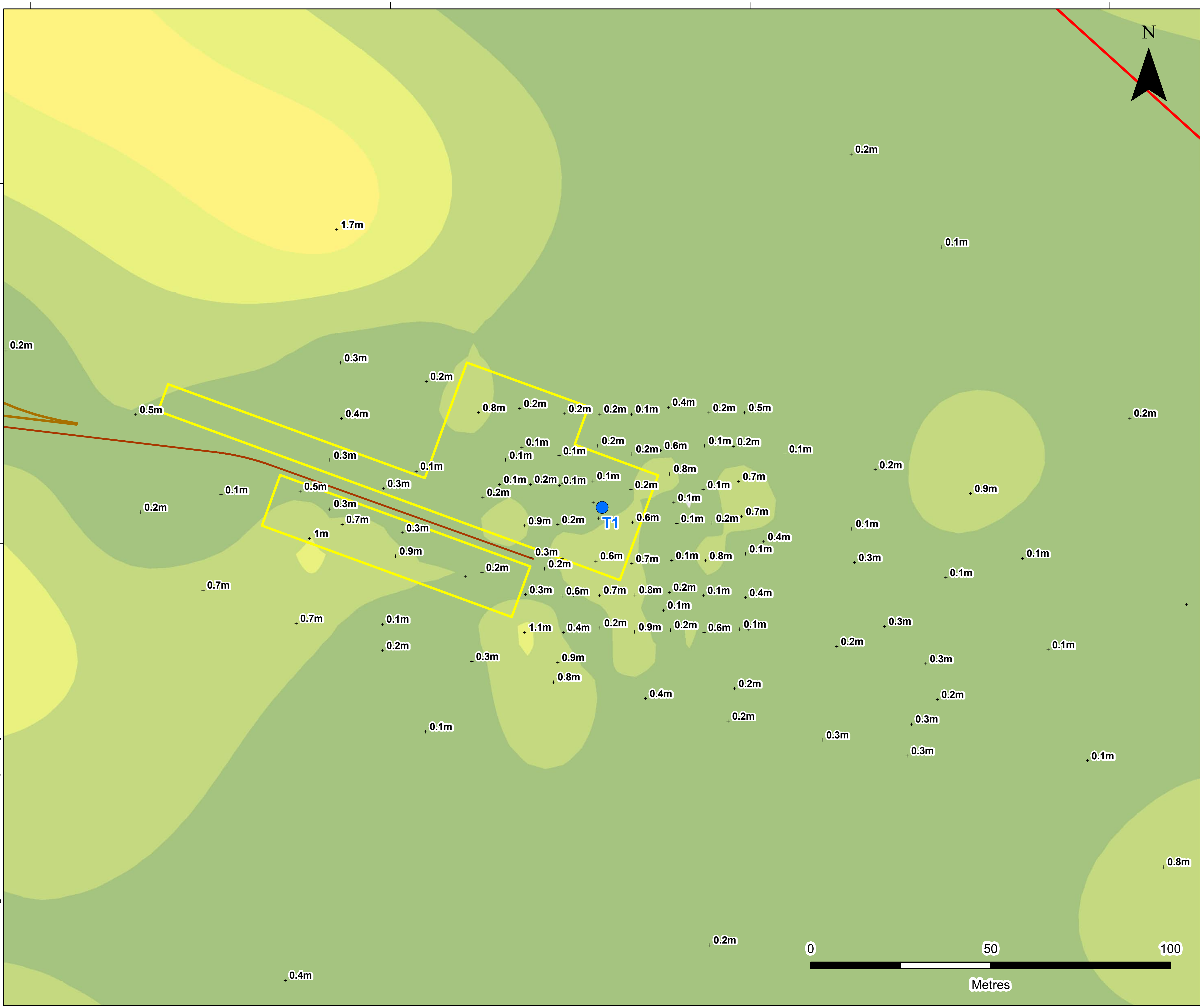
TA 10.2 – PMP

PEAT DEPTH PLAN OVER 0.5 M

FIGURE 10.2.4

Scale 1:10,000 @ A3 | Date JULY 2023

11223.00001.0290.0 Figure 10.2.4 Peat Depth Over 0.5 m



LEGEND

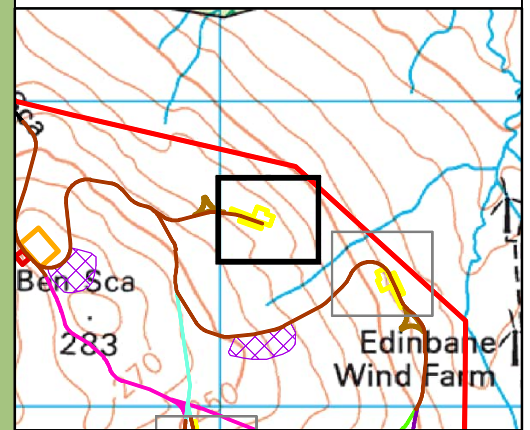
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Proposed Turning Head

Proposed Track Alignment

- Proposed
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2



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TA 10.2 – PMP

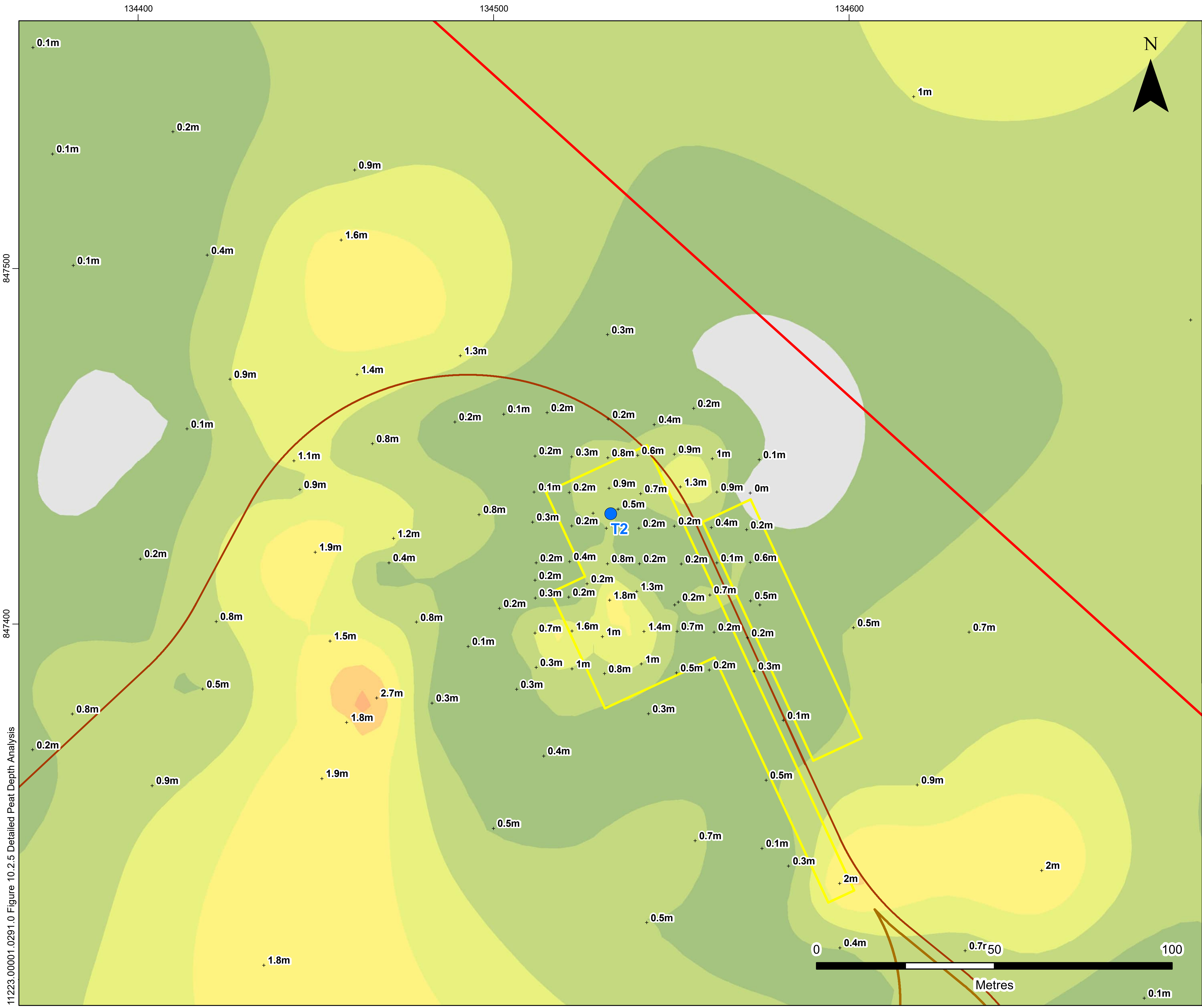
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

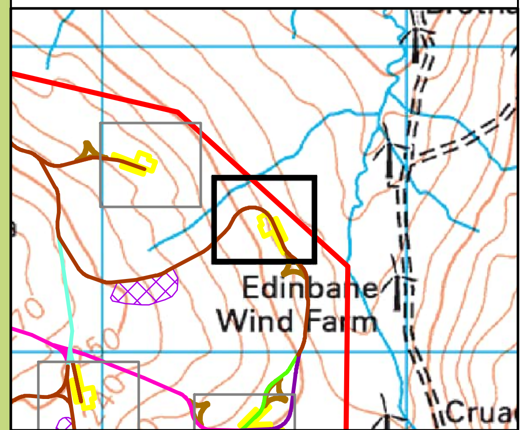
FIGURE 10.2.5a

Scale 1:1,000 @ A3

Date JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis





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TA 10.2 – PMP

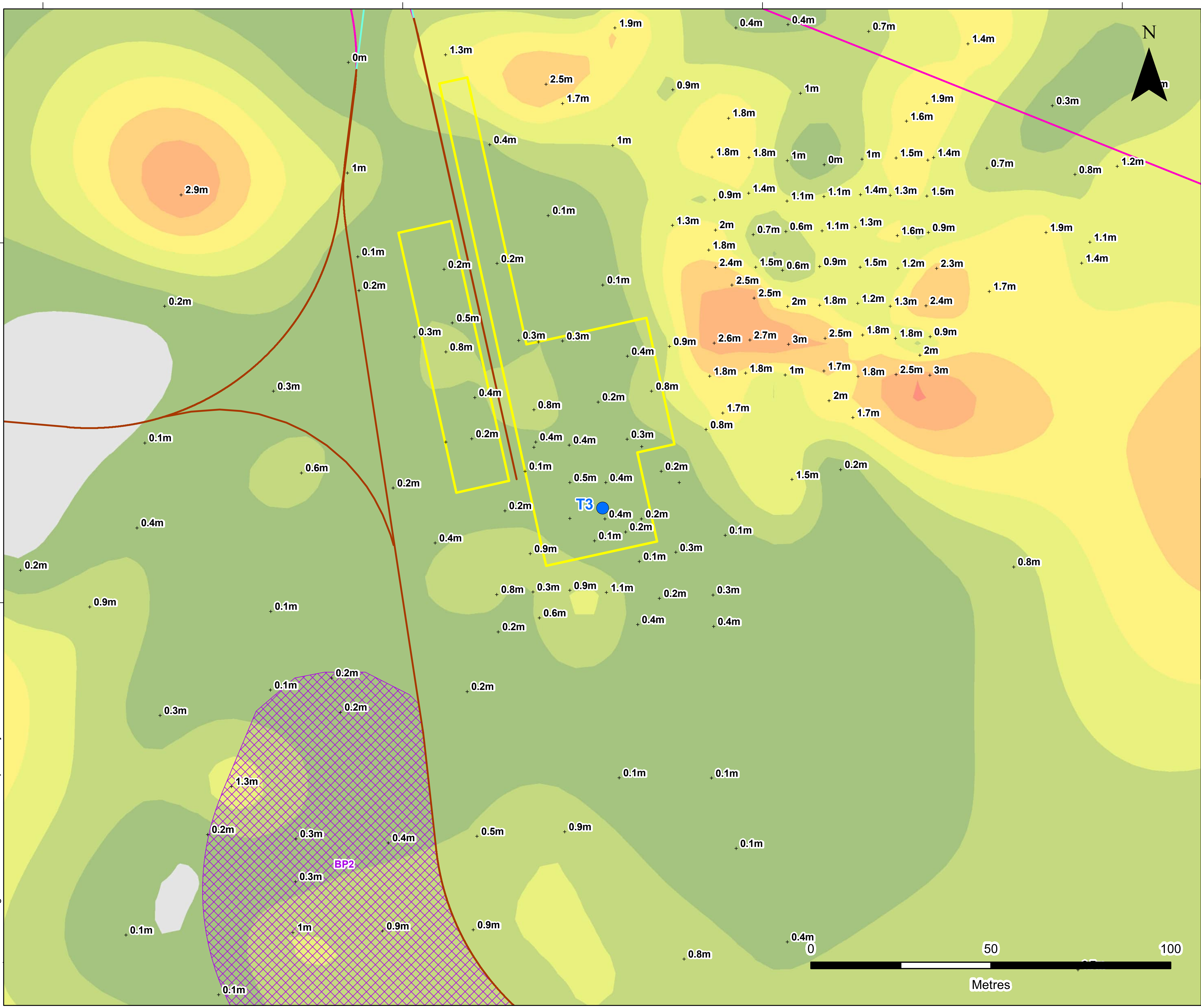
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5b

Scale 1:1,000 @ A3

Date JULY 2023

11223.00001.02910 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

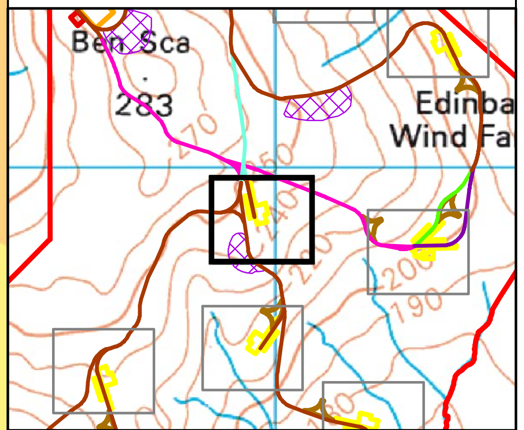
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Potential Borrow Pit

Proposed Track Alignment

- Proposed
- Proposed Option A
- Proposed Option B
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3



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TA 10.2 – PMP

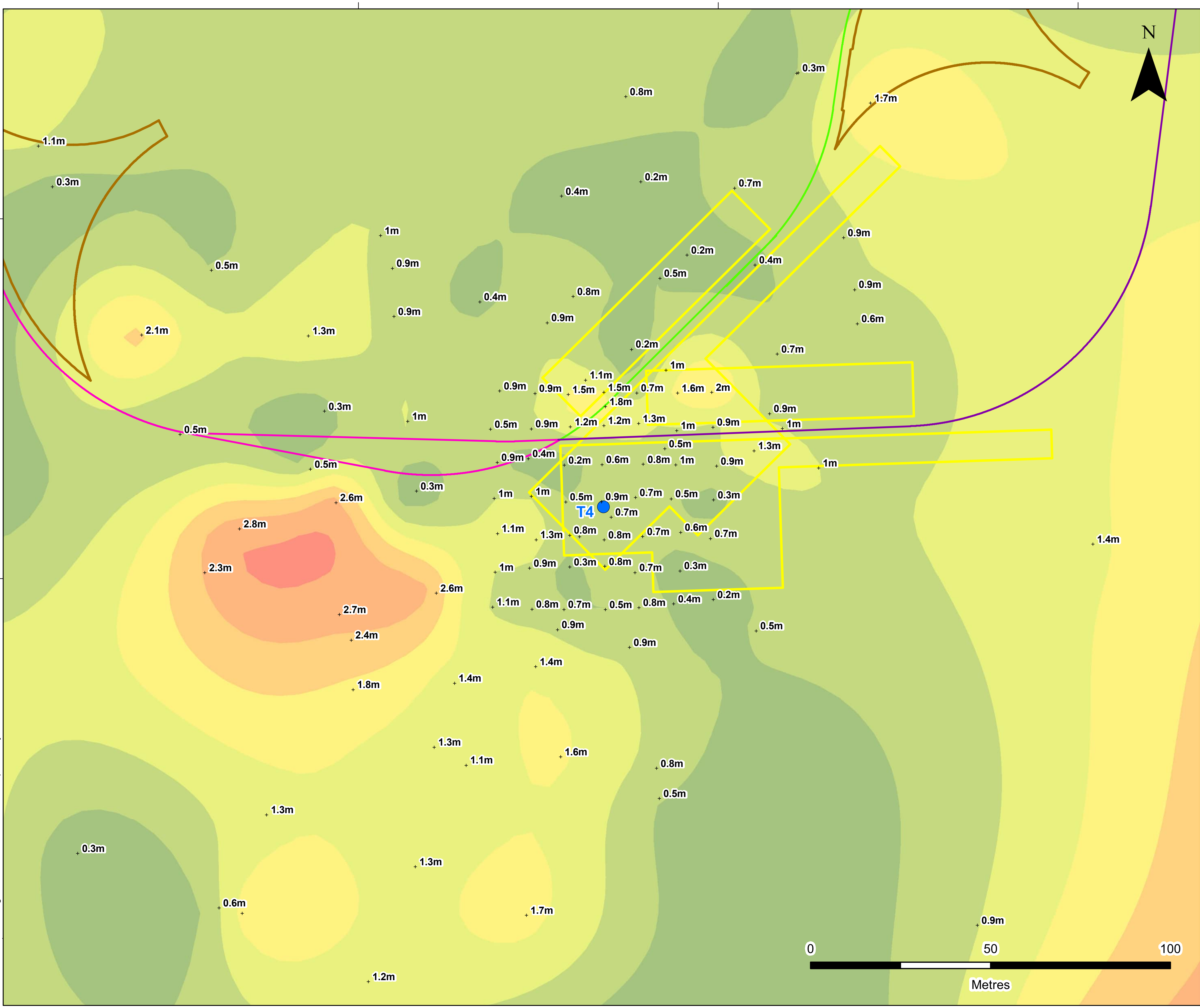
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5c

Scale 1:1,000 @ A3

Date JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

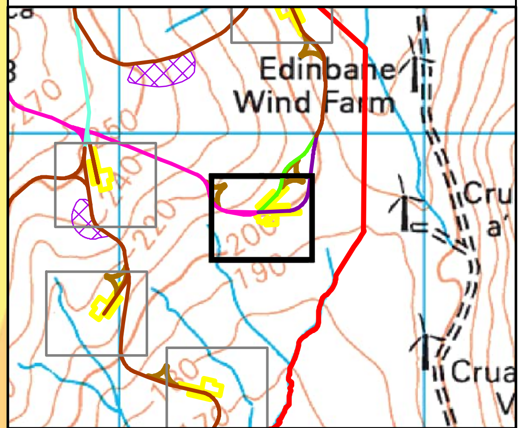
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Proposed Turning Head

Proposed Track Alignment

- Proposed Option A1
- Proposed Option A2
- Proposed Option B
- Peat Probe Location

Peat Depth (m)

- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3



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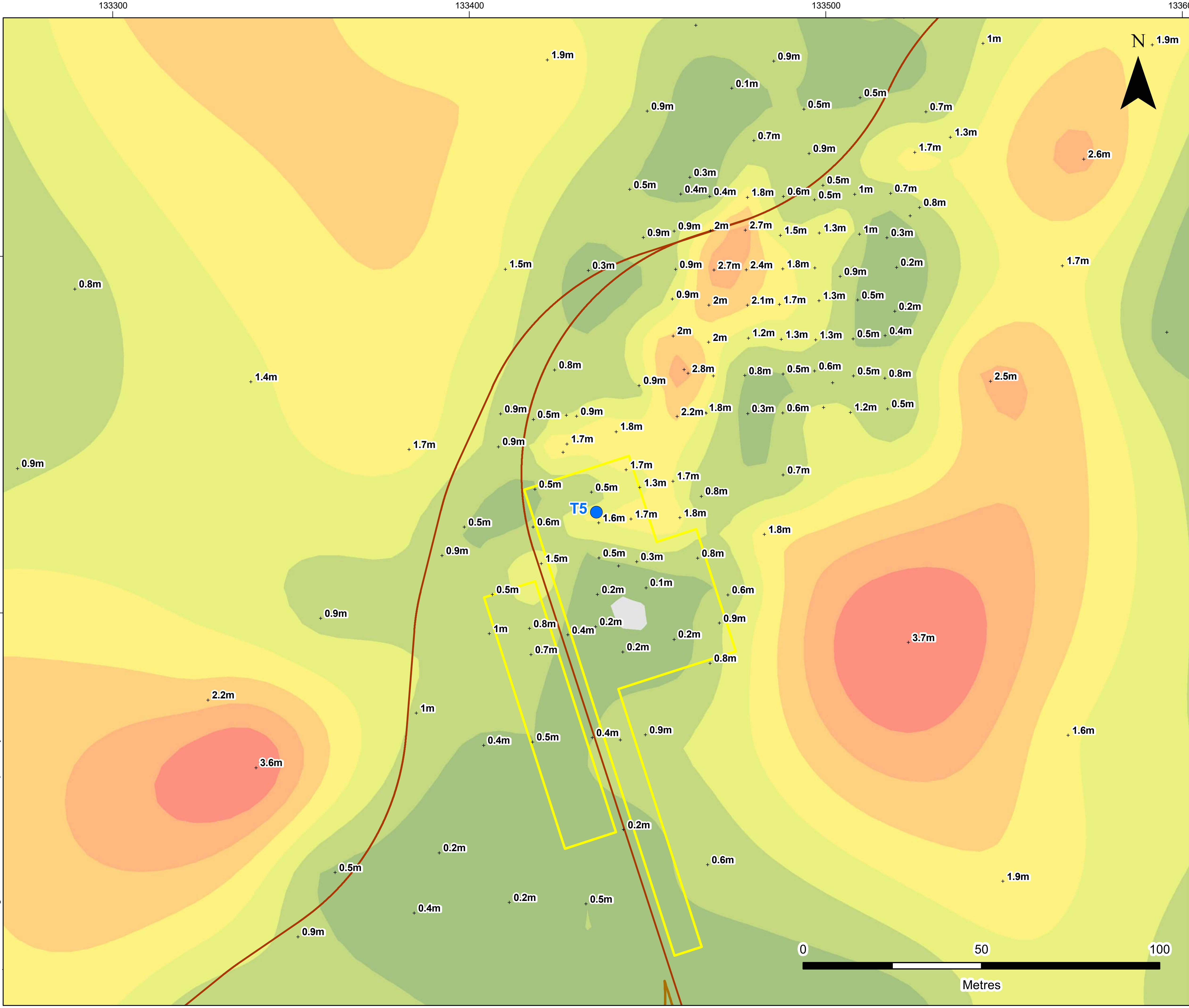
TA 10.2 – PMP

DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5d

Scale	Date
1:1,000 @ A3	JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

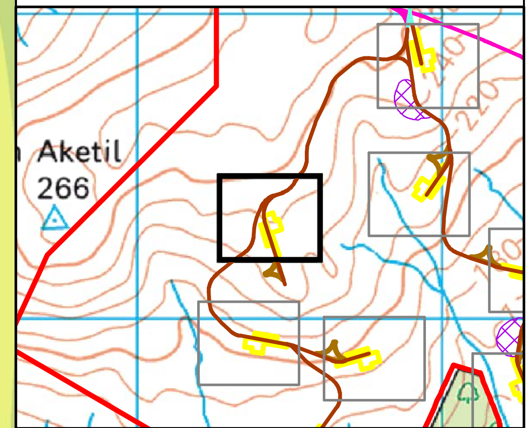
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Proposed Turning Head

Proposed Track Alignment

- Proposed
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3



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TA 10.2 – PMP

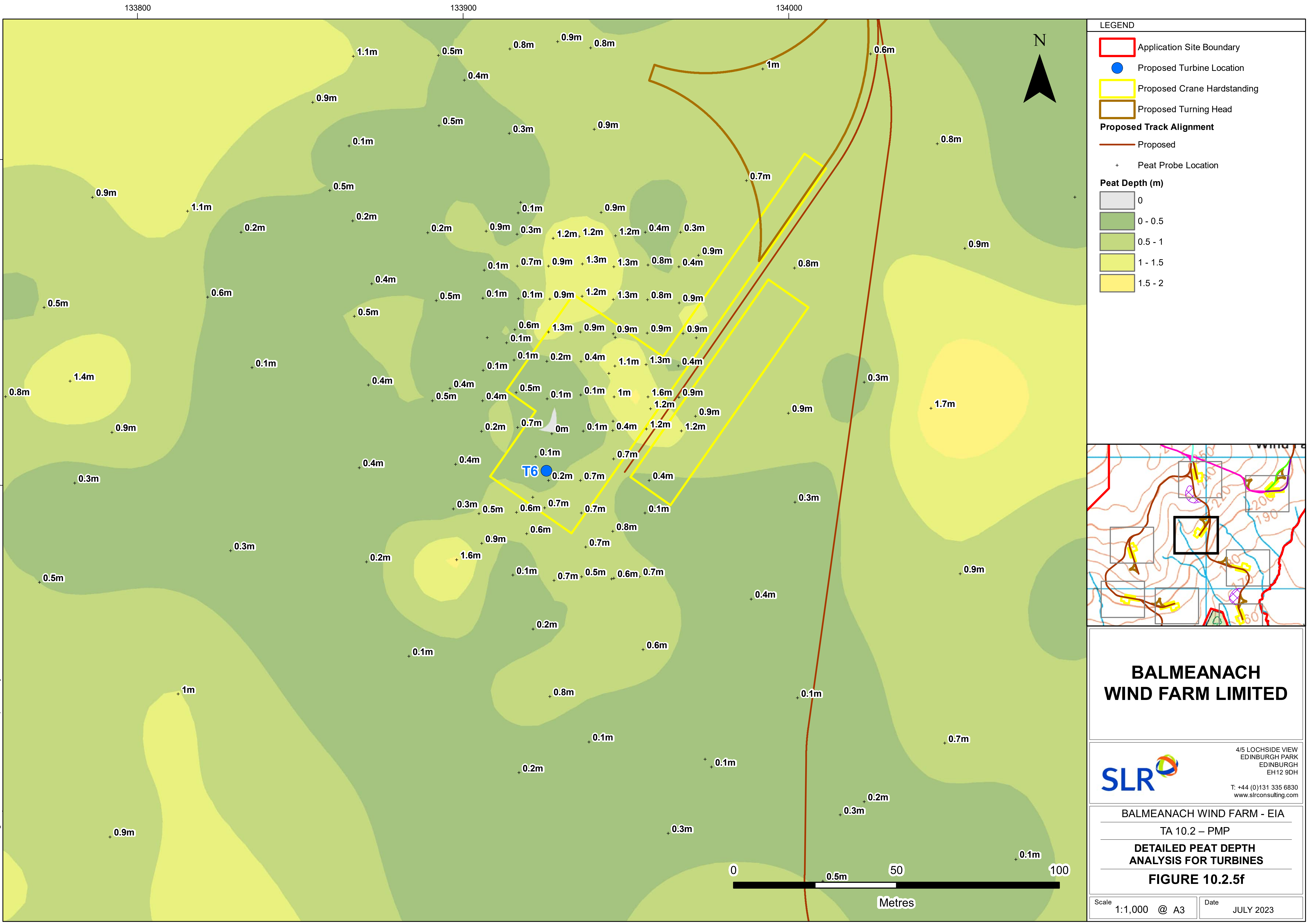
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5e

Scale 1:1,000 @ A3

Date JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Proposed Turning Head

Proposed Track Alignment

- Proposed
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2

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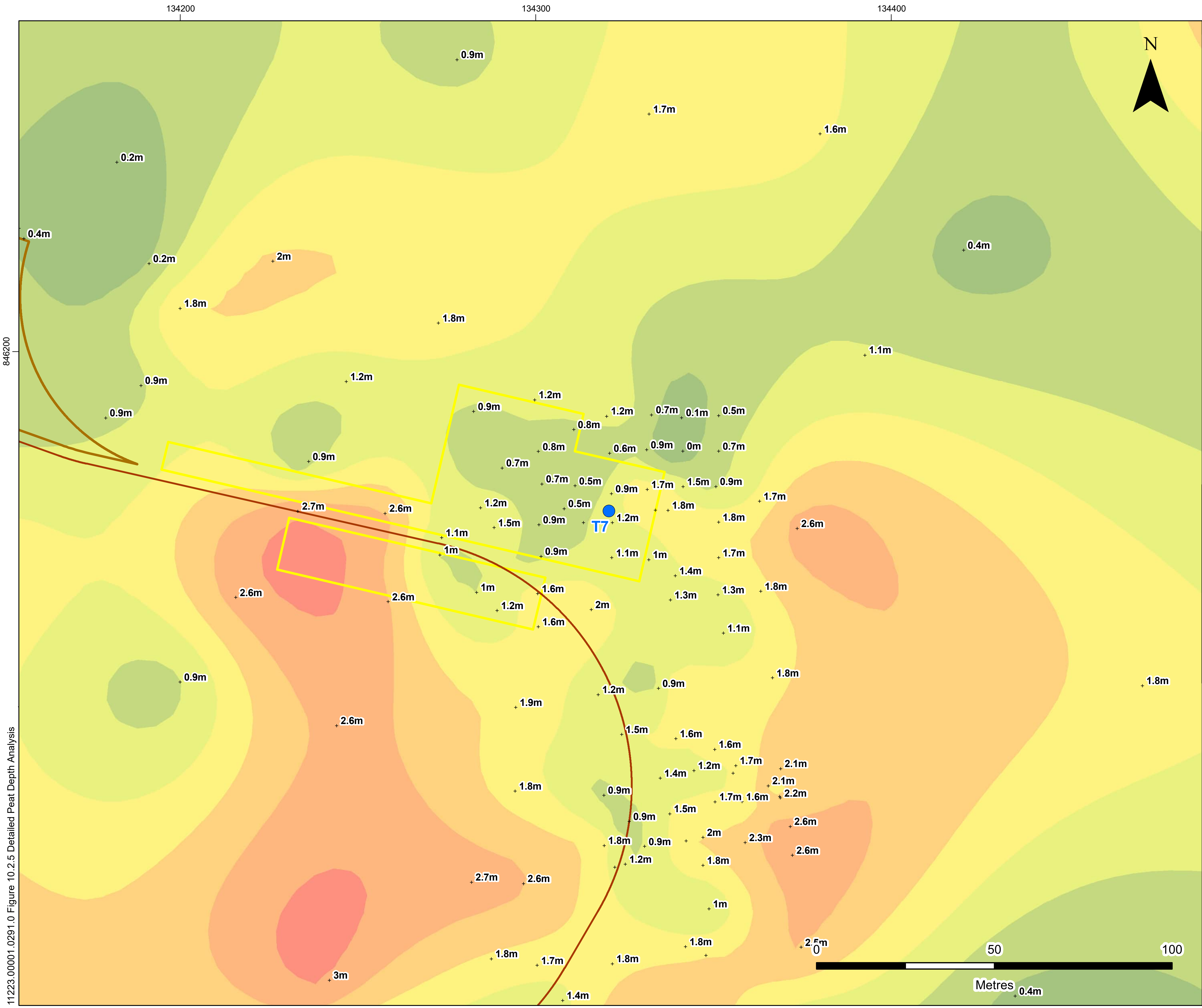
TA 10.2 – PMP

DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5f

Scale 1:1,000 @ A3 | Date JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

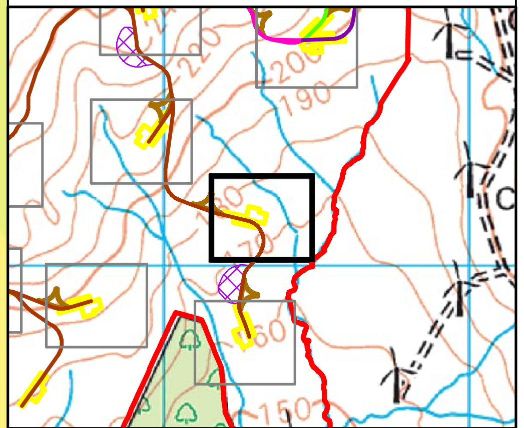
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Proposed Turning Head

Proposed Track Alignment

- Proposed
- Peat Probe Location

Peat Depth (m)

- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3



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TA 10.2 – PMP

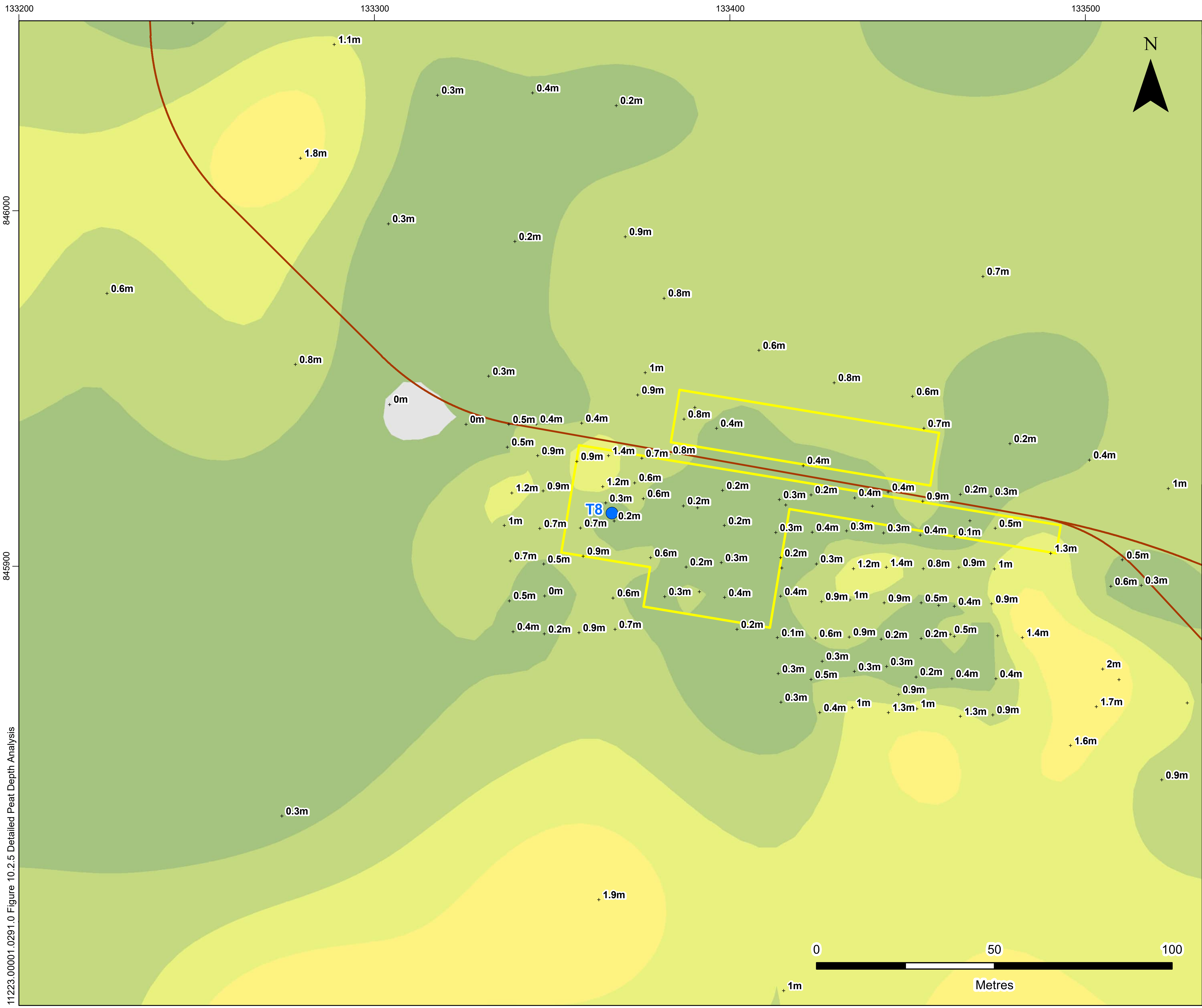
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5g

Scale 1:1,000 @ A3

Date JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

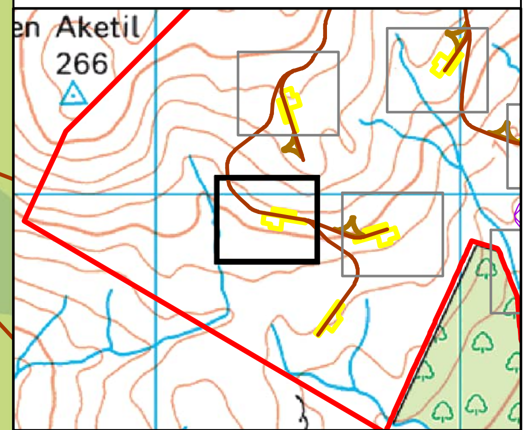
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding

Proposed Track Alignment

- Proposed
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2



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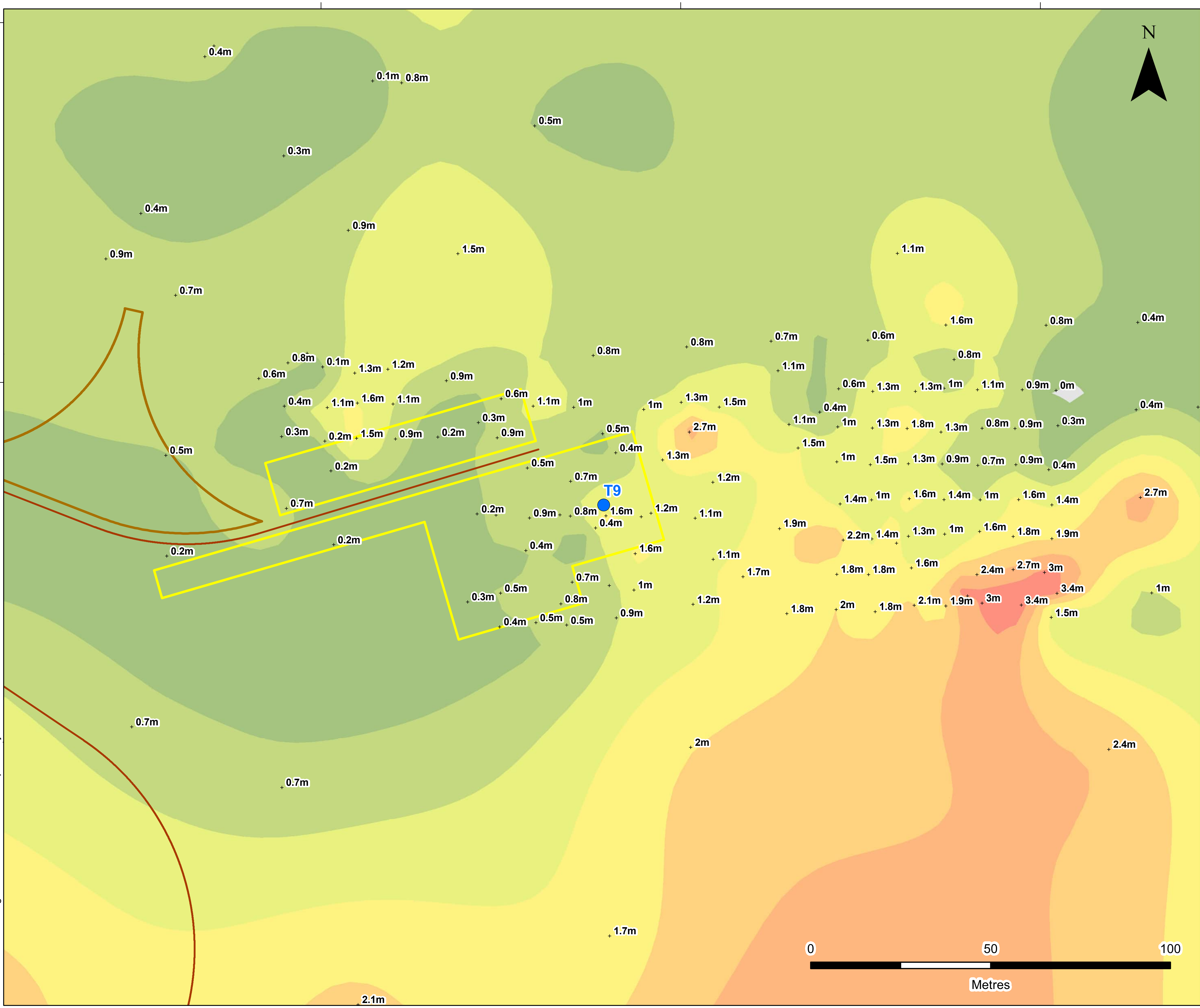
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5h

Scale	Date
1:1,000 @ A3	JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis



LEGEND

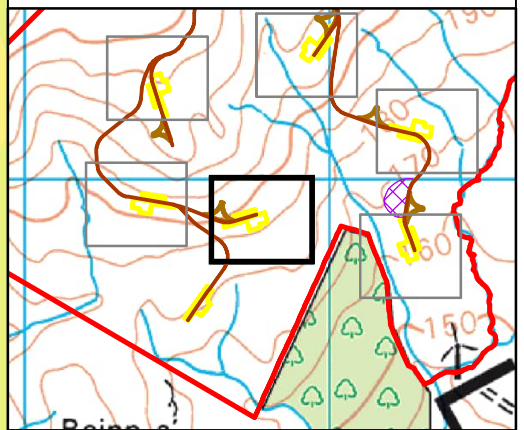
- Application Site Boundary
- Proposed Turbine Location
- Proposed Crane Hardstanding
- Proposed Turning Head

Proposed Track Alignment

- Proposed
- Peat Probe Location

Peat Depth (m)

- 0
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3



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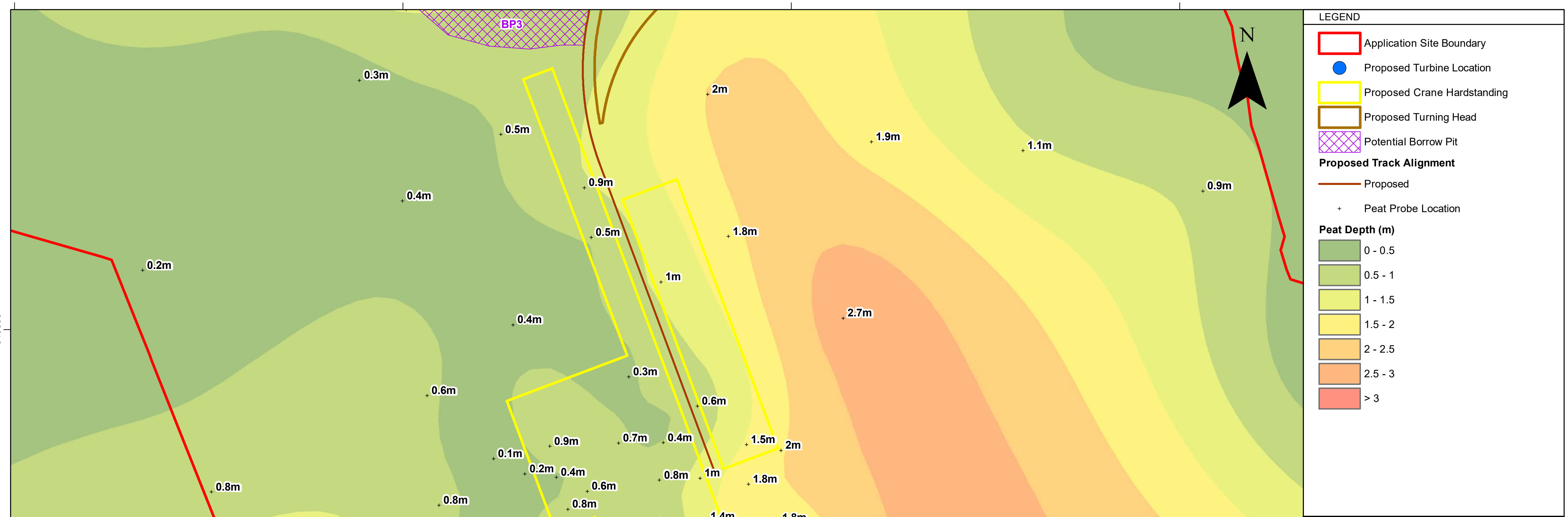
DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

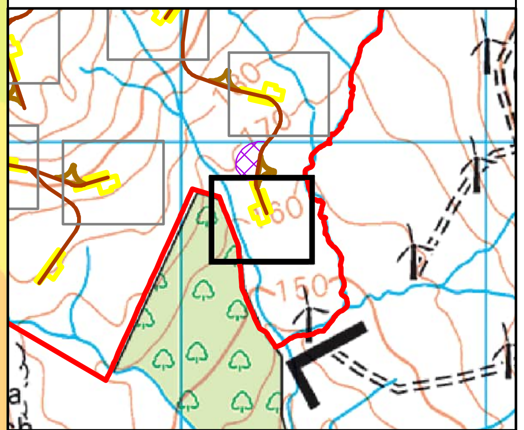
FIGURE 10.2.5i

Scale 1:1,000 @ A3

Date JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis





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DETAILED PEAT DEPTH ANALYSIS FOR TURBINES

FIGURE 10.2.5j

Scale	Date
1:1,000 @ A3	JULY 2023

11223.00001.0291.0 Figure 10.2.5 Detailed Peat Depth Analysis

ANNEX 10.2A: EXCAVATED MATERIALS CALCULATIONS

Infrastructure	Length (m)	Width (m)	Average Depth (m)	Number	Total Volume Excavated (m3)	Length (m)	Width (m)	Average Depth (m)	Number	Total Re-use Volume (m3)
Site Track (Excavated) Option B	9404	6	0.48	1	27084	9404	3	1.00	1	28212
Turning Heads	55	50	0.67	9	16583	100	1.5	1.00	9	1350
Turbine Bases - formation only	23	23	0.75	10	3114	80	2	0.50	10	800
Hardstandings	68	38	0.68	10	17571	240	2	0.50	10	2400
Met Mast	10	10	1.20	1	120	40	2	0.50	1	40
Substation	35	30	0.51	1	536	130	2	0.50	1	130
Construction Compound	100	80	0.24	1	1920	360	2	0.50	1	360
Borrow Pit 1	231	88	0.20	1	4066	231	88	1.50	1	30492
Borrow Pit 2	139	66	0.55	1	5046	139	66	1.50	1	13761
Borrow Pit 3	130	74	1.20	1	11544	130	74	1.50	1	14430
Borrow Pit 4	150	100	0.23	1	3450	150	100	1.50	1	22500

Total Excavated Volume (m3)	91033
Total Re-use Volume (m3)	114475
Net Balance (m3)	-23442

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