

CPAT Report No. 1533

# Brenig Wind Farm, Denbighshire

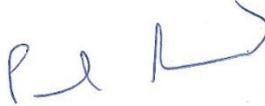
Archaeological Mitigation Works



YMDDIRIEDOLAETH ARCHAEOLEGOL CLWYD-POWYS

CLWYD-POWYS ARCHAEOLOGICAL TRUST

Client name: Brenig Wind Ltd  
 CPAT Project No: 2234  
 Project Name: Brenig Wind Farm  
 Grid Reference: SH 9943 5756 (centre)  
 County/LPA: Denbighshire  
 Planning Application: 25/2007/0565/PF  
 CPAT Report No: 1533  
 Event PRN: 140203  
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## Summary

A programme of archaeological mitigation was carried out by the Clwyd-Powys Archaeological Trust on behalf of Brenig Wind Ltd, during the construction of a new wind farm on uplands east of the Llyn Brenig reservoir.

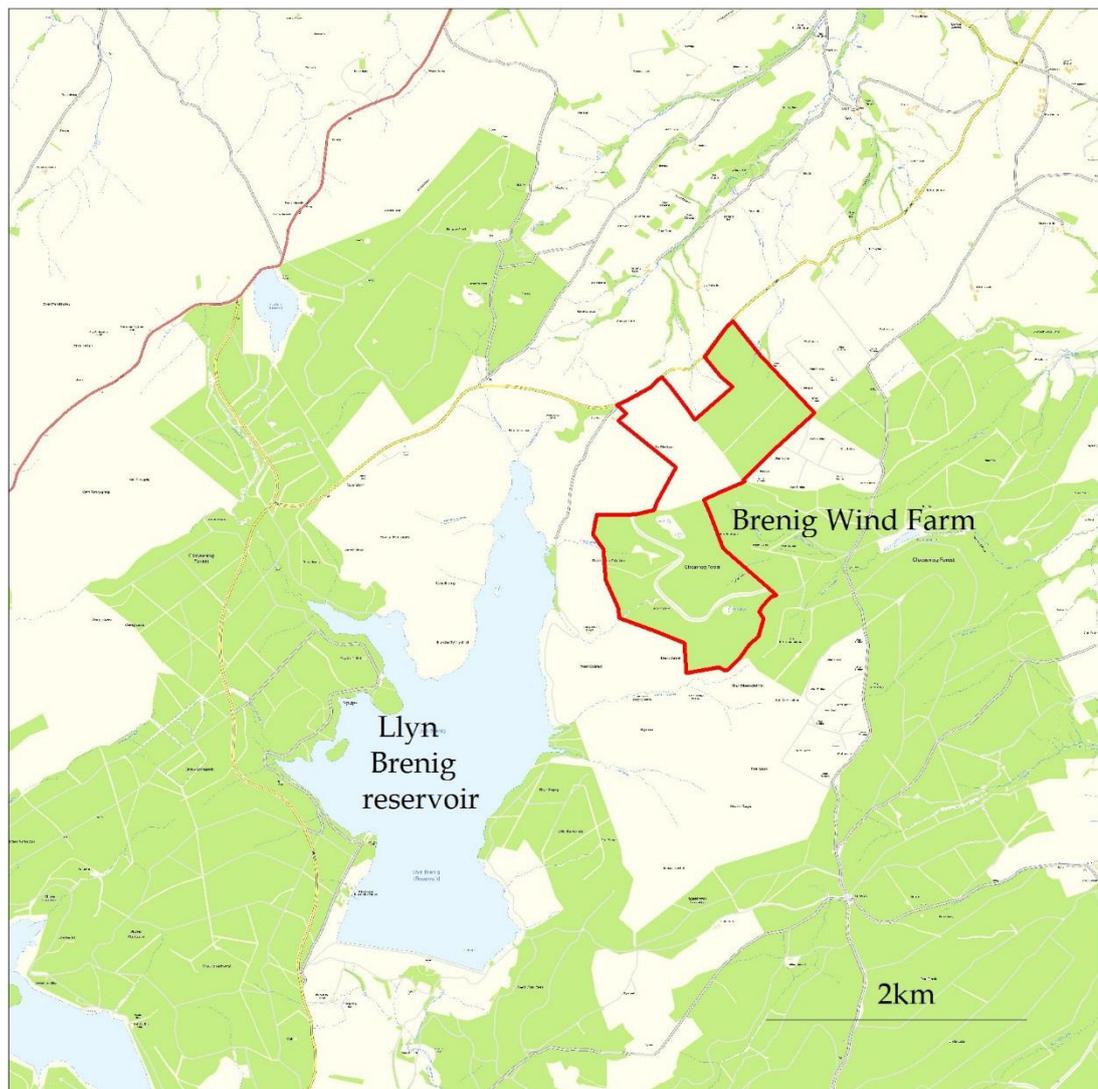
Work carried out for an environmental statement in advance of construction had identified a number of heritage assets within, and in close proximity to, the development site. The Cultural Heritage section of this statement proposed a programme of mitigation for the development, including field survey over areas of forestry that could not be accessed when the environmental statement was being compiled; demarcation of known heritage assets; and a watching brief on soil stripping during the construction phase of the wind farm.

The work was carried out from 27 July to 13 October 2017, on a combination of de-forested areas and grassland. The field survey for the environmental assessment had been unable to access the more dense areas of forestry, so a survey of those areas was required once the existing tree cover had been removed; two heritage assets were demarcated prior to the felling as a protective measure. The survey was followed by the demarcation of known heritage assets to ensure their continued preservation, prior to the commencement of construction. The final element of the mitigation process was a watching brief during construction work; in this regard 100% of all groundworks on the grassed areas were monitored, and 25% on the de-forested areas, where the ground had already been disturbed when the forestry was originally planted.

In total, the locations of 16 Turbine bases, two large borrow pits, the site access roads and substation were monitored, but no significant archaeological remains were revealed. Plough scarring was seen in some parts of the grassland, and widespread evidence of deeper ploughing and drainage works were noted in the de-forested areas.

# 1 Introduction

- 1.1. In August 2016 the Clwyd-Powys Archaeological Trust (CPAT) was invited by Natural Power, on behalf of Brenig Wind Ltd (BWL), to prepare a proposal for undertaking a programme of mitigation works during the construction of the Brenig Wind Farm in Denbighshire. This was accepted by the client in July 2017; it followed an earlier programme of mitigation undertaken by CPAT in 2015.



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Fig. 1: Location of Brenig Wind Farm

- 1.2. The Brenig Wind Farm is located to the east of Llyn Brenig in Denbighshire, North Wales (see Fig 1). The site lies within the Strategic Search Area A, an area identified by the Technical Advice Note (TAN) 8 publication in 2005 for large scale wind farm developments.
- 1.3. The site lies approximately 11 km west of Ruthin and 10 km south-west of Denbigh. The Llyn Brenig reservoir is located adjacent to the west of the site. The site covers approximately 208 hectares, 44 hectares being improved grassland used for

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agricultural purposes, and 164 hectares being commercial forestry, which was clear-felled in advance of the commencement of construction. The site is wholly within the local authority boundary of Denbighshire County Council. The topography of the site comprises rolling upland, lying between 380m and 500m above ordnance datum (AOD).

1.4. The development consisted of:

- 16 wind turbines and the associated crane pads
- A construction compound
- An electrical substation
- Up to 2 anemometry masts
- Site access roads
- Up to 4 borrow pits

### **Planning Background**

1.5. In April 2007 a planning application was submitted by Natural Power on behalf of BWL to Denbighshire County Council (DCC) for the Brenig Wind Farm (100 m maximum blade tip height).

1.6. Planning permission for the development was granted by Denbighshire County Council in 6 April 2009 (Ref 25/2007/0565/PF) and included two conditions relating to the cultural heritage:

**Condition 27** – ‘No works of construction, laying out of access tracks, work on the construction compound or tree felling shall take place until the applicant has secured the implementation of a programme of archaeological mitigation in accordance with section 11.7 of the Environmental Statement and such other mitigation as has been submitted by the applicant and approved in writing by the local planning authority, to include for a watching brief and appropriate buffer zone marking of identified archaeological sites.

**Reason:** To ensure adequate arrangements for the archaeological recording and observations’

**Condition 28** – ‘Where development approaches to within 50 metres of any archaeological site, that site shall be protected and marked by a robust temporary barrier and the barrier should remain in place for the duration of the construction phase so that no accidental damage occurs. The placement of the barriers should not directly impact upon any unscheduled site or scheduled ancient monuments areas and must be placed outside any scheduled monument boundary.

**Reason:** To ensure the protection of archaeological interests’

1.7. In February 2014 the site entrance was constructed and in February 2015 felling of the two blocks of forestry commenced, and the spine road running from the site entrance through to the southern block of forestry was constructed. A watching brief was carried out by CPAT during ground works, although no assets were encountered.

- 1.8. In June 2015 a planning application was submitted by Natural Power on behalf of BWL to increase the tip height of the 16 turbines from 100 m to 110 m. The locations of the turbines and infrastructure was not changed within this application. In May 2016 the 110 m application was consented at appeal.

## 2 Historic Background

- 2.1. The wind farm lies in the area historically known as Mynydd Hiraethog, otherwise the Denbigh Moors, which is situated at the northern end of the Cambrian Mountains and forms a bleak and now largely deserted area of rolling moorland, much of it generally lying between 400 m and 500 m above Ordnance Datum (AOD). The landscape comprises a large and uninterrupted extent of heather moorland which was deliberately managed and maintained as a grouse moor and a shooting estate in the early part of the 20<sup>th</sup> century. This is an increasingly rare survival in Wales (Cadw 2001; Silvester 2011, 9).
- 2.2. This moorland landscape, like many other hill regions of Wales, has its origins in the upland economies of the Neolithic and Bronze Age. Many of the local summits within the landscape are topped by groups of Bronze Age burial cairns which presumably attest a wider occupation at that time, the evidence for which is now difficult to identify, being frequently masked by evidence of more recent activity. There is only slight evidence of the settlements that would have been associated with the burial sites, a small group of circular house platforms lying close to the upper part of the Alwen Reservoir (SH 9273 5602) being one of the better surviving examples. However groups of later, prehistoric-type settlements have been found in the eastern portion of Mynydd Hiraethog that lies 5.8 km to the south of the proposed Development Area, and the areas around Llyn Aled and the Aled Isaf reservoir have yielded large quantities of worked flint, indicative of settlement or other activity dating from the Mesolithic period through to the Bronze Age.
- 2.3. The prehistoric landscape of the uplands was no doubt modified in later centuries through continued use, but there is no confirmed evidence of occupation as yet in the immediate area around the proposed development until the medieval period, when at least one area of Mynydd Hiraethog was under the control of Aberconwy Abbey. The main use of the area was for summer grazing, based on temporary summer settlements or *hafodydd* sited in the valleys and along the edges of the moor. In times of population pressure when land at lower levels was becoming difficult to acquire or when a better climate encouraged farming at higher altitudes, some of these sites might have been occupied on a permanent basis, and there are several known *hafod* sites which became permanently settled in the post-medieval period. ‘Hafoty Siôn Llwyd’ on the eastern side of Llyn Brenig and just to the south of the proposed Development Area is one such site. Nearby are the earthworks of Hen Ddinbych, a medieval grange enclosure which is considered to have been part of the Bishop of Bangor’s estate at Llanrhaeadr in the Vale of Clwyd and perhaps originated as part of a vaccary, or cattle ranch, primarily used during the summer months.
- 2.4. Much of the area was subject to localised peat extraction in the last century, and the remains of cuts and drying stacks are still present where there were suitable deposits are present. The post-medieval upland farmsteads with their associated fields and

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- enclosures can still be seen; some are ruined but others are still active, and it is the occupants of these who exploited the peat for domestic fuel.
- 2.5. On the Denbigh Moors, the earlier landscapes were followed and in places superseded by a sporting landscape, and the remnants of the regime of managed heather moorland imposed on it in the early years of the 20th century can still be observed. While this landscape is a relatively modern creation, the large and uninterrupted area that survives is nonetheless rare in Wales and therefore historically valuable; elsewhere in the country some of these managed grouse moors have been done away with in the last half century or more. The survival of the sporting landscape on this part of Hiraethog is largely due to the creation of a shooting estate by Viscount Devonport between 1908 and 1925. Spread over what was the Devonport estate are the remains of both dug-out and drystone-built shooting butts and shelters, together with field walls, boundary markers and earthworks which probably date from this period. This area also boasts the ruined shooting lodge at Gwylfa Hiraethog (SH 9472 5906), an elaborate building constructed in 1908-11 to accommodate shooting parties, which lies about 4 km to the west of the Development Area. The structure, which replaced an earlier timber lodge specially imported from Norway, and still known locally as Plas Pren, has been claimed to have been the highest inhabited house in Wales and, less realistically, to have had the widest views of any house in Britain. The ruins still form a prominent landmark which are visible across the area from several directions.
- 2.6. Within the immediate area of the development the earliest evidence for human activity comprises a number of Bronze Age burial and ritual monuments which have a notable concentration around Llyn Brenig. There is no direct evidence for activity from the later prehistoric period until post-medieval times, although that is not to say that there was no human presence in the area for several millennia. A number of post-medieval *hafodydd* are known to lie close to the development area, though none are within; a series of trackways may be associated with them, perhaps as routes used for the transport of peat. There are a number of small quarries within and around the development and the area was also exploited by public turbaries (peat cutting areas) which were established there at the time of enclosure in the 19<sup>th</sup> century. During the later 19<sup>th</sup> century the area formed part of a shooting estate, the evidence for which lies in two rows of shooting butts.
- 2.7. The Llyn Brenig reservoir was built between 1973 and 1976, and is surrounded by coniferous forestry, which also contains a number of Bronze Age and post-medieval sites; it dominates much of the eastern Hiraethog landscape, particularly from the south. Many of the sites close to, or flooded by, the reservoir were excavated prior to its construction and a sample of the sites have now been reconstructed as part of an archaeological trail. The management of water resources is also an important theme in the locality, and is one of the key functions of Hiraethog in the modern era, for the landscape contains the catchment for the earlier Alwen reservoir built between 1911 and 1916 to supply water to the Birkenhead Corporation, and the smaller reservoirs of Llyn Aled and Llyn Aled Isaf built in the 1930s to supply water to the coastal holiday resort of Rhyl. In the immediate area of the proposed development, the small lake of Llyn Bran (PRN 81837) was enlarged by the creation of a concrete dam (PRN 36831) in the early years of the 20<sup>th</sup> century, under the

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auspices of the then North Wales Counties Lunatic Asylum in Denbigh. The reservoir supplied water to the institution, which lay some 11 km to the north-east.

- 2.8. A field survey of the development area was conducted as part of the initial archaeological assessment for the Environmental Statement, revealing 19 undesignated heritage assets. With the exception of a possible burial cairn, all of the assets were considered to be of negligible or minor significance; these included post-medieval quarries, boundary stones, shooting butts and trackways.

### **3 Methodology**

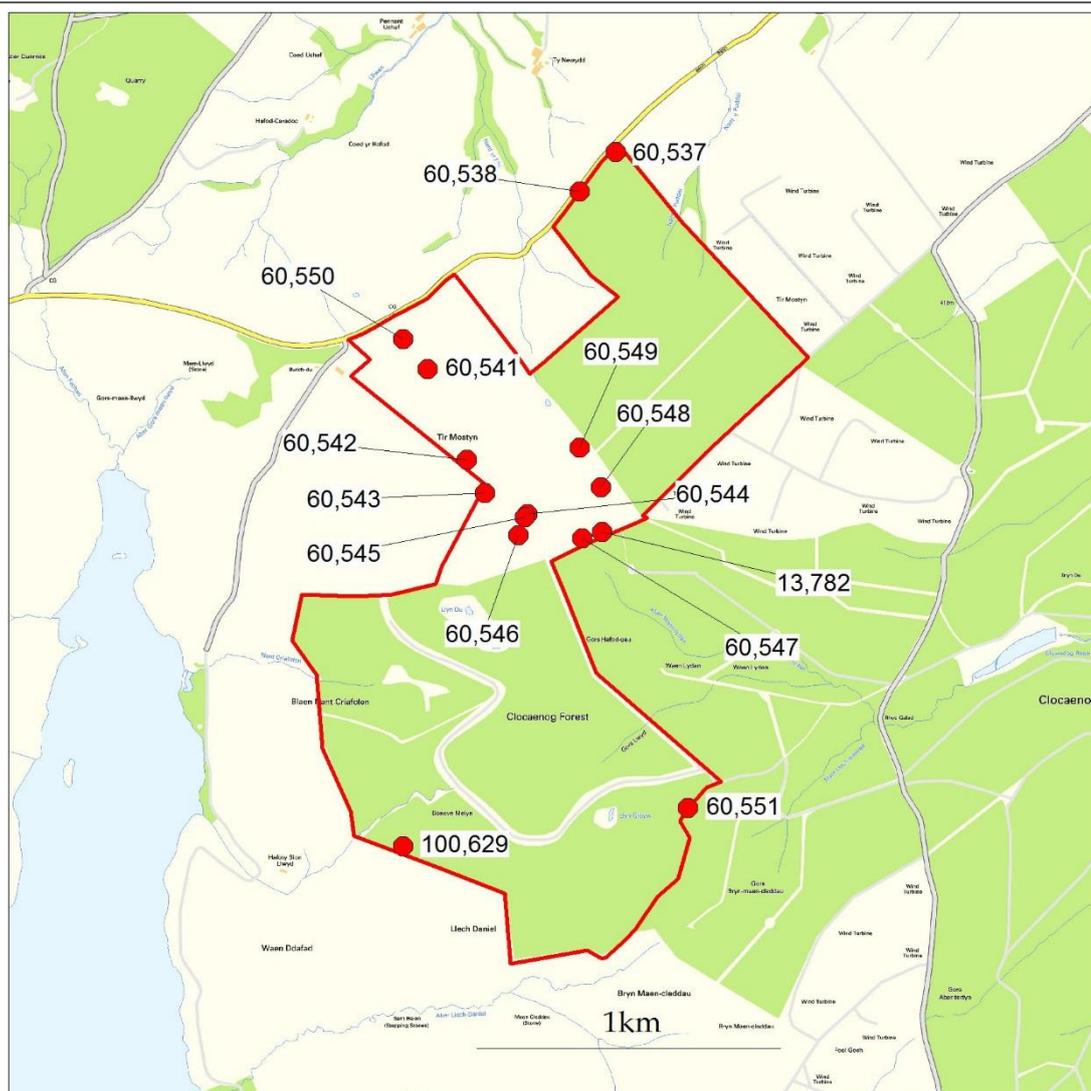
- 3.1. The watching brief was conducted according to the Chartered Institute for Archaeologists' (CIfA) *Standard and Guidance for an Archaeological Watching Brief* (2014).
- 3.2. Following discussions with Mark Walters of the Curatorial Section of CPAT, acting in his role as the archaeological curator for the development, it was agreed that while the watching brief would monitor all soil stripping operations which lay within grassland, in those areas that had been forested until recently a sampling strategy of 25% of each area would be adopted, with the allowance that this would be extended should any archaeological discoveries be made.

### **4 Field Survey**

- 4.1. Following the felling of the two forestry blocks, a rapid field survey was carried out on 27-28 July 2017, with a view towards identifying any heritage assets in those areas that it was not possible to access when the survey carried out for the Environmental Statement was undertaken. The survey focussed on: (i) the proposed turbine locations and the immediate areas around them; (ii) the site roads; and (iii) the ancillary structures within the development area.
- 4.2. No previously unrecognised heritage assets were revealed by the survey, though it was clear that the forestry planting had utilised deep ploughing and this may have had an impact on asset survival.

### **5 Demarcation of assets**

- 5.1. Once the proposals for the development had been finalised it was clear that some of the heritage assets were sufficiently distant from elements of infrastructure to be unaffected by construction work. Where an asset was considered to be of sufficient merit to be worthy of protection and it was thought possible that some disturbance might occur, a 30m buffer zone was demarcated around the asset. The assets within the development are depicted on Fig. 2, below, and those requiring demarcation are identified in Table 1. It should be noted that of these, PRNs 60537 and 60551 had to be demarcated as part of the enabling works for the forestry felling operations and to ensure their continued protection; they were sufficiently distant from infrastructure elements to not require any further mitigation once felling had been completed.



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Fig. 2: Heritage Assets within the Brenig Wind Farm

- 5.2. The 30m buffer zones were defined from the perimeter of the relevant asset, not from its central point; their integrity was checked periodically during the construction works. Each buffer zone was defined by CPAT staff and demarcated by the site contractor, under CPAT's direction, using wooden posts with a single strand of plain wire; some zones were merged so that they contained more than one asset.

**Table 1: Assets requiring demarcation**

PRN	Asset name	Asset type
13782	Bwlch-du Stones	Boundary stone
60537	Nant y Fuddal shooting butts (felling only)	Shooting butt
60541	Tir Mostyn cairn	Burial cairn?
60545	Tir Mostyn mound	Burial cairn?
60547	Tir Mostyn stone I	Boundary stone
60550	Tir Mostyn trackway II	Trackway
60551	Gors Bryn-maen-cleddau boundary stone (felling only)	Boundary stone

## 6 Watching brief

- 6.1. As has been noted above, the construction of the main spine road leading through the wind farm, from the entrance to Turbine 16, was subject to a watching brief in 2015. A watching brief was also conducted on the site of Borrow Pit B at this time but no evidence of heritage assets was revealed at either location.
- 6.2. The 2017 watching brief was carried out from 27 July to 12 October. In total, the initial soil removal at 16 turbine bases with their associated crane pads (1-16), one borrow pit (A), the site of the substation and the remaining site access roads was monitored (see Fig. 3).

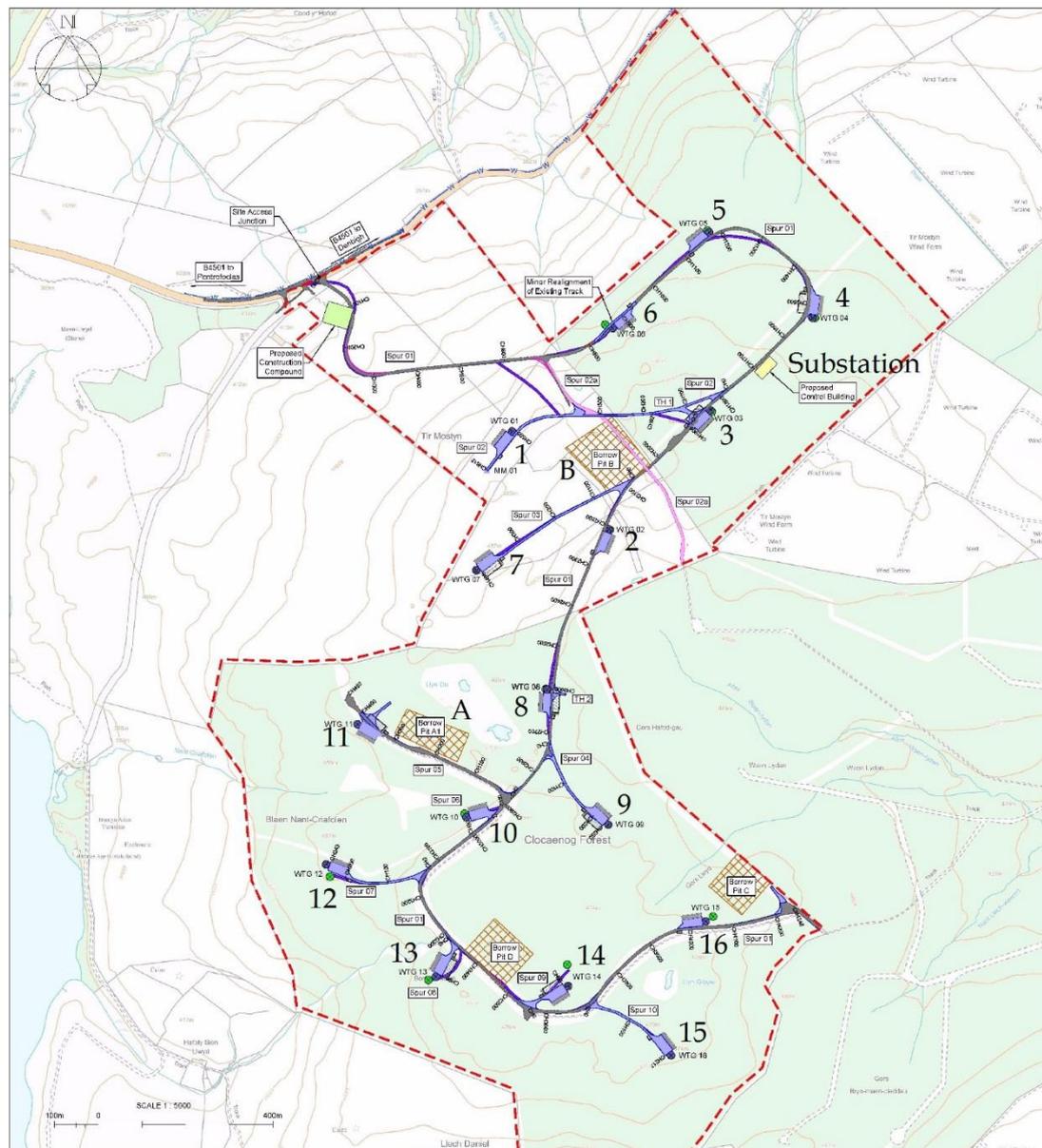


Fig. 3: Wind Farm layout, courtesy of the client (contains Ordnance Survey data © Crown copyright and database right 2017)

- 6.3. Thirteen of the turbine bases were on clear-felled land, with numbers 1, 2, and 7 on grassland. A minimum 25% of the total area of each turbine base/crane pad and access road in the clear-felled areas was monitored, with 100% monitoring of the three bases and the site roads in the grassland. Four large borrow pits formed part of the original development plan, the purpose of which was to provide stone for use elsewhere in the development. In the event, only pits A and B were required.
- 6.4. In the clear-felled areas, the footprint of the turbine base and crane pad was first cleared of the remaining tree-stumps and overlying vegetation with a toothed bucket, leaving approximately 0.3m of lower topsoil overlying the natural substrate. At the archaeologists discretion, transects or areas of topsoil were then removed under supervision, down to the level of the natural substrate, with a smooth ditching bucket. This process continued until the required percentage monitoring figure was achieved and the archaeologist was satisfied that no further monitoring was necessary.
- 6.5. The general stratigraphy in the clear-felled areas comprised approximately 0.3m of humic vegetation and roots, overlying 0.3m of dark brown/black peat. Between the peat and the natural substrate was a thin horizon of greyish white, gleyed soil, measuring 0.05-0.10m thick. The natural substrate comprised an orange brown, stony clay.



Fig. 4: Typical soil profile in the formerly afforested areas, see para 6.4 (Photo CPAT 4378-0079)

- 6.6. In the pasture areas, (Turbines 1, 2 and 7), the complete area of the turbine and crane pad was monitored during machine stripping. For numbers 1 and 7, this included the stripping of the access roads leading up to the turbine, which branched off from the main site access road serving the development. The general stratigraphy comprised black peat, 0.3m thick, overlying the same greyish white gleyed soil,

interface deposit as seen in the recently forested areas. The natural substrate was an orange stony clay.

### **Turbine bases and crane pads**

- 6.7. The turbine bases were located at heights ranging from 453m AOD (Turbine 5), to 483m (Turbine 7). Seven were sited on slightly higher ground in the northern half of the site. The remaining nine were located in the southern part of the site, three of which (Nos 11, 12 and 13), were sited approximately 400m from the site of a group of prehistoric cairns just below the plateau and next to Llyn Brenig.
- 6.8. The footprint of the turbine bases and crane pads combined formed a rectangular shape, which was uniform across the site. Each area measured approximately 40m by 80m, though with slight variations, giving a total area at each turbine of 3200m<sup>2</sup>. Consequently, in the clear-felled areas, the aim was to monitor an area of at least 800m<sup>2</sup>, and this typically comprised two strips measuring 10m x 40m evenly spaced across the turbine footprint, thereby providing both an adequate sampling strategy, and the required percentage coverage.
- 6.9. Narrow linear features were observed at the level of the natural substrate at turbines 4 and 15. The feature at Turbine 4 measured 0.25m wide x 0.10m deep, and ran for approximately 15m. The cut was filled with a brown, friable silty clay. There was no dating evidence associated with this feature which was interpreted as the remains of relatively modern drainage activity.



Fig. 5: The linear features observed at Turbine 15 (Photo CPAT 4378-0081)

- 6.10. At Turbine 15, following machine stripping of the southern half of the area, two straight parallel linear features were identified running in an east-west direction, approximately 7 metres apart. They were visible for 28m, each feature being 0.3m

wide, and filled by a dark brown peaty topsoil, similar to that at Turbine 4. There was no dating evidence for these features, which were most likely the remains of drainage/ploughing connected with the forestry plantation.

- 6.11. At Turbines 1 and 7, in the pasture areas, the underlying substrate showed evidence of intensive plough scarring (see Fig. 6), which was no doubt related to land improvement; no significant archaeological evidence was forthcoming at either location.



Fig. 6: Plough scarring of the underlying soils in improved pasture (Photo CPAT 4378-0065)

- 6.12. A cluster of several small, ephemeral patches of reddish burning were located at the western end of Turbine 1, one of the highest points of the development area. There was no dating evidence however, and further investigation indicated the remains of burned out vegetation and roots, suggesting that this was relatively recent in origin.

### Access roads

- 6.13. As has already been mentioned, the soil stripping for the main spine road through the development was subject to a watching brief in 2015. In 2017, soil stripping was monitored on the spur roads leading up to Turbines 1, 7, 9, 12 and 15. Generally the roads were of a standard 15m width, and the spurs ranged in length from 80-100m for turbines 1, 9, 12, and 15, up to almost 200m for Turbine 7.
- 6.14. As with the turbine locations, in the clear-felled areas a sample section of the each site road was excavated to a minimum 25% of the total area. For the spur roads this was typically an area measuring 15m x 45m, which in most cases was up to 50% of the total area. In the areas of pasture, 100% of the soil stripping was monitored for

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the roads leading to Turbines 1 and 7. No features of archaeological interest were observed.

### **Borrow pits**

- 6.15. Borrow Pit B lay on the site of the main compound and measured approximately 80m x 100m. All of the soil stripping there was examined in 2015, but no archaeological remains were revealed.
- 6.16. Borrow Pit A lay in the southern half of the site and was proposed to cover an area of approximately 140m x 70m, but only 50% of this was required. Consequently, an area measuring approximately 70m x 70m was subject to the 25% archaeological monitoring criteria used elsewhere for the watching brief. Parts of this site were very wet, with peat visible on the surface. Upon excavation the peat proved to be of no great thickness, generally of the order of 0.3-0.4m. Again, no material of archaeological significance was revealed.

## **7 Conclusions**

- 7.1. The archaeological mitigation works for the construction phase of the Brenig Wind Farm included an additional walkover survey of areas that had been clear felled prior to the commencement of construction; the demarcation of known heritage assets; and a watching brief during soil stripping at the 16 turbine bases and their associated crane pads, as well as for the site access roads and other structures.
- 7.2. No new heritage assets were identified by the additional walkover survey, but the demarcated heritage assets that had previously been identified as meriting preservation were effectively protected and remain unaffected.
- 7.3. The watching brief revealed little of archaeological significance, despite being sited within an upland area with significant prehistoric and later archaeological remains nearby. Only relatively modern ploughing activity was evidenced in the grassland, while linear drainage ditches were observed in the de-forested area.
- 7.4. Allowing for the relatively small percentage of the development area that was subject to groundworks for the wind farm, the indications are that the disturbance resulting from ploughing related to pasture improvement and also to the creation of the former forestry plantations within the development area has probably had a significant impact on the archaeological resource. It may potentially have removed evidence of any prehistoric activity that could once have existed in the development area.
- 7.5. No significant peat deposits were identified during the watching brief, and any pockets seen at surface level proved to be shallow, to a maximum thickness of 0.4m, and of little palaeoenvironmental potential.

## **8 References**

Cadw, 2001. *The Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales*. Part 2.2. Register of Landscapes of Special Historic Interest in Wales. Cadw: Cardiff.

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Silvester, R J, 2011. *Mynydd Hiraethog*. Royal Commission on the Ancient and Historical Monuments of Wales: Aberystwyth,

## 9 Archive deposition Statement

- 9.1. The project archive has been prepared according to the CPAT Archive Policy and in line with the CIfA *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives guidance* (2014). The digital archive only will be deposited with the Historic Environment Record, Clwyd-Powys Archaeological Trust and the paper/drawn/digital archive with the National Monuments Record (RCAHMW). No artefacts were recovered.

### Archive Summary

CPAT Event PRN: 140203

34 Watching brief forms

92 digital photographs, CPAT Film 4378

Photographic catalogue

## Appendix 1: Details of Watching Brief visits

(not including site meetings, walkover survey etc)

Date (staff member)	Half/full day	Notes
27/7/2017 (ID)	Full day	Site road to Turbine 1
28/7/2017 (RH)	Full day	Site road to Turbine 1
28/7/2017 (IG)	Full day	
1/8/2017 (IG)	Full day	
2/8/2017 (IG)	Half day	
3/8/2017 (IG)	Full day	
3/8/2017 (RH)	Half day	Called out but no relevant works, arrangements made for future working
4/8/2017 (IG)	Full day	
4/8/2017 (RB)	Full day	Turbine 3
7/8/2017 (RB)	Full day	Turbine 3
8/8/2017 (RB)	Full day	Site road to Turbine 1
10/8/2017 (RB)	Full day	Turbine 4
11/8/2017 (RB)	Full day	Borrow Pit A
16/8/2017 (RB)	Half day	General monitoring
18/8/2017 (RB)	Full day	Turbine 5
21/8/2017 (RB)	Full day	Called out but no relevant works
23/8/2017 (RB)	Full day	Site road to Turbine 1; Turbine 6
24/8/2017 (RB)	Full day	Turbine 1
25/8/2017 (IG)	Half day	
25/8/2017 (RB)	Full day	Turbine 1
29/8/2017 (RB)	Full day	Turbine 1
29/8/2017 (RH)	Full day	Turbine 2
30/8/2017 (RB)	Full day	Turbine 1; Turbine 2
1/9/2017 (RB)	Full day	Turbine 7
4/9/2017 (RB)	Full day	Turbine 8; Substation
5/9/2017 (RB)	Full day	Turbine 8
15/9/2017 (RB)	Full day	Turbine 10; Turbine 11
18/9/2017 (RB)	Full day	Turbine 8
19/9/2017 (RB)	Full day	Called out but no relevant works
20/9/2017 (RB)	Full day	Called out but no relevant works
21/9/2017 (RB)	Full day	Turbine 13
25/9/2017 (RB)	Full day	Site road to Turbine 12
26/9/2017 (RB)	Full day	Turbine 12
28/9/2017 (RB)	Full day	Turbine 16
3/10/2017 (RB)	Full day	Turbine 15
5/10/2017 (RB)	Full day	Turbine 14
10/10/2017 (RB)	Full day	Called out but no relevant works
11/10/2017 (RB)	Full day	Turbine 9
12/10/2017 (RB)	Full day	Turbine 9

## Appendix 2: CPAT WSI 1710

### 1 Introduction

- 1.1. The Clwyd-Powys Archaeological Trust (CPAT) have been invited by Natural Power, on behalf of Brenig Wind Ltd, to prepare a proposal for undertaking a programme of mitigation works during the construction of the Brenig Wind Farm in Denbighshire.

#### Previous experience

- 1.2. CPAT has contributed on archaeology and cultural heritage to almost 30 Environmental Statements since 2000, including the following wind and solar farms, as well as mitigation works during construction on a number of projects. In particular CPAT has been involved with the Brenig Wind Farm since its inception, contributing the Cultural Heritage Chapter for the ES and its 110m-high revision, developing the mitigation strategy in compliance with Condition 27 and undertaking demarcation and a watching brief during the construction of access tracks to enable felling.

Project	LPA	Year
Tir Gwynt Wind Farm mitigation	Powys	2015-2016
<b>Brenig Wind Farm access road</b>	Denbighshire	2015
<b>Brenig Wind Farm revision</b>	Denbighshire	2015
<b>Brenig Wind Farm mitigation strategy</b>	Denbighshire	2015
Pant y Main Wind Farm*	Denbighshire	2014
Tai Moelian Solar Farm	Anglesey	2012
Ystalyfera Wind Farm	Glamorgan	2012
Braint Wind Farm	Anglesey	2012
Tirgwynt Wind Farm	Powys	2011
Mynydd Mynyllod Wind Farm	Denbighshire	2011
Cwm Penanner Wind Farm	Conwy	2009
Carno Wind Farm III*	Powys	2009
Bwlch-y-sarnau Wind Farm	Powys	2008
Reeves Hill Wind Farm	Powys	2007
Gorsedd Bran Wind Farm *	Denbighshire	2006
Waun Garno Wind Farm	Powys	2006
Cemmaes III Wind Farm	Powys	2006
<b>Brenig Wind Farm</b>	Denbighshire	2006
Mynydd yr Hendre Wind Farm	Powys	2005

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- 1.3. Since its foundation in the mid 1970s CPAT has developed an unrivalled expertise in the archaeology of its home region of mid and north-east Wales and its staff, most of whom have worked in the region for many years have an intimate knowledge of its cultural heritage. In recent years that expertise has been put to use in adjacent regions such as north-west Wales and the English border counties. Over the last 20 years has been involved as an archaeological consultant and contractor in a number of major development projects.
- 1.4. The project will be managed by Nigel Jones, CPAT's Principal Archaeologist, with the assistance of Richard Hankinson, Senior Project Archaeologist, CVs for whom have been provided.

#### **Location and site description**

- 1.5. Brenig Wind Farm is located east of Llyn Brenig in Denbighshire, North Wales. The site lies within the Strategic Search Area A, an area identified by the Technical Advice Note (TAN) 8 publication in 2005 for large scale wind farm developments.
- 1.6. The site is located approximately 11 km west of Ruthin and 10 km south-west of Denbigh. The Llyn Brenig reservoir is located adjacent to the west of the site. The site is approximately 208 hectares, 44 hectares being improved grassland used for agricultural purposes, and 164 hectares being commercial forestry, which has now been clear-felled. The site is wholly within the authority boundary of Denbighshire. The topography of the site ranges between 460 and 491 m above ordnance datum (AOD).
- 1.7. The site consists of:
- 16 wind turbines (either 100 m or 110 m blade tip height) – including transformers;
  - Crane hard standings;
  - A construction compound;
  - An electrical substation;
  - Up to 2 anemometry masts;
  - Access tracks; and
  - Up to 4 borrow pits.

#### **Planning Background**

- 1.8. The planning history of the site is as follows:
- In April 2007 a planning application was submitted by Natural Power on behalf of BWL to Denbighshire County Council (DCC) for the Brenig Wind Farm (100 m maximum blade tip height);
  - In April 2009 the application was consented by DCC;

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- In February 2014 the site entrance was constructed. Relevant suspensive planning conditions were either partially or fully discharged to facilitate this (no archaeological works were required);
  - In February 2015 felling of the two blocks of forestry commenced, and the spine road running from the site entrance through to the southern block of forestry was constructed. Relevant suspensive planning conditions were either partially or fully discharged to facilitate this. A Cultural Heritage Mitigation Strategy was submitted and agreed with DCC in order to discharge planning condition number 27. A watching brief was carried out during intrusive ground works, no assets were encountered.
  - In June 2015 a planning application was submitted by Natural Power on behalf of BWL to increase the tip height of the 16 turbines from 100 m to 110 m. The locations of the turbines and infrastructure was not changed within this application.
  - In May 2016 the 110 m application was consented at appeal.
- 1.9. Planning permission for the development was granted by Denbighshire County Council in 6 April 2009 (Ref 25/2007/0565/PF) and included two conditions relating to the cultural heritage:

**Condition 27** - 'No works of construction, laying out of access tracks, work on the construction compound or tree felling shall take place until the applicant has secured the implementation of a programme of archaeological mitigation in accordance with section 11.7 of the Environmental Statement and such other mitigation as has been submitted by the applicant and approved in writing by the local planning authority, to include for a watching brief and appropriate buffer zone marking of identified archaeological sites.

**Reason:** To ensure adequate arrangements for the archaeological recording and observations'

**Condition 28** - 'Where development approaches to within 50 metres of any archaeological site, that site shall be protected and marked by a robust temporary barrier and the barrier should remain in place for the duration of the construction phase so that no accidental damage occurs. The placement of the barriers should not directly impact upon any unscheduled site or scheduled ancient monuments areas and must be placed outside any scheduled monument boundary.

**Reason:** To ensure the protection of archaeological interests'

## 2 Methodology

### Field survey of felled areas

- 2.1. Following the felling of all or parts of each plantation, a rapid field assessment will be made of (i) the proposed turbine locations and the immediate areas around them, (ii) the site tracks and (iii) the ancillary structures within the development area. This will confirm the presence or absence of heritage assets, and could influence the micro-siting of development structures to avoid any significant archaeological remains identified by the survey.
- 2.2. The survey will be conducted by a two-person team, focusing on the turbine locations, access tracks and ancillary structures, though taking in a slightly wider area in order to place any discoveries in context and identify any relationships with other known assets (eg rows of shooting butts). The survey will be undertaken in 30m-wide transects, depending on access, vegetation and any other restrictions. All assets will be located using a hand-held GPS set. A descriptive record will be produced using standard proforma recording forms, including a measured sketch plan as appropriate. Each asset will be photographed using a high resolution digital SLR, with a metric scale visible in each view. All newly recorded assets will be added to the existing GIS database of heritage assets and an assessment will be made of the perceived significance and consideration given to the need for any further forms of assessment and/or mitigation.

### Review of proposed site design

The site layout and design for infrastructure will be reviewed against known heritage assets resulting from the previous study and the field survey following felling operations. The mitigation strategy will be reviewed and updated as necessary.

### Demarcation of assets

- 2.3. A 30m buffer will be applied to all heritage assets identified in the table below. It should be noted that PRNs 60537 and 60551 have already been demarcated as part of the enabling works for the felling operations, although the condition of the demarcation will be checked as part of the general demarcation and upgraded if required.
- 2.4. The buffer zones will be defined from the perimeters of those sites and features, not from their central points, and its integrity checked periodically during the construction works. The buffer will be defined by a suitably qualified archaeologist and demarcated by the site contractors under their direction. It has been assumed that the all materials will be provided by the site contractors. An appropriate means of demarcation would be the use of wooden posts with strainers and a single strand of plain wire. Where necessary the posts may be painted to aid visibility.

### Assets requiring demarcation

PRN	Asset name	Asset type
13782	Bwlch-du Stones	Boundary stone
60537	Nant y Fuddal shooting butts	Shooting butt
60541	Tir Mostyn cairn	Burial cairn ?

60545	Tir Mostyn mound	Burial cairn ?
60547	Tir Mostyn stone I	Boundary stone
60550	Tir Mostyn trackway II	Trackway
60551	Gors Bryn-maen-cleddau boundary stone	Boundary stone

- 2.5. CPAT is a Chartered Institute for Archaeologists (CifA) Registered Organisation (RAO No 6) and as such is required to abide by their *Code of Conduct* (2014) and the *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology* (2014). The work that is covered by this report and any future reports has been and will continue to be conducted according to the CifA's *Standard and Guidance for Archaeological Field Evaluation* (2014), *Standard and Guidance for an Archaeological Watching Brief* (2014) and *Standard and Guidance for Historic Environment Desk-based Assessment* (2014).

### Watching brief

- 2.6. The watching brief will be conducted according to the Chartered Institute for Archaeologists' (CifA) *Standard and Guidance for an Archaeological Watching Brief* (2014). The watching brief will be undertaken to monitor groundworks associated with the construction of the new wind farm, including access roads, turbine bases, crane pads, borrow pits etc.
- 2.7. The excavation of any archaeological features or deposits will be undertaken by hand using the conventional techniques for archaeological excavation:
- The presence or absence of archaeological features encountered during the ground works will be noted.
  - Where features of archaeological interest are identified during the ground works they will be systematically investigated by hand with sufficient work being undertaken to determine their date, character and function, using the conventional techniques for archaeological excavation and in accordance with CifA Standard and Guidance.
  - All features will be located as accurately as possible on an overall plan of the development at an appropriate scale, showing boundaries depicted on Ordnance Survey mapping.
  - Contexts will be recorded on individual record forms, using a continuous numbering system, and be drawn and photographed as appropriate.
  - Plans will be drawn on permatrace to a scale of 1:10, 1:20 or 1:50, as appropriate.
  - All photography will be taken using a digital SLR camera with a minimum resolution of 8 mega pixels, including a metric scale in each view, with views logged in a photographic register.
  - In the event of human burials being discovered the Ministry of Justice will be informed. The remains will initially be left *in situ*, and if removal is required, a MoJ licences will be applied for under the Burial Act 1857.
  - In the event of finding any artefacts covered by the provisions of the Treasures Act 1996, the appropriate procedures under this legislation will be followed.

- 2.8. All artefacts and environmental samples will be treated in a manner appropriate to their composition and a sampling strategy will be developed as appropriate:
- All stratified finds will be collected by context, or where appropriate, individually recorded in three dimensions. Unstratified finds will only be collected where they contribute significantly to the project objectives or are of particular intrinsic interest.
  - All finds and samples will be collected, processed, sorted, quantified, recorded, labelled, packed, stored, marked, assessed, analysed and conserved in a manner appropriate to their composition and in line with appropriate guidance.
  - arrangements to assess and study any artefacts, assemblages and environment samples.
  - Any artefacts recovered during the evaluation will be deposited with an appropriate museum, subject to the permission of the owner.

### **Interim report**

- 2.9. Following completion of the fieldwork programme any artefacts and environmental samples will be processed, assessed, conserved and packaged in accordance with ClifA's Standards and Guidance for the collection, documentation, conservation and research of archaeological materials (2014), and Museums and Galleries Commission Standards in the museum care of archaeological collections (1994).
- 2.10. If justified by the extent of archaeological discovery, a post-excavation assessment will be undertaken following the completion of the fieldwork. A Post Excavation Project Design will be prepared and submitted to the Archaeological Curator for approval. Any post-excavation reports will be undertaken in accordance with this document.
- 2.11. An interim report will be produced incorporating all the evidence and material retrieved during the watching brief, which will contain:
- Non-technical summary
  - Introduction
  - Site location
  - Topography and Geology
  - Archaeological Background
  - Watching brief
  - Archive assessment
  - Conclusions
  - References
  - Appropriate appendices on archives and finds

### **Final publication**

- 2.12. Following the completion of the interim report and archive assessment a further programme of work may be required in order to produce a final publication of the results from all phases of archaeological work resulting from the construction of the

wind farm. A summary of the results will be published in *Archaeology in Wales*, and this may be considered sufficient, although should any significant archaeological discoveries come to light which require more detailed excavation this may warrant more detailed publication in an appropriate regional or national journal. Any decision on final publication will be the subject of discussions with the regional archaeological curator.

### Archive

- 2.13. The site archive will be prepared to specifications in English Heritage's Management of Research Projects in the Historic Environment (MoRPHE) system and the Cifa *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives* (2014), to be deposited with the regional Historic Environment Record (HER).

## 3 Resources and programming

- 3.1. The watching brief will be undertaken by a skilled archaeologist under the overall supervision of Nigel Jones, a senior member of CPAT's staff who is also a member of the Chartered Institute for Archaeologists (Cifa). CPAT is also a Cifa Registered Organisation (RAO No 6) and as such agrees to abide by their *Code of Conduct* (2014) and the *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology* (2014).
- 3.2. All report preparation will be completed by or with the assistance of the same field archaeologist(s) who conducted the site work. Copies of the report will be deposited with the client and the regional Historic Environment Record within one month of the completion of on-site works. If appropriate, a short report will be published in *Archaeology in Wales*.
- 3.3. The client should be aware that in the event that significant archaeological remains are revealed there may be a requirement for more detailed excavation and specialist services. Any further work over and above the original watching brief and report would be the subject of a separate WSI and costing. The following figures provide an indication of the types of additional services and indicative costs which might be required, for which the client is advised to make some provision.

Curatorial monitoring	£50 per visit
Finds conservation etc	£285 per day
Radiocarbon dating	£330 each
Finds specialist	£285 per day

- 3.4. Requirements relating to Health and Safety regulations will be adhered to by CPAT and its staff.
- 3.5. CPAT is covered by appropriate Public and Employer's Liability insurance, as well as Professional Indemnity insurance.

N W Jones

30 August 2016