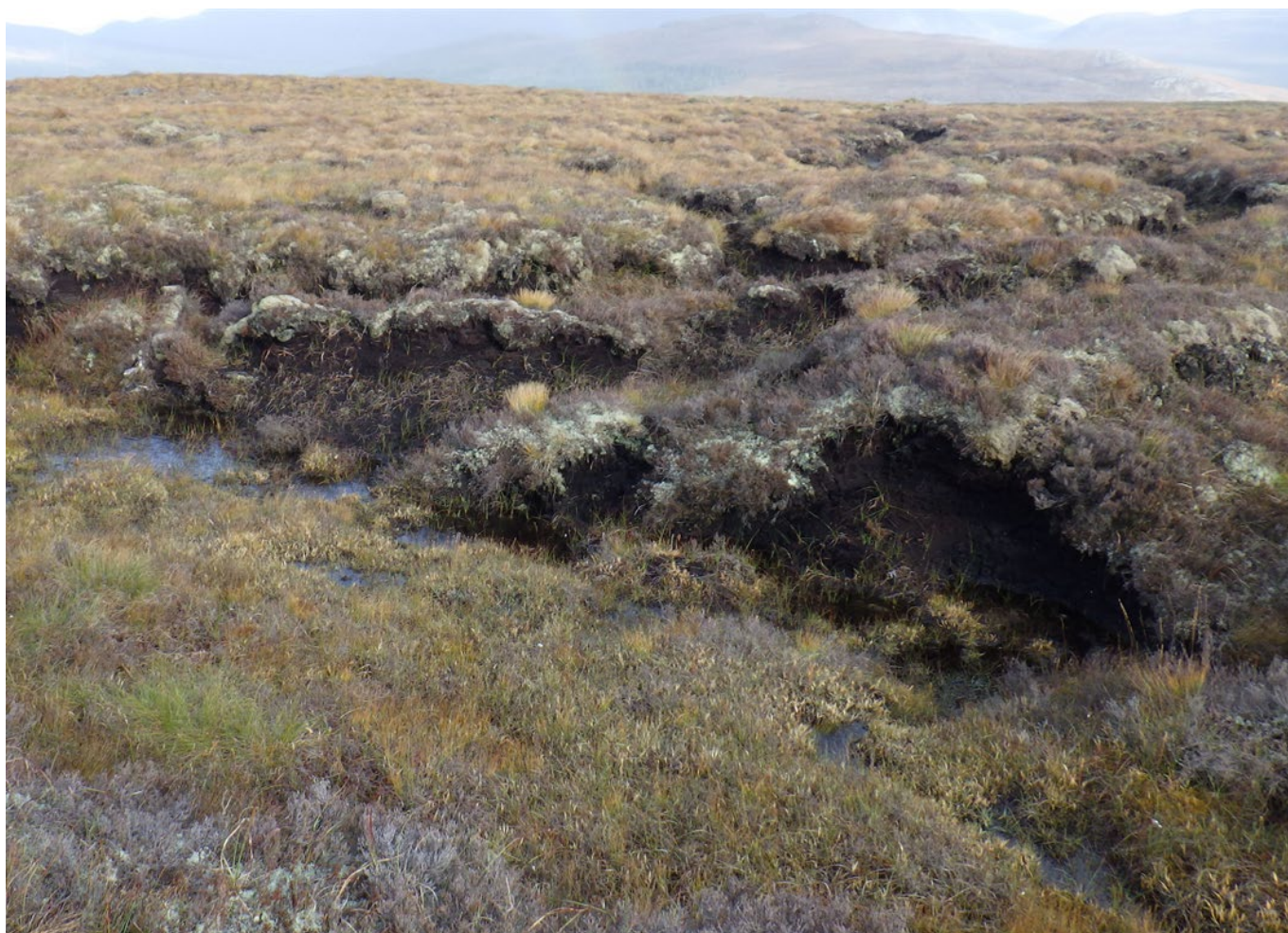




RWE Renewables UK Swindon Ltd.

Pen March Wind Farm: Outline Peat Management Plan

Technical Appendix 6.2

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RSK GENERAL NOTES

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This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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1 INTRODUCTION

- 1.1 This report provides an Outline Peat Management Plan for the proposed Pen March Wind Farm and associated infrastructure (hereafter, the 'Proposed Scheme').
- 1.2 The report forms a Technical Appendix to the Environmental Statement (ES) for the Proposed Scheme and should be read in conjunction with this document. It has been produced to address the requirement for excavation of peat and peaty soils during the construction process.
- 1.3 This report will consider total volumes of peat that need to be excavated and will set out options for reuse of the excavated material. Guidance on management and handling of excavated peat and soils will be provided.

Location

- 1.4 The Site is located in South Wales, approximately 1.5 km north-east of Merthyr Tydfil and 1.5 km north-west of Rhymney. The Site lies across the Merthyr Tydfil and Caerphilly County Borough Council areas. The land is currently a mix of common land and Countryside and Rights of Way Act 2000 (CRoW) land with open access.
- 1.5 The Site covers a broadly sloping area of Purple Moor Grass-dominated grassland, with small scattered areas of dense scrub, exposed rock, dry heath and standing open water habitats. The western side borders the town of Merthyr Tydfil, the northern side borders the Bannau Brycheiniog National Park (formerly Brecon Beacons National Park), the eastern side stops at the top of the valley slope down towards the Rhymney River, and the southern side borders the A465 Heads of the Valleys Road.
- 1.6 The Site is underlain by soils and peat of variable depth, with some areas of notable peat depth.

Development proposals

- 1.7 The Proposed Scheme includes the following key elements:
 - Six wind turbines with a maximum tip height of 180m.
 - Hardstanding areas at the base of each turbine, with a maximum total area of approximately 9,147 m²
 - Approximately 5,376 m of new access track with associated watercourse crossings and passing places.
 - Two temporary construction and storage compounds, one of which would form the energy storage facility.
- 1.8 Full details of the Proposed Scheme design are provided in **Chapter 4 (Volume 2)** of the ES.

Aims

- 1.9 This report aims to undertake a review of all available peat depth information for the Site and immediate environs, and to provide a series of calculations determining the estimated volumes of peat that would require excavation in order to allow the development to progress. Options will be provided to address use of the excavated peat within necessary restoration of Proposed Scheme infrastructure. A series of good practice measures relating to peat and soil handling and storage will also be provided.

Assessment method

- 1.10 The assessment has involved the following stages:
- Desk study;
 - Peat depth surveys and infrastructure design;
 - Volume calculations for excavation and reuse; and
 - Peat handling and storage guidance.

2 PEAT CONDITION

Developments on peat

Definition of peat

- 2.1 Peat is described by the JNCC (2011) as:
- The partially decomposed remains of plants and soil organisms which have accumulated at the surface of the soil profile. Peat accumulates where the rate of input of organic material from the surface exceeds the rate of decomposition and 'turn-over' of this new material. Under UK climate conditions, this happens under seasonal or year-round water-logging and is exacerbated by cold temperatures.*
- 2.2 In Wales, Natural Resources Wales (NRW) considers organic-rich soils to be peat if they have a thickness of more than 40 cm of organic material within the upper 80 cm of a soil profile (NRW, 2022c).
- 2.3 Peatlands are defined by Forest Research (2012) as soil types where the surface horizon contains >25% organic matter and is >40 cm deep. This corresponds with the definition used within the Soil Survey of England and Wales; however, in Scotland peat soils are defined as >50 cm deep.
- 2.4 The extent of peat in Wales was mapped using a method adopted by Natural England in their England's Peatlands project which identified three types of peatland soil types based on their general characteristics (JNCC, 2011):
- Deep Peaty Soils: areas covered with a majority (>80%) of peat >40 cm deep often referred to as peat.
 - Shallow Peaty Soils: areas with extensive (>50%) of soils with peat 10-40 cm deep also referred to as organo-mineral soils.
 - Soils with Peaty Pockets: areas of mostly non-peat or shallow peaty soils, supporting significant smaller pockets of deep peat (such as flushes or exposures of buried peat) too small to map at a national scale (Forest Research, 2012).
- 2.5 Active peatland typically consists of two layers: the surface layer or *acrotelm* and the deeper layer or *catotelm*. The acrotelm contains the living vegetation and consists of living and partially decayed plant material. It typically has a low but variable hydraulic conductivity and allows some through-flow of water within the plant material.
- 2.6 The underlying catotelm is denser, with a very low hydraulic conductivity, and is formed from older decayed plant material. The catotelm varies in structure, in some areas retaining a proportion of fibrous material and in other areas being more humified and amorphous. The degree of humification typically increases with depth.
- 2.7 Underneath the peat-forming layers, the basal substrate can be a mineral soil, a superficial deposit such as glacial material, or bedrock. There may be a transition zone through a mineral-rich peaty layer at the base of the peat, although this is usually no more than 5 cm in thickness.

Importance of peat

- 2.8 Based on the unified peat map of Wales, peatlands are estimated to cover 4.3% of the total land area of Wales which amounts to over 90,000 ha; they also represent the largest terrestrial ecosystem store of carbon in Wales and are important for biodiversity (Evans *et al.*, 2015). Forest Research (2012) indicates that deep peat soils are estimated to contain approximately 30% of the Wales's total soil carbon stock.
- 2.9 Active and healthy peatlands develop continuously, removing carbon dioxide from the atmosphere and storing it within the peat soil. Therefore, protection of this peatland resource is becoming increasingly recognised as crucial to climate change mitigation in the land-use sector. As well as carbon storage and improving biodiversity, another important driver for protecting peatlands is their role in regulating water flows and water quality (Forest Research, 2012).
- 2.10 Peatland protection and restoration form key parts of the Welsh Government's Climate Change Plan, promoted and enacted by NRW's National Peatland Action Programme (NPAP). The NPAP is a five-year plan of peatland restoration in Wales. The programme is designed to target peatlands that need the most restoration and aims to restore 600-800 hectares (ha) of public and private land every year. Over 650 ha were restored in the first programme year, 2020-21 (NRW, 2022d).
- 2.11 Activities such as over-grazing, drainage and conversion to grassland and forestry have had a detrimental effect upon many areas of peatland in Wales which can stop them from regenerating, cause peat to oxidise and emit greenhouse gases (Evans *et al.*, 2015).
- 2.12 Measures supported by land management and conservation mechanisms, such as the Glastir Monitoring & Evaluation Programme run by NRW, aim to restore Welsh peatlands and allow them to continue carbon sequestration.
- 2.13 It is therefore important that developments in peatland areas take recognition of the importance of peatland as a habitat and carbon store. Careful planning of developments, and careful infrastructure design, can remove or minimise the disturbance of peat that would be needed to allow the development to proceed.

Development setting

Topography and geomorphology

- 2.14 The Site is located on Pen March, part of the southern slope of Cefn y Ystrad. The area slopes down to the south and south-east, with the highest land lying on the northern boundary at approximately 535 m AOD and the lowest land at approximately 355 m AOD by the A465 Heads of the Valleys Road on the south-eastern boundary.
- 2.15 The area forms a broad ridge with watercourse valleys to east and west. As the watercourses diverge, the ridge becomes broader and less distinct, having more of the character of a wide slope along the southern margin. Across the A465 Heads of the Valleys Road the ground rises to the south. The land in this area has undergone significant modification as a result of coal mining activity.

- 2.16 Prominent breaks-in-slope are largely absent from the area. Two key topographical features are notably incised watercourse channels, one to the east and one to the west of the development area. These are associated with the main channels of the Nant Pitwellt to the east side and the Nant Morlais to the west. A pond or wetland feature on the northern boundary, Pwll Mere, has a notably steep back wall with a pronounced break-in-slope on the northern side.
- 2.17 In the area to the east of the Site, two reservoirs are visible. The northern one is on the Nant Pitwellt, and the southern where the Nant Pitwellt joins the Rhymney River.
- 2.18 The area to the west of the Site includes a number of disused quarries. These appear to have faces of 20-30 m in height with a near-vertical slope.
- 2.19 Within the Site, two reservoirs are indicated on the maps – Pitwellt Pond and Jepson's Pond. Pitwellt Pond is shown to be dry on aerial imagery and this was found to be the case during visits to the site. There are a number of watercourse channels that are either artificial or have been channelised, in addition to watercourses that appear to be fully natural.
- 2.20 Some bedrock exposure is apparent in parts of the site, notably between Pitwellt and Jepson's Ponds in the western part of the site and on the mid-part of the slope in the eastern part of the site.

Habitats and vegetation

- 2.21 The survey area is dominated by grassland and moorland habitats that are typical of south Wales including marshy grassland, acid grassland, heath, flush and degraded bog. Most of the habitats occur as mosaics. The majority of the habitats present within the survey area have been heavily modified by livestock grazing and/or fires which has reduced the species diversity. Most of the habitats present are relatively species poor and dominated by common, vigorous plant species that are most resilient to the effects of grazing.
- 2.22 Detailed survey work has confirmed the presence of any habitats of conservation importance across the Site, further detail is provided in **Chapter 7: Ecology, (Volume 2)** of the ES. Habitats of potential conservation importance include:
- H18 *Vaccinium myrtillus* - *Deschampsia flexuosa* heath
 - M15 *Scirpus cespitosus* - *Erica tetralix* wet heath
 - M20 *Eriophorum vaginatum* blanket and raised mire
 - M17 *Scirpus cespitosus* - *Eriophorum vaginatum* blanket mire
 - M25 *Molinia caerulea* - *Potentilla erecta* mire
 - M4 *Carex rostrata* - *Sphagnum recurvum* mire
 - M6 *Carex echinata* - *Sphagnum recurvum/auriculatum* mire
 - M29 *Hypericum elodes* - *Potamogeton polygonifolius* soakway

Hydrology

- 2.23 The Site lies across two catchment areas: the River Rhymney and the River Taff catchments. The catchment areas are shown on **Figure 6.4 (Volume 3)** of the ES.

River Rhymney catchment

- 2.24 The River Rhymney catchment has a total area of approximately 73.9 km² down to Ystrad Mynach, and drains 68% of the Site.
- 2.25 The River Rhymney lies immediately east of the Site boundary. Within the Site boundary, drainage is provided by the Nant Pitwellt and tributaries in the northern part of the Site, and a number of unnamed and modified watercourses in the southern and central section.
- 2.26 Within the site, the Rhymney catchment has been described by NRW's Environmental Information Portal (NRW, 2022b) as an area of grassland and marshland mainly used for upland grazing. Smaller regions on steeper slopes are described as upland hills or plateau. The watercourses within the site have been modified during the period of mining and quarrying activity, with Jepson's Pond described as an industrial reservoir, with sluices upstream to divert flow into the pond; these form part of the Dowlais Free Drainage System (Roberts & Jones, 2007).

River Taff catchment

- 2.27 The River Taff catchment has a total area of 188.8 km² down to Abercynon, and drains 32% of the site.
- 2.28 The River Taff is formed by the confluence of the Taf Fawr and Taf Fechan at the west side of Merthyr Tydfil. The Taf Fechan is located approximately 1.5km west of the site boundary. Within the site, drainage is provided by the Nant Morlais and its tributary the Nant Tor-gwyn and a number of unnamed smaller watercourses.
- 2.29 Within the site, the Taff catchment has been described by NRW (2022b) as an area of grassland and marshland mainly used for upland grazing. Smaller sections on the steeper slopes surrounding the Taff Fechan are described as an upland valley. The watercourses within the site have been modified during the period of mining and quarrying activity, with part of the Nant Morlais diverted in the area near Pitwellt Pond and additional connections across the catchment divide towards Jepson's Pond. As with Jepson's Pond, Pitwellt Pond is an industrial reservoir with sluices upstream to divert flow into the pond; these form part of the Dowlais Free Drainage System (Roberts & Jones, 2007).

Dowlais Free Drainage System

- 2.30 The interconnected system of reservoirs, ponds, leats and culverts in the area is known as the Dowlais Free Drainage System (Dowlais FDS). The full extent of the system is not clearly defined and much of it has not been mapped, partly as a result of poor documentary evidence of the drainage works (Roberts & Lawler, 2003). The system was established to provide water to the Dowlais Iron Company and was developed over a period of roughly 50 years as required by the works, dating from the mid 19th Century.
- 2.31 As a result of the system's extent, the River Taff and River Rhymney catchments are now partially interconnected although the Dowlais FDS is no longer maintained and parts of the system have fallen into disrepair.

Catchment statistics

- 2.32 The Catchment Wetness Index, PROPWET, for the project area catchments ranges from 0.40 to 0.44, indicating the project area is wet for 40-44% of the time. The area has a moderate Baseflow Index, indicating that groundwater contribution is important to regional watercourses but may be strongly determined by seasonality. The Standard Percentage Runoff (SPR) is moderate, indicating that 38-45% of area rainfall is converted into surface runoff from rainfall events. Catchment statistics are derived from the Flood Estimation Handbook Web Service (CEH, 2022).
- 2.33 BFI and SPR are likely to vary within the study area as a result of local changes in bedrock, superficial geology and soil types.
- 2.34 Catchment statistics are derived from the Flood Estimation Handbook Web Service (CEH, 2022). Full catchment statistics are provided in **Table 2-1**.

Table 2-1: Project area catchment statistics

Catchment Name	Catchment Wetness Index (PROPWET)	Base Flow Index (BFI HOST)	Standard Percentage Runoff (SPR HOST)	Area of site within catchment (%)
River Rhymney	0.51	0.44	38.28	68
River Taff	0.53	0.40	44.95	32

Peat characteristics at the Site

- 2.35 The Site is almost entirely underlain by soils described as slowly permeable seasonally waterlogged fine loamy soil and fine loamy soil over clayey upland soils with a peaty surface horizon. The very south-westernmost corner is identified as restored opencast coal workings.
- 2.36 Parts of the site have widespread evidence of drainage, mainly associated with the Dowlais FDS. The area is mainly common land and is used extensively for rough grazing for sheep and horses.
- 2.37 Initial peat depth surveying was undertaken by RSK in February and March 2021. This Phase 1 survey consisted of a 100 m grid across the main development area in order to develop a picture of the overall pattern of peat development across the site. In areas where peat was identified, additional probing on a 25m grid was undertaken to help in defining the peat bodies and the peat margins more effectively. The survey results were used to inform the infrastructure design, in order to minimise incursion into areas of peat as far as possible.
- 2.38 Subsequent phases of peat depth surveying were undertaken by RSK in May, July and August 2021 and in April 2022. For these Phase 2 surveys, peat depths were recorded at 50 m intervals along proposed tracks, crosshair probing at turbine base locations and in grids across hardstanding areas, site compounds and buildings. Additional records were collected in some areas to help delineate areas of peat.

- 2.39 The combined peat depth data were used to generate a detailed map of peaty soil and peat depth for the study area. This is provided on **Figure 6.3 (Volume 3)** of the ES. Measured peat and soil depths range from 0 (bedrock at surface) to 5.2 m. A total of 1,290 peat depth measurements have been recorded for the Proposed Scheme and immediate surroundings.
- 2.40 No areas of blanket peat are present within or adjacent to the Site, although pockets of blanket peat are mapped within 5 km to the north and east.
- 2.41 Areas of peat were identified in parts of the Site, with one recorded depth deeper than 5 m. Most of the site has no peat, or peaty soils under 0.5 m in thickness. Areas of deeper peat tend to be restricted to pockets in some of the boggy areas of ground.

Peat excavation volumes

- 2.42 The intention has been to avoid peat areas where possible, and to minimise incursion into peat where it has not been possible to avoid it altogether. Approximately 70% of the development infrastructure including drainage is underlain by peaty soil or topsoil no greater than 0.4 m deep.
- 2.43 **Tables 2-2 to 2-5** set out the estimated volumes of peat that need to be excavated in order to construct the Proposed Scheme. The calculations are provided per 'scheme element', as totals for each element type, and as an overall total. Each set of calculations provides subdivision into 'acrotelm' and 'catotelm'.
- 2.44 For the purposes of these calculations, the acrotelm has been assumed to form the uppermost 0.3 m where peat is present. Acrotelm is known to vary in thickness, but it is recommended that peat turves are excavated to approximately 0.5 m where possible, including the uppermost part of the catotelm, to promote quicker regeneration of disturbed areas following reinstatement.
- 2.45 Volumes of peaty soil and topsoil have not been included, in line with the definition of peat quoted above. Soils would also require excavation but are less sensitive than peat to both excavation and restoration.
- 2.46 **Table 2-2** provides peat volumes that require excavation in order to allow construction of the access track network and associated drainage. The proposed new access track width will be approximately 5.5 m, although may be up to 7.0 m for short sections, such as passing places, laydown areas and tighter bends. The working corridor for excavation calculations of proposed new access track includes an additional 10 m buffer on each side to calculate excavational width. Turning heads present directly adjacent to the access track have been included as part of the access track.

Table 2-2: Peat excavation volumes for access tracks

Scheme element	Acrotelm (m ³)	Catotelm (m ³)	Total (m ³)
Access entry and track to T4	2,975	1,209	4,183
Track to T6	529	142	671
Track to T3, T5 & Substation	1,265	16	1,281

Scheme element	Acrotelm (m ³)	Catotelm (m ³)	Total (m ³)
Track to T2 & T1	661	83	744
Total	5,430	1,449	6,879

- 2.47 **Table 2-3** provides peat volumes that require excavation in order to allow construction of the turbine foundations, hardstanding areas and crane pads, plus associated drainage. Calculations have been made for each turbine base plus necessary hardstanding areas, making use of peat depth data for the relevant turbine and hardstanding footprint. Where turning heads are present directly adjacent to areas of turbine hardstanding these have been combined.

Table 2-3: Peat excavation volumes for turbines, hardstandings, crane pads and associated drainage

Scheme element	Acrotelm (m ³)	Catotelm (m ³)	Total (m ³)
Turbine 1	0	0	0
Turbine 2	2,001	750	2,751
Turbine 3	1,734	390	2,124
Turbine 4	2,297	1,025	3,322
Turbine 5	1,941	904	2,845
Turbine 6	2,610	1,189	3,799
Total	8,581	3,508	12,090

- 2.48 **Table 2-4** provides peat volumes that require excavation in order to allow construction of additional infrastructure, such as construction compounds and associated drainage. Calculations have been made for each footprint, making use of peat depth data for the relevant infrastructure element.

Table 2-4: Peat excavation calculations for other infrastructure elements

Scheme element	Acrotelm (m ³)	Catotelm (m ³)	Total (m ³)
Construction Compound	233	117	350
Electrical Compound	0	0	0
Total	233	117	350

- 2.49 A summary of the total peat volumes is provided in **Table 2-5**.

Table 2-5: Summary of estimated peat excavation volumes

Scheme element	Acrotelm (m ³)	Catotelm (m ³)	Total (m ³)
All tracks	5,430	1,449	6,879
All turbine infrastructure	8,581	3,508	12,090
All other infrastructure	233	117	350
Total	14,245 (74%)	5,073 (26%)	19,318

Peat reuse

- 2.50 The guidance document '*Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste*' (Scottish Renewables/SEPA, 2012) identifies a number of reuse options for excavated peat within wind farm developments. This document has been used in lieu of any Wales-specific guidance. These have all been tested in practice and found to be effective, if undertaken with care and appropriate handling of the peat.

Dressing-off edges of constructed infrastructure

- 2.51 Excavated peat can provide a valuable means for dressing-off and reinstating the slopes and edges of constructed infrastructure. This should be undertaken as soon as practicable after construction and should be managed such that a suitable tie-in to the surrounding topography is created as part of the process. This has a twofold purpose – to reduce the visual effect of the infrastructure and to retain as much of the existing habitat as possible.
- 2.52 A secondary part of this would involve full reinstatement of elements of infrastructure only required for the construction phase, principally temporary construction compounds. Temporary parts of the turbine hardstandings may also be reinstated following installation of the turbines.

Peat reuse volumes

- 2.53 Calculations have been made to determine where excavated peat can usefully be reused within the Proposed Scheme, for the purposes of reinstatement. Estimated volumes for reuse are provided in **Table 2-6**, subdivided by the different reinstatement and restoration methods that are appropriate for the Proposed Scheme.

Table 2-6: Estimated soil and peat volumes for different reuse options

Reuse option	Acrotelm (m ³)	Catotelm (m ³)	Total (m ³)
Dressing-off edges of turbine hardstandings	3,400	1,400	4,800
Reinstatement of temporary construction compound	2,600	800	3,400
Proposed access track verge reinstatement	9,600	3,200	12,800
Dressing-off edges of proposed substation	200	100	300
Totals	15,800	5,500	21,300

- 2.54 All figures provided in **Table 2-6** have been rounded down to the nearest 50 m³, to make allowance for the uncertainties present within the figures.
- 2.55 It has been assumed that approximately 25-30% catotelmic peat would be reused for dressing-off edges and reinstatement of construction infrastructure. Catotelmic peat

tends to be best used in areas with natural hollows, where it can be overlaid with acrotelmic peat to help restore the natural surface vegetation.

- 2.56 Verge reinstatement and dressing-off have assumed a maximum depth of 0.6 m and a maximum width of 2.0 m from the infrastructure or track margin, to be varied in practice as best suits the local ground conditions. For the temporary construction compound, restoration up to 1.0 m depth has been assumed.

Proposed peatland restoration

- 2.57 The potential to provide beneficial measures for peatland restoration within the Proposed Scheme is limited as a result of a number of factors.
- 2.58 The main constraints relate to the areas of land classified as common land, and the overall highly degraded nature of the habitat within the Application Boundary. While both concerns could be overcome, restricting grazing on the common requires the agreement of all the commoners, of which there are many. The common land is a key part of the area which would be necessary to any proposed peatland restoration activity in order to allow recovery of habitats through vegetation management and, potentially, planting with plugs of key peatland species.
- 2.59 Consultation with Dŵr Cymru Welsh Water (DCWW), which owns the adjacent land to the east of the Application Boundary, has led to the potential for peat and peatland habitat restoration to be undertaken within their land holding. This has two strong advantages: the DCWW land is immediately adjacent to the Application Boundary, which would allow peat units to be considered as a whole where they cross the boundary between the two land holdings, and there is much greater flexibility for grazing and land management which means that restoration works are more likely to be effective.
- 2.60 A peat depth survey was undertaken across the area of DCWW land in April 2023, in order to identify the best parts of the area in which to target peat restoration. The survey identified three main areas with peat presence, where restoration activities would be beneficial to development of peat and peaty soils. The three areas cover a total of 63.1 ha and vary in size from 18 to 24 ha (Figure 6.2.2).
- 2.61 The total indicative working area has a footprint of 26.4 ha, of which 16.4 ha has soil cover <0.4 m. This gives an indicative peatland area of 10.0 ha which would be lost or damaged by the Proposed Scheme, before micro-siting it taken into account.
- 2.62 For each area, a detailed study would be undertaken post-consent and prior to any works being undertaken in the areas to identify the best methods of peat and peatland restoration. It is anticipated that these would include the following techniques:
- Ditch and channel blocking and reprofiling to raise water levels;
 - Vegetation management to control plant species that are not conducive to peat development;
 - Management of grazing to control grazing impacts in target areas, including consideration of stocking density, type of livestock and potential for fencing-off particularly sensitive areas.

- 2.63 Proposals for vegetation management would be prepared in consultation with the ecologists and would be included within a detailed Habitat Management Plan.

3 PEAT HANDLING & STORAGE

Peat excavation

- 3.1 During the construction of the development infrastructure, the Contractor would adopt the following good practice guidelines with relation to peat excavation:
- Where peat conditions are suitable, peat turves would be excavated as intact blocks of the uppermost 0.5 m including the vegetated surface acrotelm layer and the upper part of the catotelm.
 - In areas where peat conditions do not allow clean removal of peat turves, the upper layer of peat would be removed as divots or mulch rather than as turves. Careful handling would help to keep the vegetated blocks largely the right way up.
 - Underlying peat would be extracted as close to intact as is feasible within the constraints of the area. Remoulding of the peat by the excavator would be kept to a minimum.
 - Excavated materials would be classified depending on their composition, and each type would be stored separately. Anticipated material classes are: peaty soils and topsoil, subsoil, acrotelmic peat, catotelmic peat, mineral soil and rock.
 - Excavated peat would be transported as short a distance as practicable for either reuse or temporary storage, in order to minimise loss of structure during transport.
- 3.2 Peat and soil stripping can be adversely affected by very wet weather. The following 'stop' conditions are recommended to guide any peat and soil stripping activity (Table 6.2.7; CH2M & Fairhurst, 2018).

Table 3-1: Recommended 'stop' conditions

'Stop' rule	Requirements
High intensity rainfall	Rainfall during construction greater than 10 mm per hour
Long duration rainfall	Rainfall in the preceding 24 hours greater than 25 mm
7-day cumulative rainfall (1)	Preceding 7 days of rainfall greater than 50% of the monthly average
7-day cumulative rainfall (2)	Preceding 7 days of rainfall greater than 50 mm

- 3.3 Monitoring of rainfall for 'stop' conditions would require access to a suitable local source of data, such as the Met. Office's monitoring station at Tredegar, or a site-specific rainfall station, to allow identification of these conditions being exceeded in order to allow appropriate action to be taken.

Temporary storage

- 3.4 Temporary storage of peat should be avoided or minimised wherever possible. This is best achieved by transporting the peat to an allocated reuse location as soon as practicable following excavation. This would help to retain its structural integrity as far as possible, would minimise volumes of peat requiring storage and would help to prevent the peat drying out.
- 3.5 The Environmental Clerk of Works would maintain a schedule of reuse and restoration areas. Immediate reuse is likely to be more practicable in the later stages of construction.
- 3.6 Soils, peat turves and peat would all be stored separately. The following outline good practice would be applied to all areas of peat and soil storage:
- Excavated materials would not be stored immediately above excavation faces, in order to prevent overburden-induced failure.
 - Local drainage lines, areas of very wet ground and locally steep slopes would be avoided for excavated material storage, including peat.
 - Peat turves would be stored vegetation-side up where possible.
 - Careful handling of upper-layer peat divots, from areas where peat turves cannot be excavated, would help to retain vegetated blocks the right way up.
 - Catotelmic peat would be stored separately from vegetated peat blocks, in mounds up to 1 m high. Covering of mounds with a suitable geotextile may be necessary to minimise drying of the peat.
 - Limited smoothing or 'blading' of stockpiled catotelm peat, topsoil and subsoil would help to shed rainwater and prevent ponding of water on the stockpile.
 - In periods of dry weather, light spraying of the temporary peat stores would be applied in order to minimise drying.
 - All temporary storage areas for excavated peat and soils would be at least 50 m from any watercourse.
 - Runoff from stored peat and soils would be managed to avoid impacts to habitats and watercourses. Where necessary, drainage control measures such as use of silt fences or straw bales would be put in place.
 - Monitoring of peat storage areas may be required during wet weather or snowmelt. This would be undertaken by the Contractor, with findings reported to the Environmental Clerk of Works.

Reinstatement

- 3.7 The following principles would be applied in all situations where peat is being reinstated or used in restoration:
- Reinstatement of peat turves and vegetated peat divots would ensure that surface re-vegetation is encouraged as early as possible. Vegetated peat must only be used for surface layer reinstatement and restoration.
 - Re-seeding of any significant areas of bare peat would be undertaken with a suitable species mix appropriate to the surrounding habitats. Careful planning

of reinstatement should minimise areas of bare peat by appropriate distribution of vegetated peat turves and divots.

- Grazing by livestock may need to be prevented in sensitive areas, by selective use of fencing, until re-vegetation has become established.
- In the event that stored peat becomes dewatered or desiccated, this material would not be exposed in the upper part of any reinstatement or restoration area in order to minimise any further character loss. Storage of excavated peat would be minimised in order to prevent or limit dewatering and desiccation.

Updated peat management

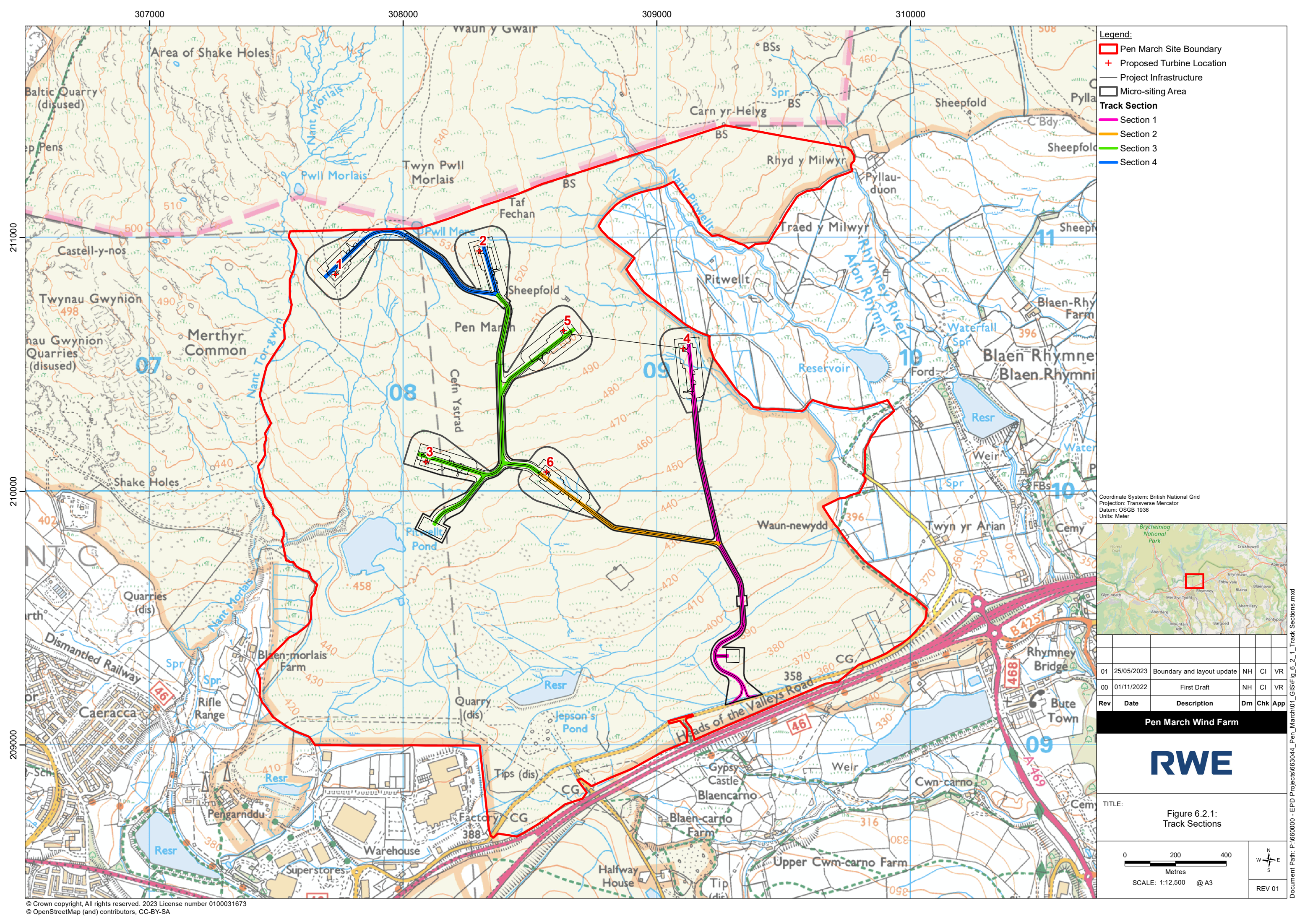
- 3.8 The Outline Peat Management Plan presented here would be updated and refined as necessary with further site-specific detail once site investigation results become available. This would involve recalculation of peat volumes requiring excavation and storage. Location-specific reinstatement and restoration would be overseen by the Environmental Clerk of Works, taking account of specific local variation in topography and natural ground conditions.
- 3.9 Detailed plans for peat and peatland restoration would be provided as part of the updated document, once details have been agreed and finalised.
- 3.10 The Construction Peat Management Plan would be a live document, with revisions added as necessary during the construction process.

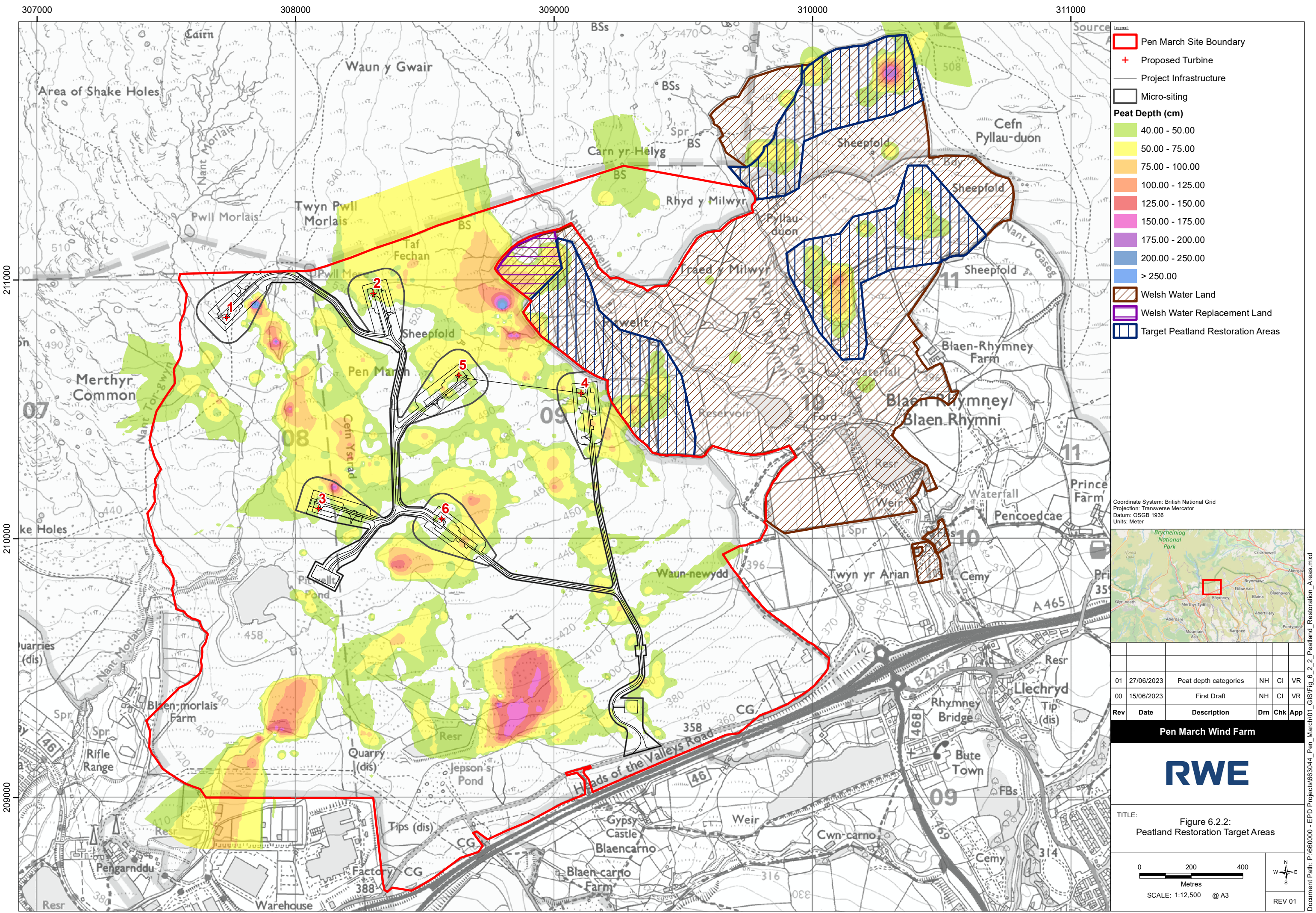
4 SUMMARY

- 4.1 This Outline Peat Management Plan provides an assessment of the likely volumes of peat that would require excavation during the construction of the Proposed Scheme, and of the volumes of peat that can legitimately be used in reinstatement and restoration of development infrastructure. The assessment has included consideration of all proposed infrastructure that would require construction and excavation work where peat would require removal.
- 4.2 The assessment indicates that there would be a balance in peat volumes and that all peat excavated for construction would be able to be reused within the development area for reinstatement. Approximately 74% of the excavated peat would be acrotelmic, which provides good opportunities for promoting re-establishment of peatland vegetation around construction areas. Sensitive reinstatement would help to minimise the visual impact of the construction works as well as minimising the habitat loss from construction.

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Legend:

- Pen March Site Boundary
- Proposed Turbine
- Project Infrastructure
- Micro-siting

Peat Depth (cm)

- 40.00 - 50.00
- 50.00 - 75.00
- 75.00 - 100.00
- 100.00 - 125.00
- 125.00 - 150.00
- 150.00 - 175.00
- 175.00 - 200.00
- 200.00 - 250.00
- > 250.00

- Welsh Water Land
- Welsh Water Replacement Land
- Target Peatland Restoration Areas

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



Rev	Date	Description	Drm	Chk	App
01	27/06/2023	Peat depth categories	NH	CI	VR
00	15/06/2023	First Draft	NH	CI	VR

Pen March Wind Farm

RWE

TITLE: Figure 6.2.2:
Peatland Restoration Target Areas

0 200 400
Metres
SCALE: 1:12,500 @ A3

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