



# **Higher Trevibban, St. Ervan, Cornwall**

## **Archaeological assessment of proposed wind turbines**





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<b>Client</b>	<b>Norman Treseder for Bowler Energy</b>
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<b>Report author</b>	<b>Adam Sharpe BA MIfA</b>
<b>Approved by</b>	<b>Andrew Young MIfA, HE Projects Officer</b>

Historic Environment, Cornwall Council

Kennall Building, Old County Hall, Station Road, Truro, Cornwall, TR1 3AY

tel (01872) 323603 fax (01872) 323811 E-mail [hes@cornwall.gov.uk](mailto:hes@cornwall.gov.uk)

[www.cornwall.gov.uk](http://www.cornwall.gov.uk)

## **Acknowledgements**

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The viewshed mapping was carried out by Krysia Truscoe, whilst the geophysical survey was carried out by Archaeophysica Ltd.

The views and recommendations expressed in this report are those of Historic Environment Projects and are presented in good faith on the basis of professional judgement and on information currently available.

## **Freedom of Information Act**

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.



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## **Cover illustration**

*Looking north across Bogee Downs with Higher Trevibban left centre.*

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## **Abbreviations**

EH	English Heritage
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment, Cornwall Council
NGR	National Grid Reference
OS	Ordnance Survey



## **1 Summary**

Planning application PA11/08884 was submitted on the 24<sup>th</sup> October 2011 for the installation of two 50kw wind turbines mounted on 36m high monopole masts together with cabling. A brief for site investigation was prepared by the Historic Environment Planning Advice Officer (East), Cornwall Council, and HE Projects was commissioned to carry out an assessment of the potential impacts of this proposal on the 4<sup>th</sup> April 2012. Geophysical survey of the area surrounding the location proposed for the wind turbine and along the route for its cables was commissioned from Archaeophysica Ltd.

The site chosen for the wind turbines lie on the former Higher Bogee Common: a former area of elevated downland which formed part of the very extensive St. Breock Downs, but which is now enclosed to agriculture. During the Bronze Age, this downland became the site for a large number of highly visible barrows, many of these being intervisible with one another, some being clustered into discrete groups.

From the mid 18<sup>th</sup> century, the Downs were increasingly subjected to a process of enclosure for agriculture, a process which continued through the 19<sup>th</sup> century and into the early years of the 20<sup>th</sup> century, and these barrow groups became incorporated into the newly-created fieldscape on the former downs. Many have been Scheduled.

Although still a prominent and lightly-settled upland area, modern developments have not been absent within this landscape, as there is a large and very prominent wind farm on Bears' Downs 1.25Km to the south west of the proposed turbine site.

Although the wind turbines proposed for Higher Trevibban will be the first visually prominent 'modern' feature on Higher Bogee Common and will have impacts on the settings of designated and undesignated heritage assets within the surrounding landscape, the existence of the nearby Bears' Downs wind farm will inevitably reduce the scale of the impacts resulting from its construction.

Within the survey area, no archaeological features other than three very ploughed down Scheduled barrows were found during the walkover survey, whilst a 1Ha magnetometer survey centred on the sites proposed for the wind turbines and the 20m wide corridor following the route proposed for cabling revealed no obvious major archaeological features.

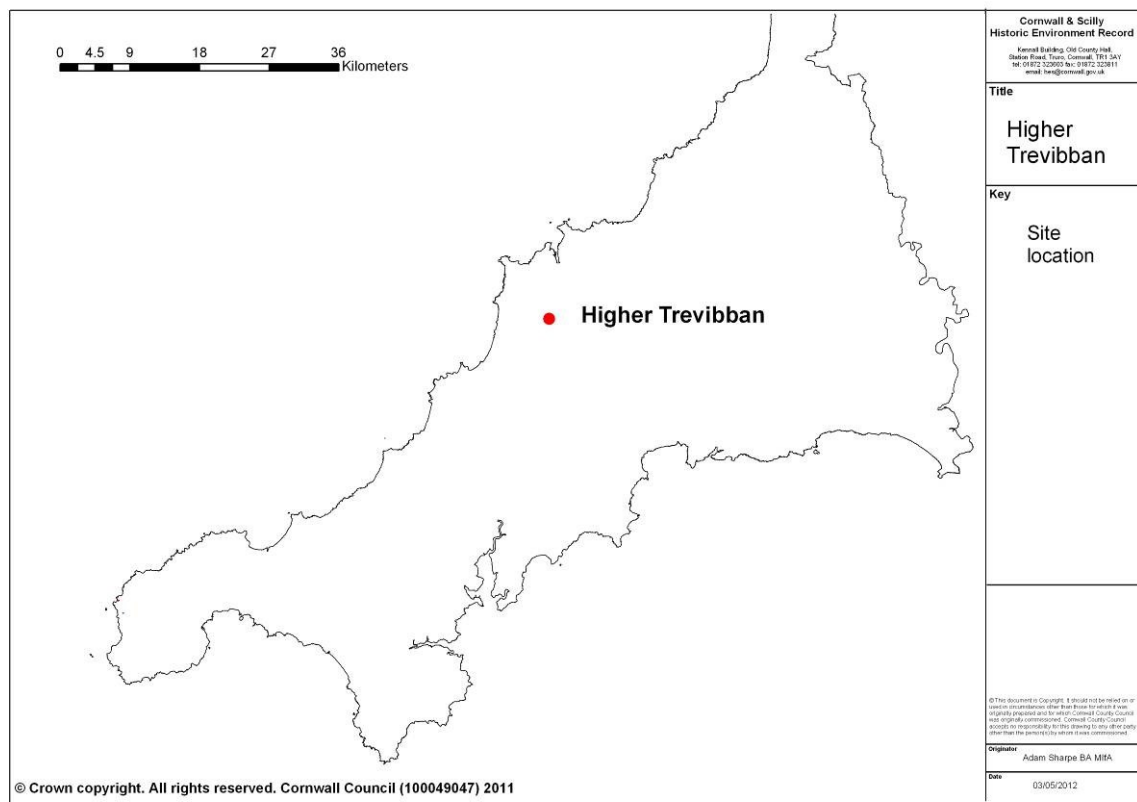


Fig 1. The location of Higher Trevibban, St. Ervan.

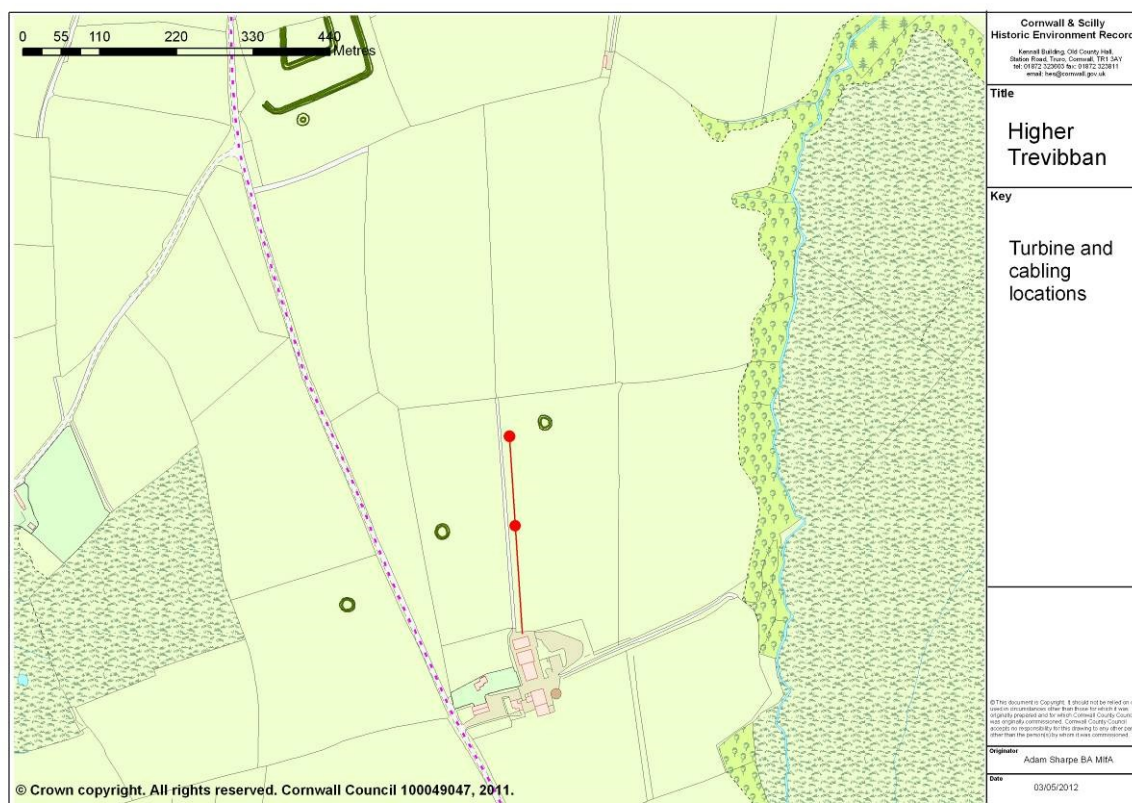


Fig 2. The location proposed for the Higher Trevibban wind turbines on former downland which had been part of Higher Bogue Common.

## **2 Introduction**

### **2.1 Project background**

Planning application PA11/08884746 was submitted on the 24<sup>th</sup> October 2011 and was for the installation of two 50kw Endurance wind turbines mounted on free standing 36m high monopole masts at SW 91286 68572 and SW 91275 68701 (Figs 1 and 2). The turbines would be sited on 6m x 6m concrete bases and would have blade radii of 9.6m. This application is currently pending consideration.

A brief for site investigation dated 23<sup>rd</sup> March 2012 was prepared by Phil Copleston the Historic Environment Planning Advice Officer (East), Cornwall Council. The Planning officer is Ms. Cathy Devereaux-Mack. Requests for a Written Scheme of Investigation (WSI) and cost schedule for the work were received by Historic Environment Projects from Bowler Energy on 13<sup>th</sup> March 2012. HE Projects Cornwall Council was commissioned to undertake an archaeological assessment on 4<sup>th</sup> April 2012. Geophysical survey of the area proposed for the turbine and the route proposed for its cabling was commissioned from Archaeophysica Ltd. A walkover survey was undertaken on 16<sup>th</sup> May 2012.

### **2.2 Aims and objectives**

The principal aim of the study is to gain a better understanding of the impacts which would result from the construction of two wind turbines on land in the southern part of the parish of St. Ervan, Cornwall, which is farmed from Higher Trevibban immediately to the south.

The overall project aims are to:

- Draw together historical and archaeological information about the development site and its surroundings, including relevant information held within the Cornwall Historic Environment Record.
- Review and analyse historic map evidence for the site.
- Follow the approach outlined in Section 3 of the English Heritage guidance on setting.
- Identify the construction, use and 'end of life' impacts of the current proposals on the significance of the setting of these assets and the proposal site.

The site specific project aims are to:

- Undertake an archaeological magnetometer survey.
- Produce a report containing the geophysical data and the data in interpreted form.
- Inform whether an archaeological evaluation or further archaeological recording of any potential buried remains or other mitigation is recommended.

The objective of the project is to produce a report setting out the likely range of impacts (both direct and on settings) of the development on heritage assets within the site or the surrounding locality, as defined above.

### **2.3 Methods**

#### **2.3.1 Desk-based assessment**

As part of the desk-based assessment (DBA), historical databases and archives were consulted in order to obtain information about the history of the site and its surroundings, and the structures and features recorded within the site boundaries. The main sources consulted were as follows:

- Published sources available in the Cornwall and Scilly HER

- Historic maps including
  - Joel Gascoyne's map of Cornwall (1699)
  - Norden's Map of Cornwall (1728)
  - Thomas Martyn's map of Cornwall (1748),
  - OS 1 inch survey (*circa* 1810)
  - Little Petherick Tithe Map (*circa* 1840),
  - 1<sup>st</sup> and 2<sup>nd</sup> Editions of the OS 25 inch maps (*circa* 1880 and *circa* 1907)
- Modern maps
- National Mapping Programme transcripts from aerial photographs
- Other aerial photographs in the Cornwall and Scilly HER
- Historic Landscape Characterisation mapping
- Cornwall and Scilly Historic Buildings, Sites and Monuments Record (HBSMR)
- Information held as GIS themes on the Cornwall and Scilly HER

The historical and landscape context of the site was also considered during this stage of the assessment in order to establish the nature of the heritage assets which are located within the area surrounding the proposed wind turbines.

### **2.3.2 Viewshed analysis**

An assessment of the impacts of the proposals was made from the surrounding area using the guidelines and methodological approaches set out in English Heritage's recent consultation draft guidance on the setting of heritage assets. This was based on GIS-based viewshed mapping produced using a model of theoretical inter-visibility between the wind turbines proposed for the site and significant heritage assets within the surrounding landscape; the viewshed (ZTV or Zone of Theoretical Visibility) was generated using ArcGIS software. The methodology employs a Digital Surface Model (DSM), which takes account of surface features such as buildings, woodland, vegetation, roads etc, and provides a more accurate representation when compared to a 'bare earth' or DTM elevation model. A viewshed was generated for two 'observer points' based on the locations of the proposed wind turbines.

When performing a viewshed analysis, several variables are used to limit or adjust the calculation including offset values, limitations on horizontal and vertical viewing angles (azimuth) and distance parameters (radius) for each observer point. For the proposed wind turbines at Higher Trevibban, the viewshed was based on an 'overall observer elevation value' made up of the 'elevation value' or height above sea level of the ground at the observer viewpoint, with added to this an additional offset of 36m to represent the height of the turbine masts. This viewshed was checked on the ground, given that vegetation and other factors may block views to key sites, whilst significant heritage assets within the theoretical viewshed were visited (where access was possible) to determine intervisibility with the proposed development site, and hence the scale and type of any visual impacts which may affect their settings, as required by English Heritage (2011). A viewshed radius of 3Km was used to determine potential impacts on designated heritage assets and a radius of 1Km for undesignated heritage assets (see Figs 16 to 18).

### **2.3.3 Fieldwork**

In order to check the validity of the Zone of Theoretical Visibility (ZTV) indicated by the viewshed analysis, and thus the potential impacts on key heritage assets within the ZTV, site visits were made to both the sites proposed for the wind turbines, and to key locations within the surrounding landscape. A visual check and photographic record were made of intervisibility (or the lack of it) between the proposed development site



and heritage assets indicated by the ZTV mapping as being likely to be within the viewshed. A walkover survey of the site proposed for the wind turbines and for their cabling was also undertaken to examine the site for upstanding archaeology and to record the nature of the boundary types which might be impacted upon during the development.

#### **2.3.4 Fieldwork – geophysical survey**

A geophysical survey of two one hectare areas of the field proposed for the proposed wind turbines (centred on their proposed locations) and a 20m wide strip following the route proposed for their cabling was commissioned from Archaeophysica Ltd. The fieldwork was undertaken on 8<sup>th</sup> May 2012.

Geometrics MagMapper G858 caesium vapour magnetometers were used for the survey, using a high performance sledge mounted acquisition system. The four sensors were sited approximately 0.3m above the ground surface to maximise sensitivity while decreasing the strengths of anomalies from surface, whilst a line separation of 0.5m was used. The along line interval was approximately 0.25m following English Heritage guidance. As the ground conditions were suitable the instruments were deployed as an array mounted on a specially constructed nonmagnetic high performance sledge towed by a quad bike, offering a faster rate of coverage, less contact with the ground and a stable measurement platform. The sled-based approach avoids the need for extensive grid set out because real time tracking is provided by GNSS receiver mounted on the sledge. Coverage can be guided by real time track plotting visible to the driver who also monitors instrument data, positioning quality and survey resolution through continuous display on a ruggedized laptop mounted on the quad.

The field data was subjected to normal potential field processing techniques including reduction of the background regional field and splitting of the resultant residual field into different depth models through analysis in the frequency domain, yielding a shallow data set modelling anomalies likely to originate within the upper 3m of ground and also a pseudo-gradient data set which models the response of a 1m vertical gradiometer.

The data was presented as a series of greyscale images overlaid onto map data georeferenced to the Ordnance Survey grid. A separate catalogue map graphically highlights the most significant anomalies regardless of their origin and also provides a numerical key to a detailed anomaly catalogue included within the Archaeophysica report (see Fig 15 in this report). Significant aspects of the results were discussed, and were accompanied by a detailed methodological description, and justification and analysis of the geophysical environment and its impact upon or presence within the data.

The geophysics report has been made available to Historic Environment Projects, Cornwall Council, and its findings have been incorporated into the HEP assessment report and form the basis of recommendations for any further investigative work on site.

#### **2.3.5 Post-fieldwork**

On completion of the project and following review with the HE Project Manager the results of the study were collated as an archive in accordance with: *Management of Research Projects in the Historic Environment (MoRPHE) English Heritage 2006*. The site archive will initially be stored at ReStore, with the eventual aim of deposition at Cornwall Record Office.

An archive report (this report) has been produced and supplied to the Client. This report will be lodged with the Cornwall and Scilly Historic Environment Record (HER) and made available for public consultation once a planning application for the site has been made. A copy of the report will be supplied to the National Monuments Record

(NMR) in Swindon, to the Courtney Library of the Royal Cornwall Museum and to the Cornish Studies Library. All digital records will be filed on the Cornwall Council network.

An English Heritage/ADS online access to the index of archaeological investigations (OASIS) record has been made covering this assessment project.

### **3 Location and setting**

The sites proposed for the wind turbines are at SW 91286 68572 and SW 91275 67801 on land 540m to the north of Higher Trevibban Farm, between 125m and 130m OD on a north-facing slope on Higher Bogee Common, which was formerly at the western end of the larger St. Breock Downs (Fig 2).

The development area is characterised in the Cornwall and Scilly Historic Environment Record (HER) as 'Recently Enclosed Land (land enclosed during the 20<sup>th</sup> century), part of the former very extensive St. Breock Downs (Fig 11).

The field selected for the construction of the wind turbines contains three elements of a Scheduled extant Bronze Age barrow group (Fig 12), whilst the surrounding area sites a large group of prehistoric and medieval monuments. Within a 2Km radius of the proposed turbine are the sites of approximately thirty-six Bronze Age barrows, most of which are also Scheduled Monuments. There are also two Scheduled late prehistoric defended farmsteads (rounds) within the locality (Fig 13). There are few intervisible Listed Buildings within a 3Km radius of the proposed development site (Figs 18 and 19).

The parent bedrock underlying the application site is recorded as sandstones, siltstones and mudstones of the Staddon Formation, part of the Early Devonian Meadfoot Group (BGS data). The soils in the field proposed for the development are recorded as Hafren peaty loams over shale, these typically having a wet peaty surface horizon and a bleached subsurface horizon, a thin iron pan often being present.

### **4 Project extent**

The archaeological assessment was focussed on those heritage assets (whether designated or not) which might be physically impacted upon through activities associated with the erection of the wind turbines, including cable trenching, siting of temporary compounds, cranes or other equipment and with any associated semi-permanent infrastructure.

The assessment takes into account and quantifies impacts on the settings of heritage assets (both designated and undesignated) within the viewshed of the proposed turbine site in line with Policy HE6 in PPS5, sections 16(2) and 66(1) of the Planning (Listed Buildings and Conservations Areas) Act 1990 Chapter 9, and English Heritage guidance relating to the setting of historic assets (2011) and on wind energy and the historic environment (2005), namely:

- Non-designated heritage assets – 1 Km radius
- Scheduled Monuments, Listed Buildings – 2.5Km radius
- Conservation Areas – 2.5Km radius
- Registered Parks and Gardens – 5Km radius
- Historic Battlefields – 5Km radius.

## 5 Designations

### 5.1 National

The field proposed for the development contains a Scheduled Bronze Age barrow (DCO1108, one element in a group of four designated barrows, the remainder of which are sited in the fields immediately to the east of the application site). A further group of nine Scheduled barrows lie just to the south (DCO1111), another group of four Scheduled barrows (DCO1104) are to the south west, the Scheduled Longstone or Eddystone (DCO1105) is not far to the west whilst the Scheduled Bogee Round (DCO1110) is just to the north.

There are no Listed Buildings within the immediate environs of the application site, though as noted in the brief, 24 buildings Listed at Grade II are within the 3Km radius of this site. Trelow Downs 400m to the east of the application site are designated as a Site of Special Scientific Interest (SSSI). There are no Registered Parks and Gardens or Registered Battlefields within the environs of the site.

### 5.2 Regional/county

No regional or county designations apply to the field proposed for the development. The Conservation Areas at Little Petherick, St. Mawgan, St. Columb Major and St. Breock are 3.5Km to the north north east, 4.75Km to the south west, 5Km to the south and 7.25Km to the north east respectively. Trelow Downs 400m to the east of the application site is an Area of Great Historic Value (AGHV). The Cornwall and Scilly Historic Environment Record lists extensive prehistoric field systems 500m to the south west and south east of the application site, together with many Medieval and later monuments.

### 5.3 Local

No local designations apply to the field proposed for the development.

### 5.4 Rights of Way

No rights of way traverse the site proposed for the wind turbines, nor the remainder of the field through which the cabling will be undergrounded. This area is not registered as open access land under the CROW Act 2005.

## 6 Results of desk-based assessment

St Breock Downs was formerly a large area of open upland stretching from St. Columb in the west to the valley of the River Camel in the east, the churchtowns and enclosed land of Withel and St. Wenn lying to its south. Higher Bogee Common and the nearby Bears' Downs formed part of its north western flank.

During prehistory the archaeological evidence suggests that this formerly very extensive area of downland was not permanently settled, and would have been used as upland grazing by the farmers whose settlements lay on the fringes of this area, probably predominantly during the summer. In common with other upland areas in Cornwall, the Downs were also the focus for important ceremonial activity, as is demonstrated by the very extensive Bronze Age barrow cemeteries which top the high ground at Bears' Downs, Trelow Downs and Rosenannon Downs, and by the presence of three standing stones, one of Cornwall's small number of stone rows (the Nine Maidens) dating to same period, and the Neolithic Pawton Quoit (labelled on Martyn's map as '*An Altar of Ye Druids*'). St. Breock Downs were, therefore, of far more than marginal importance to those who lived around them, and the often prominent barrows sited on them (like the earlier Pawton Quoit) were as much territorial markers and shrines associated with local kin groups as places of burial. Whilst many of these barrows survive to this day (and are Scheduled Monuments), it is likely that the locations of

others have been lost to agriculture. Unless deep or repeated ploughing has taken place, however, significant archaeological evidence for these lost barrows may survive. Four examples (DCO1108) close to the location of the proposed wind turbines are recorded in the Cornwall and Scilly Historic Environment Record (HER). In later prehistory, a defended farmstead (Bogee Round) was constructed on the lower slopes of Bogee Downs just to the north (DCO1110).

St. Breock Downs remained as open land into the historic period, the rough grassland which they supported continuing to provide an important agricultural resource for farming families living in the surrounding landscape, providing summer grazing, as well as a place where 'furze' (gorse) could be gathered for fuel, as well as 'ferns' (bracken) or rushes for animal bedding. Settlements were established off the high ground during the pre-Conquest period, these having names incorporating elements in Cornish such as 'Tre', 'Pol' or 'Pen', though a few farms were created on the fringes of the Downs – these being characterised by names beginning with the prefix 'Ros', meaning heath or downs.

The analysis of historic aerial photographs undertaken as part of the English Heritage National Mapping Programme (Fig 14) shows that, during the medieval period, parts of the Downs were also occasionally cultivated during times of high land pressure in the lowlands, most probably during the period preceding the Black Death. At several locations not far distant from Higher Trevibban there is often extensive evidence for medieval outfields. These strip fields would have been used for only short periods, perhaps once a generation, exploiting what little natural fertility had built up in the shallow soils of the downs in the interim. Trevibban (of which Higher Trevibban is a 19<sup>th</sup> century offshoot) was first recorded in 1208 (as *Treveban*) and occupied a valley-head location at the edge of the Downs.

The first mapping depicting St. Breock Downs dates to the 17<sup>th</sup> century, when Joel Gascoyne produced his map of Cornwall. Gascoyne labelled this area 'St. Breigh Downs' (Fig 3), showing the area as being characterised by a series of elevated hills, traversed by the roadway from Bodmin to Padstow (the route now known as 'The Saints' Way') which crosses the River Camel at 'Rothrwn Bridge' (Ruthernbridge); another prominent track (now a road) crossing the Downs ran from St. Columb Major to Padstow. No settlements were depicted on St. Breock Downs at this date, and it would have been a large area of open upland grazing land, much as it had been through prehistory and the medieval period – a significant resource for local farmers.

Norden's map dating to 1728 (Fig 4) also depicted St. Breock Downs as a chain of rugged hills siting 'The 9 Stones' and bereft of settlements or farms, whilst Martyn's map of 1748 (Fig 5) again showed the Downs ('St. Breock Beacon') as lacking any farms, though traversed by a plethora of routeways linking settlements to their north and south, these also providing the tracks along which animals were seasonally moved to summer pastures.

The 1<sup>st</sup> Edition of the Ordnance Survey 1" to a mile mapping (Fig 6), dating to the first decade of the 19<sup>th</sup> century, continued to show the southern part of Bogee Downs as largely unenclosed. There are, however, indications on this mapping that the process of downland enclosure had begun by this date, blocks of enclosed land being shown on the lower slopes of the Downs, with examples of what were probably relatively recently established small upland farms including Longstone, Music Water, Cuckold's Peepout and Mount Misery just to the west of the proposed turbine sites. The enclosure of parts of the Downs may reflect the increased demand for food created by the growth of Cornwall's towns and the development of a rapidly increasing industrial workforce at the time, but may also to a degree reflect the effects of naval blockades during the Napoleonic wars.

The *circa* 1840 Little Petherick Tithe Map (Fig 7) shows this process in progress with the development of new farms set within blocks of straight-sided fields, these often having grid-like layouts. Many of these fields were described within the Tithe Assessment as

'Coarse Pasture/Arable' or 'occasionally arable' indicating that the process of improvement was at a relatively early stage, the majority probably still being in coarse, unimproved pasture. The field chosen for the construction of the turbines was named 'Higher Down' and was owned by Charles Prideaux Brune, Esq. of Padstow. A small farmstead had been established at Higher Trevibban by this date.

By the late 19<sup>th</sup> century (Fig 8) it can be seen from the 1<sup>st</sup> Edition Ordnance Survey 25" to a mile mapping that the process of downland enclosure had taken place on a massive scale, almost all of the former uplands having been parcelled up. Nevertheless, many of the enclosures were still depicted as being croft, rough grassland or even heathland, and it is evident from this mapping that the improvement process was, at the time, still ongoing. The farmstead appears to have expanded slightly by this date.

This process of gradual improvement continued during the following decades. By 1908 (Fig 9) the area surrounding the application site remained depicted by the Ordnance Survey as heathland, though some nearby blocks of fields seem to have been fully improved. This probably reflects variations in the quality, stoniness, moisture content and depth of soils, local topography and exposure together with the resources available to tenant farmers and the degree of encouragement to improve imposed on tenants by their landlords. Some land might have remained very marginal, and simply not worth improvement to arable use, and would have remained as rough grazing, despite having been enclosed. By 1908, the farmstead at Higher Trevibban had been reduced to a single building, perhaps suggesting that this farm had proved too marginal to allow full improvement, and the land may have been worked from another local farm at this time.

Today, as can be seen on Cornwall Council aerial photographs dating to 2005 (Fig 10) or on recent Google Earth mapping, the downland character of this part of Bogee Downs has effectively disappeared completely and the landscape is now almost entirely agricultural in character, although the higher ground of Trelow Downs just to the east retains its earlier upland appearance.

The processes underlying the landscape history of Bogee Downs are reflected in its Historic Landscape Characterisation (Fig 11) as Recently Enclosed Land (REL), both post-medieval and 20<sup>th</sup> century in date.

## 7 Results of site walkover

The description for Scheduled Monument group 32982 (four round barrows 270m north west of Higher Trevibban Farm, see Fig 12) notes that the south-western barrow has a slightly oval plan and measures 25.9m north-south and 22.6m east-west, being about 0.7m high and there is some evidence for the impacts of antiquarian excavation and plough damage. According to the scheduling description, the documented kerb of stones around the platform has been lost. The north-western example is again described as being oval, measuring 16m east-west and 13m north-south. The mound has been reduced in height by the effects of cultivation activity, and now survives only as a slight rise in the ground approximately 0.25m high and 24m in diameter. The site was under cut silage, but was noted by earlier visitors as having a notable concentration of quartzite stone in its makeup. The central barrow in the group is recorded as 19.5m in diameter and 0.5m high; as on the other barrows this feature was noted as incorporating a notable concentration of quartzite stones. At the time of the field visit the barrow showed as a 30m diameter, 0.4m high feature. The easternmost barrow is recorded as varying between 19m and 17m in diameter, has been reduced by plough activity, but as being 0.6m high. At the time of the field visit the barrow was measured at 24m in diameter and 0.6m high. The scheduled areas for each of the barrows extends 2.0m beyond the dimensions stated at the time of their scheduling.

A site walkover and inspection was made on 16 May 2012. The weather was fine and clear, and visibility was good. The pair of fields containing the eastern three members of the barrow group examined were in short grazed pasture, the easternmost of which was being grazed at the time of the site visit, the westernmost having recently been cut for silage. The ground was dry and there were no impediments to survey except for some at-times over-curious heifers in the eastern field.

Given the relatively low and largely unvegetated modern enclosure boundaries defining these large fields and the barbed wire fence dividing them, the open character this part of the former Bogee Downs is largely intact. Almost all views were therefore open and extensive, particularly to the north and west. Higher Trevibban, just to the south of these fields, is made up of large, modern farm buildings and industrial/workspace units. The Bears Down wind farm is a short distance away to the south and south-west and dominates views in this direction.

The surrounding landscape is notably open in character, being for the most part divided up into large enclosures, though Trelow Downs to the east retains its original upland rough grassland character and constrains views to the east. Views to the south are closed by Bears Downs a kilometre away. To the north and west the views are open and far ranging, extending down to the coast around Padstow, whilst to the north-east, views of the northern parts of Bodmin Moor are available.

## **8 Summary results of geophysical survey**

See Fig 15.

A one hectare area surrounding each of the proposed turbine sites and the corridor for the cabling were surveyed by Archaeophysica Ltd on 8<sup>th</sup> May 2012, preliminary results being supplied to HE Projects shortly afterwards.

The results revealed no major anomalies which are likely to be archaeological features within either the 1 Hectare area centred on the site proposed for the wind turbine or the corridor following the route proposed for the cable trench. The local soils were considered amenable to the detection of archaeological sites, and the absence of archaeological features from the geophysical data was considered likely to reflect the true situation within the survey area.

Within both the area surrounding the proposed turbine site and in the 20m wide corridor for the cabling route the data plots show some variation due to the underlying bedrock and soil depths and magnetic quality, but apart from a modern buried water pipe, no features were detected. It was concluded that no features of archaeological interest were detectable using magnetometer survey within the survey area.

## **9 Results of viewshed analysis**

See Figs 16 to 18.

Given the elevated location of the site and the height of the turbine masts, the viewshed analysis suggests that the Zone of Theoretical Visibility (ZTV) will be very far-reaching. In line with the requirements of the brief, the ZTV has been mapped to a distance of 3Km from the site, though will inevitably extend a considerable distance beyond this. However, the visibility of the turbines will diminish with distance, and may be locally blocked by intervening buildings within settlements.

The ZTV mapping shows that the wind turbine will be almost ubiquitously visible within a 1.5km radius of the site. Within the zone from 1.5Km radius to 3Km radius out from the site, the wind turbines will be visible from about 40% of the local landscape due to topographical factors, being visible from about 3Km distance in an arc running from west through the north to the east. To the south the site will be visible out to about 1.35Km, though will be blocked by the topography beyond this distance. To the east, the ridgeline of Trelow Downs between Nine Maidens and Cannalidgey will block views

from 1.5Km to just under 3Km from the site, and though the tops of the turbines will be theoretically visible from Scotland Corner to St. Jidgey in this direction, the high ground of St. Breock Downs will almost certainly block views further to the east. The most distant views of the wind turbines will be from the west and north west, from where the site will theoretically be visible from ridgetops running out towards the coast from St. Eval through St. Merryn to Trevone, though very significant attenuation of the visibility of the turbine masts will occur at this distance, and the Bears Downs and St. Breock Downs wind farms will be far more prominent within views.

Many of the Scheduled barrows from Denzell Downs to the south west through Bogee Common to the north and round to Trelow Downs to the east (Fig 22) will theoretically fall within the zone of intervisibility, together with Bogee Round and its adjacent barrow (Figs 25 and 26), the Bogee Longstone (Fig 29), Lower Treviskar Round near St. Mawgan to the west, Trenance Camp to the north east (Fig 30) and the Nine Maidens stone row to the east. Potentially intervisible Listed Buildings tend to lie in a zone extending from 600m to 1,700m to the north of the site (see tables below for detail). Of the 25 Listed Buildings within 3Km of the proposed development site (at St. Ervan, Higher Mellingey, Pentruse, Tregolds, Nine Maidens, Tredinnick, Trenance, Higher Denzell and Winnard's Perch), only two (West View and Trelow Cottage at St. Ervan and Rumford) were thought likely to be intervisible, and these only partially so.

The proposed wind turbines will also be visible well beyond the 2.5m viewshed in an arc from the east through the north to the west, with the potential to be visible from a considerable distance away. However it is felt that any potential for impact on the settings of heritage assets would be negligible at distances greater than 3Km, especially given that any views from the north, north east or north-west would also include the nearby large and prominent wind farms on St. Breock Downs and Bears' Downs.

### **Field verification of ZTV**

The viewshed mapping and potential impacts were ground checked from a number of locations, including Bears Downs, St. Eval, St. Ervan (Fig 28), Trenance, Cannalidgey, Prince's Common and Little Penatillie (Fig 20) on the periphery of the 3Km viewshed and from Bogee Round (Fig 26) and the Higher Bogee Common barrows near its centre (Figs 21 to 24).

On the whole, the ZTV mapping was found to be an accurate representation of the likely intervisibility between the proposed wind turbine and the surrounding landscape out to 3Km together with the heritage assets it includes. Some local blocking of intervisibility elsewhere within the viewshed is likely to be produced by hedges, tree screens and by other buildings where they occur within groups or clusters, for example at St. Ervan (see Fig 28).

Intervisibility with the proposed wind turbines was confirmed for the majority of Scheduled Monuments and Listed Buildings within the 3Km radius ZTV and for the large majority of undesignated heritage sites within the 1Km radius ZTV.

## **10 Synthesis**

The walkover survey and the geophysical survey suggest that, on the basis of available information, there are unlikely to be any direct impacts on substantive buried archaeological features within the site selected for the wind turbines on Higher Bogee Common and along the route for its cable connection to the National Grid to the south. However, the distribution of known barrows within this area suggests that there is a high potential for further so far unrecorded barrows or associated prehistoric ceremonial sites on the ridge on which the turbines are proposed to be sited (Fig 19).

Impacts on both designated and undesignated heritage assets within the local landscape resulting from the construction of a wind turbine on Higher Bogee Common

will vary with their distance from the turbine site, their state of preservation, their nature, their proximity to the Bears' Downs wind farm or the dominance of this feature within views of them, and the effects of reduced or blocked intervisibility due to local topography, vegetation (including hedge plantings) or the presence of other buildings. In some cases, the topography will limit views of the wind turbines from archaeological sites in the local landscaper to the upper sections of the turbine masts or to the upper parts of their blades.

The presence of the existing, large scale and highly visible Bears' Downs wind farm 1.25Km to south west of the proposed development site inevitably reduces the impacts on the setting of heritage assets within this area which would result from the construction of the proposed wind turbines. However, this development would introduce the first highly visible modern feature on this part of Higher Bogee Common, only a few tens of metres from a group of Scheduled barrows whose current settings are characteristically relatively open, though which have been significantly impacted upon by modern agricultural practices, and which are now mostly barely visible as landscape features.

## **11 Policies and guidance**

The following section brings together policies and guidance (or extracts from these) used in the development of the assessment and its methodology.

### **11.1 Planning Policy Statement 5 (PPS5), 'Planning for the Historic Environment'**

#### **11.1.1 Policy HE9.6**

HE9.6 *'There are many heritage assets with archaeological interest that are not currently designated as scheduled monuments, but which are demonstrably of equivalent significance....The absence of designation for such heritage assets does not indicate lower significance and they should be considered subject to the policies in HE9.1 to HE9.4 and HE10.'*

#### **11.1.2 Extracts from Policies HE9.1 to HE9.4 and HE10**

Policies HE9.1 to HE9.4 and HE10, referred to in Policy HE9, include the following;

- HE9.1 *'There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting.'*
- HE9.2 *'Where the application will lead to substantial harm to or total loss of significance local planning authorities should refuse consent unless it can be demonstrated that: (i) the substantial harm to or loss of significance is necessary in order to deliver substantial public benefits that outweigh that harm or loss....'*
- HE10.1; *'When considering applications for development that affect the setting of a heritage asset, local planning authorities should treat favourably applications that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset. When considering applications that do not do this, local planning authorities should weigh any such harm against the wider benefits of the application....'*



## 11.2 PPS5 English Heritage guidance

The English Heritage and DCMS (Department for Culture, Media and Sport) document 'PPS5 Planning for the Historic Environment: Historic Environment Planning Practice Guide' provides guidance on PPS5 and its application.

This refers to the need, for decision-making in response to an application for change that affects the historic environment, of providing and assessing, at a level appropriate to the relative importance of the asset affected, information on the asset and its extent, on its setting, and on the significance of both of these aspects. Section 5, 54 states that *'Heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset and the contribution of its setting is very important....'*

Section 5 on Policies HE6 to HE 12, 58, notes among appropriate actions (in point 5) *'Seek[ing] advice on the best means of assessing the nature and extent of any archaeological interest e.g. geophysical survey, physical appraisal of visible structures and/or trial trenching for buried remains.'*

The section on Policy HE10 defines setting as follows:

*'113. Setting is the surroundings in which an asset is experienced. All heritage assets have a setting, irrespective of the form in which they survive and whether they are designated or not. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance, or may be neutral.'*

*'114. The extent and importance of setting is often expressed by reference to visual considerations. Although views of or from an asset will play an important part, the way in which we experience an asset in its setting is also influenced by other environmental factors such as noise, dust and vibration; by spatial associations; and, by our understanding of the historic relationship between places. For example, buildings that are in close proximity but not visible from each other may have a historic or aesthetic connection that amplifies the experience of the significance of each. They would be considered to be within one another's setting.'*

## 11.3 Former Cornwall Structure Plan

The following policies in the Cornwall Structure Plan relate to the historic environment are currently used to guide responses to applications.

### 11.3.1 Policy 1

*'Development should be compatible with:*

*The conservation and enhancement of Cornwall's character and distinctiveness;*

*The prudent use of resources and the conservation of natural and historic assets;*

*A reduction in the need to travel, whilst optimising the choice of modes, particularly opportunities for walking, cycling and the use of public transport;*

*Through developing the principles of Policy 1 it is intended to integrate environmental values with land use and transport policies, achieving patterns of development that reflect strong environmental protection and stewardship of resources.'*

### 11.3.2 Policy 2

*'Throughout Cornwall, development must respect local character and:*

- Retain important elements of the local landscape, including natural and semi-natural habitats, hedges, trees, and other natural and historic features that add to its distinctiveness;*

- *Contribute to the regeneration, restoration, enhancement or conservation of the area;*
- *Positively relate to townscape and landscape character through siting, design, use of local materials and landscaping.*
- *The conservation and enhancement of sites, areas, or interests, of recognised international or national importance for their landscape, nature conservation, archaeological or historic importance, including the proposed World Heritage Site, should be given priority in the consideration of development proposals.'*

## **11.4 Former North Cornwall Local Plan**

Although now part of Cornwall Council, North Cornwall District Council's policies listed in its local plan continue to be relevant. Relevant policies concerning the historic environment are listed below.

The North Cornwall Local Plan contains policies designed to protect the archaeological resource, using the following elements of policy framework:

### **POLICY ENV12:**

4. *Development proposals for the erection of a new building or other structure, or the use of land, will not be permitted where this would adversely affect the character or appearance of a listed building or its setting.*

### **POLICY ENV14:**

1. *Development proposals affecting nationally important remains, whether scheduled or not, and their settings, will not be permitted unless:*

*(a) there will be no significant damage to, or adverse effect on, a site or its setting; and*

*(b) the development can be controlled through the use of conditions or planning obligations to ensure the remains to ensure the remains are preserved in-situ.*

2. *Development proposals which adversely affect locally important archaeological sites or remains identified as a result of a prior archaeological investigation will only be permitted where:*

*(a) physical preservation in-situ is not feasible in conjunction with the proposed development and the importance of the development clearly outweighs the case for preservation of the remains; and*

*(b) satisfactory arrangements are made for the investigation and recording of the remains before or during development.*

3. *In areas of great historic value, historic settlements and all other locations where there is evidence to suggest that significant remains may exist on the site of a proposed development the extent and importance of which are unknown, applicants will be requested to carry out an archaeological evaluation of the proposal before the planning application is determined. The areas of great historic value and historic settlements are defined on the proposals map.*

### **POLICY ENV15:**

*Development proposals will not be permitted where they would adversely affect the character, appearance or setting of areas of great historic value, historic parks and gardens and historic battlefields.*

*North Cornwall District Council Policy ENV15 3. states: In areas of Great Historic Value, Historic Settlements and all other locations where there is evidence to suggest that significant remains may exist on the site of a proposed development the extent and importance of which are unknown, applicants will be requested to carry out an*

*archaeological evaluation of the proposal before the planning application is determined. The Areas of Great Historic Value and Historic Settlements are defined on the Proposals Map.*

## **11.5 Hedgerow Regulations**

Under the current, 1997 Hedgerow Regulations, owners wishing to remove all or part of a hedgerow considered to be historically important must notify the Local Planning Authority (LPA). Criteria determining importance include whether the hedge marks a pre-1850 boundary, and whether it incorporates an archaeological feature. The LPA may issue a hedgerow retention notice prohibiting removal.

## **12 Likely impacts of the proposed development**

### **12.1 Types and scale of impact**

Two general types of archaeological impact associated with wind turbine developments have been identified as follows.

#### **12.1.1 Types of impact, construction phase**

Construction of the wind turbines could have direct, physical impacts on the buried archaeology of the site through the construction of the turbine foundations, through the undergrounding of cables, and through the provision of any works compound, together with any permanent or temporary vehicle access ways into and within the site. Such impacts would be **permanent** and **irreversible**.

#### **12.1.2 Types of impact, operational phase**

These wind turbines might be expected to have a visual impact on the settings of some key heritage assets within their viewshed during the operational phase, given the height of their masts (36 metres) and the open nature of the local landscape. Such factors also make it likely that the development would have an impact on Historic Landscape Character. These impacts would be **temporary** and **reversible**.

#### **12.1.3 Scale and duration of impact**

The impacts of the wind turbines on the historic environment may include positive as well as adverse effects. For the purposes of assessment these are evaluated on a seven-point scale:

**positive/substantial**

**positive/moderate**

**positive/minor**

**neutral**

**negative/minor**

**negative/moderate**

**negative/ substantial**

**Negative/unknown** is used where an adverse impact is predicted but where, at the present state of knowledge, its degree cannot be evaluated satisfactorily.

The assessment also distinguishes where possible between **permanent** and **temporary** effects, or between those that are **reversible** or **irreversible**, as appropriate, in the application of the scale of impacts.

#### 12.1.4 Potential and residual impacts

Potential adverse impacts may be capable of mitigation through archaeological recording or other interventions. In the assessments forming Section 12.2, where appropriate, both 'potential' and 'residual' impacts are given; that is, expected impacts 'before' and 'after' such work, principally in relation to the development phase. A proposed mitigation strategy is outlined below in Section 13.

### 12.2 Assessment of impact

Overall, the impacts of the proposed wind turbines on the archaeological resource are assessed as having a potential scored as **negative/moderate** to **negative/minor**, principally dependant on proximity to the proposed turbine sites and intervisibility with them, but also taking into account the proximity of some of its components with the Bears' Downs wind farm. Impacts on the settings of the Scheduled barrows closest to the proposed turbine sites have been assessed as **negative/substantial** to **negative/moderate** given their proximity and condition. Impacts on potential sub-surface archaeology within the development site may be higher, but could be limited to **negative/moderate** provided that any recommended mitigation is undertaken.

The assessments supporting this general statement are outlined in the following sub-sections. To comply with current policies and guidance (Section 11) these provide assessments of impact in terms of different aspects of the archaeological resource - its individual sites, the settings of sites, Historic Landscape Character, and field boundaries. There are inevitably areas of overlap between these categories of impact; the assessment is adjusted accordingly to avoid 'double counting' of impacts.

#### 12.2.1 Impacts on archaeological sites within the development area

Ground disturbance associated with the installation of supports for the wind turbines, cabling or ancillary works during the construction phase could result in permanent, irreversible loss of below ground remains of archaeological sites within the development area, or of elements of these. The works, if deeper than current topsoil levels, might affect undetected buried cut features.

Scales of impact will vary with the degree of significance of individual site, and with the proportion of the whole site which would be affected. Notably, buried features could be disturbed, truncated or removed. In the absence of detailed information regarding the survival of sub-surface archaeology within the development area and the full extent of groundworks or other potentially intrusive activity associated with the development, this impact is considered to be **negative/unknown**, with a residual impact of **negative/minor** provided that appropriate mitigating work is carried out. These impacts would be **permanent** and **irreversible**.

Sites recorded in the immediate vicinity of the location proposed for the wind turbines consist of a Scheduled Bronze Age barrow group (DCO1108).

Identifier	Site	NGR	Impact/recommendations
DCO1108	Bronze Age barrow group	Centred SW 91163 68591	Damage to associated undocumented sub-surface archaeology through the creation of the turbine foundations and associated cable trenching.
None	Buried archaeological sites, possibly including funerary, ceremonial or settlement sites.	Field proposed for the development and for its associated cabling.	Potential archaeological watching brief during significant groundworks.

### 12.2.2 Impacts on the settings of surrounding key heritage assets

The proposed wind turbines are considered likely to have an impact on the setting of key surrounding heritage assets, this being summarised as **negative/substantial to negative/moderate** (dependant on their proximity to the proposed turbine site) and **temporary/reversible** overall:

- There are twenty-eight Scheduled Monuments within the 3Km radius of the site of the proposed wind turbines, most of which are Bronze Age barrows, the closest of which are 50m, 105m, 130m and 265m from the proposed turbines (DCO1108).
- Most of the barrows exist in groups, these being at distances of 1Km (Little Penatillie), 1.5Km (Trelow Downs) and Bears' Downs (1.5Km), see Fig 19. When constructed, these monuments were intended to be the most prominent features within the local landscape, in particular when viewed from the lower lying land to the north and south of the Downs. The construction of a pair of 36m high wind turbine masts at Higher Trevibban will introduce highly visible features into this former ceremonial landscape, which will be visible from much of the landscape to the north and west.
- However as a result of the 19<sup>th</sup> and early 20<sup>th</sup> century enclosure process on Bogee Common, Bears' Downs and St. Breock Downs, the character and appearance of the landscape within which these monuments now sit has changed from that within which they were originally designed to be seen and understood. Repeated ploughing has also rendered all of the group of four barrows closest to the development site virtually invisible as landscape features. In addition they are no longer fully intervisible with each other. Bogee Round and its immediately adjacent barrow which lie just to the north of the development site have also been very considerably reduced by ploughing, and are no longer readily comprehensible landscape features.
- Furthermore, there is already a large-scale and very visible wind farm on Bears' Downs centred 1.4Km to the south west of the site at Higher Trevibban proposed for the wind turbines, and another on St. Breock Downs 5Km to the east. As a result the impact on the broader setting of local Scheduled Monuments through the construction of the Higher Trevibban wind turbines will be considerably less than were it the first feature of this type to be constructed within the local landscape.
- Whilst additional wind turbines can be seen at some distance at several points in the wider landscape surrounding this site, the Higher Trevibban wind turbines would be the first in this immediate area and would be only a short distance from the four Scheduled barrows (DCO1108), the Longstone (DCO1105) and Bogee Round (DCO1110).
- The settings of Scheduled Monuments on Bears' Downs and in the surrounding landscape are considered to have already been significantly impacted upon by the proximity of the nearby wind farm. As a result, the impacts on their setting which would occur as a result of the construction of a wind turbine at Higher Trevibban are considerably lessened.
- During the operational phase the wind turbine is unlikely to impact to any significant degree on the setting of the Listed Buildings within its viewshed, given the relatively large distances between the wind turbine and these designated structures (see Fig 18) and the constraints on intervisibility.
- There are no Conservation Areas within the 3Km radius viewshed of the proposed wind turbine.
- There are no Registered Parks and Gardens within the 3Km radius viewshed of the proposed wind turbine.

- There are no Registered Battlefields within the 3Km radius viewshed of the proposed wind turbine.
- During its operational phase the proposed wind turbine is felt likely to have some degree of impact on the settings of undesignated heritage assets within the 1Km viewshed, some of which consist of the earthwork remains of Bronze Age barrows and medieval outfield systems. However, these impacts will decrease with distance from the site at Higher Trevibban proposed for the wind turbines and with increasing proximity to the Bears' Downs wind farm.

The most significant impacts on setting would be on the four Scheduled Bronze Age barrows to the north and west of the proposed wind turbines, these being from 50m to 265m from their sites. The potential impacts on these particular sites are therefore assessed as **negative/substantial**. The potential impacts on intervisible key heritage assets at a greater distance from the site have been assessed as **negative/moderate** to **negative/minor**.

- Any impacts on heritage assets within the landscape surrounding the proposed wind turbine would be **temporary** and **reversible** should the wind turbines be dismantled in the future.

### Designated heritage assets within the 3Km radius viewshed

Scheduled Monuments (SM) – see Fig 17

Identifier	Site	NGR	Impact
DCO1632	Trenance Camp	SW 92631 71058	Neutral
DCO1107	Barrow on Nine Maiden's Downs	SW 92905 67896	Negative/minor
DCO1106	Barrow on St. Issey Beacon	SW 92339 68471	Negative/moderate
DCO1106	Barrow on St. Issey Beacon	SW 92492 68338	Negative/moderate
DCO1106	Barrow on St. Issey Beacon	SW 92574 68332	Negative/moderate
DCO1110	Bogee Round and Barrow	SW 90988 69248	Negative/minor
DCO1108	Barrow	SW 91328 68722	Negative/substantial
DCO1108	Barrow	SW 91151 68736	Negative/substantial
DCO1108	Barrow	SW 91182 68563	Negative/substantial
DCO1108	Barrow	SW 91046 68460	Negative/substantial
DCO1105	Longstone or Eddystone	SW 90554 68695	Neutral
DCO1260	Lower Trevisker Camp	SW 88726 68590	Neutral
DCO1111	Barrow north of Penatillie	SW 91328 67988	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91372 67761	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91435 67595	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91747 67653	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91526 67398	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91417 67396	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91229 67837	Negative/moderate
DCO1111	Barrow north of Penatillie	SW 91086 67389	Negative/moderate
DCO1109	Barrow near Prince Parc	SW 91256 67225	Negative/minor
DCO1109	Barrow near Prince Parc	SW 92356 67184	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 90627 67304	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 90426 67417	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 90547 67669	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 90557 67812	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 90334 68048	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 89981 67667	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 89828 67909	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 89903 67830	Negative/minor
DCO1103	Barrow on Bear's Downs	SW 90046 67534	Negative/minor

Listed Buildings (LBs) with grades (see Fig 18)

Identifier	Site	NGR	Impact
DCO9675	West View (GII)	SW 92758 70096	Neutral
DCO10072	Trelow Cottage (GII)	SW 92357 69689	Neutral

**Undesignated heritage assets within the 1Km radius viewshed**

See Fig 19.

Identifier	Site	NGR	Impact
MCO13460	Bogee Farm (1327)	SW 90740 69480	Neutral
MCO2663	Bogee workhouse (site)	SW 90616 69228	Neutral
MCO29279	Bogee PM signpost	SW 90876 69096	Neutral
MCO21178	Little Trewinnick medieval field system	SW 90508 68306	Neutral
MCO29915	Higher Bogee Common medieval holloway	SW 91295 683330	Negative/minor
MCO21625	Higher Trevibban post medieval enclosure	SW 91427 68701	Negative/minor to neutral
MCO29308	Higher Trevibban Mill (site)	SW 91658 68489	Neutral
MCO29909	Trelow Downs medieval field system	SW 91838 68394	Neutral
MCO29914	Crackrattle PM building	SW 91646 68214	Neutral
MCO2488	Crackrattle cropmark barrow	SW 91834 67942	Neutral
MCO2825	Higher Bogee Common barrow (site)	SW 91263 67843	Neutral
MCO2824	Higher Bogee Common barrow	SW 91123 67843	Neutral

### 12.2.3 Impacts on Historic Landscape Character

A wind turbine installation at Higher Trevibban can be predicted to have an impact on the historic character of the landscape to some degree. The expected effect on HLC has been assessed as **negative/moderate** to **negative/minor**. Factors contributing to this assessment are as follows;

- The land-take for the proposed development is small in comparison with the area of the HLC Unit of Recently Enclosed Land within the surrounding landscape.
- There would be no impacts in terms of physical loss during the construction phase of the upstanding boundaries which form the visible components of HLC.
- Some visual impact throughout the operational phase would occur, affecting the integrity of this area as recently-created farmland, formerly open unenclosed downland, in particular through the introduction of highly visible modern features onto Bogee Common.
- The neighbouring landscape includes the extensive and visually very dominant Bears' Downs wind farm to the south-west. The effects of cumulative impact are real, and should be taken into consideration, as this is not a landscape lacking visually intrusive modern features.
- Recently Enclosed Land is a traditionally dynamic landscape type. However in the case of Higher Bogee Common this is not currently the case, there having been few significant changes to this area since its enclosure during the 19<sup>th</sup> and early 20<sup>th</sup> centuries.
- Any impacts on the legibility of HLC would be **temporary** and **reversible** should the wind turbine be dismantled in the future.

#### **12.2.4 Other archaeological impacts**

Any ground disturbing works on this site could encounter significant buried prehistoric or medieval remains, resulting in permanent, irreversible loss of these, or elements of them. This potential impact is assessed as **negative/unknown** as specific evidence for the nature and extent of any such remains is limited to that provided by documentary records, aerial photography and geophysical survey. Features or artefacts may not survive in forms recordable by these methods and the absence of evidence should not be taken as inferring evidence for absence. It is likely that any such impacts could be mitigated satisfactorily through archaeological recording, reducing the residual impact to **neutral** or **negative/minor**. These impacts would be **permanent** and **irreversible**.

### **13 Mitigation Strategy**

A range of means to mitigate the potential impacts identified in this assessment may be considered by the Historic Environment Planning Advice Officer, who may choose to recommend one or more of the following.

#### **13.1 Site re-design**

Based on the results of available evidence, the HEPAO might ask the site developer to move the turbines to less archaeologically sensitive locations within the general area of the application site. Such an approach would limit any impacts on known significant below ground archaeology and would reduce the direct impacts on the below ground archaeology of the site to **neutral**. In this instance, neither the desk based assessment, nor the site walkover, nor the geophysical survey suggest that this approach would be required.

#### **13.2 Controlled soil stripping and watching brief**

In a case where the finalised site design would seem likely to result in unavoidable impacts on below-ground features, a Written Scheme of Investigation (WSI) would need to be prepared and agreed to establish and direct a programme of mitigating archaeological work. This would follow a brief set by Cornwall Council's Historic Environment Advice Officer, and would set out the scope of any further work required.

An archaeological watching brief (observation by an archaeologist during mechanical topsoil and subsoil stripping) or a controlled topsoil strip under archaeological supervision might be required either where any significant areas of ground are to be disturbed (for instance for the foundations for the turbine masts or during cable trenching), in areas where significant results had been identified through aerial photographs or geophysical survey and which remain proposed for ground disturbance in the final scheme design, or where the balance of probability and proximity to known significant heritage assets such as Scheduled Monuments suggests that sub-surface archaeology might survive. This approach would provide for preservation by record of buried archaeological features or artefacts and reduce any impacts on the below ground archaeology of the site to **negative/minor**. The resultant impacts would be **permanent** and **irreversible**. In this case, neither the desk based assessment, nor the site walkover, nor the geophysical survey suggest that this approach would be required.

#### **13.3 Analysis and presentation of findings**

The results of any required mitigating archaeological recording outlined above would need to be compiled and analysed; significant findings would be presented as required, with publication to professional standards where appropriate.



## 14 References

### 14.1 Primary sources

Joel Gascoyne's 1699 Map of Cornwall

John Norden's 1724 Map of Cornwall

Martyn's 1748 Map of Cornwall

Ordnance Survey, 1809, *1 inch mapping* First Edition (licensed digital copy at HE)

Ordnance Survey, c1880. *25 Inch Map* First Edition (licensed digital copy at HE)

Ordnance Survey, c1907. *25 Inch Map* Second Edition (licensed digital copy at HE)

Ordnance Survey, 2007. *Mastermap Digital Mapping*

Tithe Map and Apportionment, c1840. *Parish of Little Petherick* (digital copy available from CRO)

### 14.2 Publications

English Heritage 2005, *Wind energy and the Historic Environment*

English Heritage 2011, *The setting of Heritage assets: English Heritage guidance*

Herring, P. 1998, *Cornwall's historic landscape: presenting a method of historic landscape character assessment*, Cornwall Archaeological Unit

### 14.3 Websites

<http://www.heritagegateway.org.uk/gateway/> English Heritage's online database of Sites and Monuments Records, and Listed Buildings

## 15 Project archive

The HE project number is **PR146138**

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Digital photographs stored in the directory R:\Historic Environment (Images)\SITES.E-H\Higher Trevibban wind turbines assessment 2012
3. English Heritage/ADS OASIS online reference: cornwall2-126353
4. This report text is held in digital form as: G:\TWE\Waste & Env\Strat Waste & Land\Historic Environment\Projects\Sites\Sites H \Higher Trevibban wind turbine assessment 2012\Higher Trevibban wind turbine assessment.doc

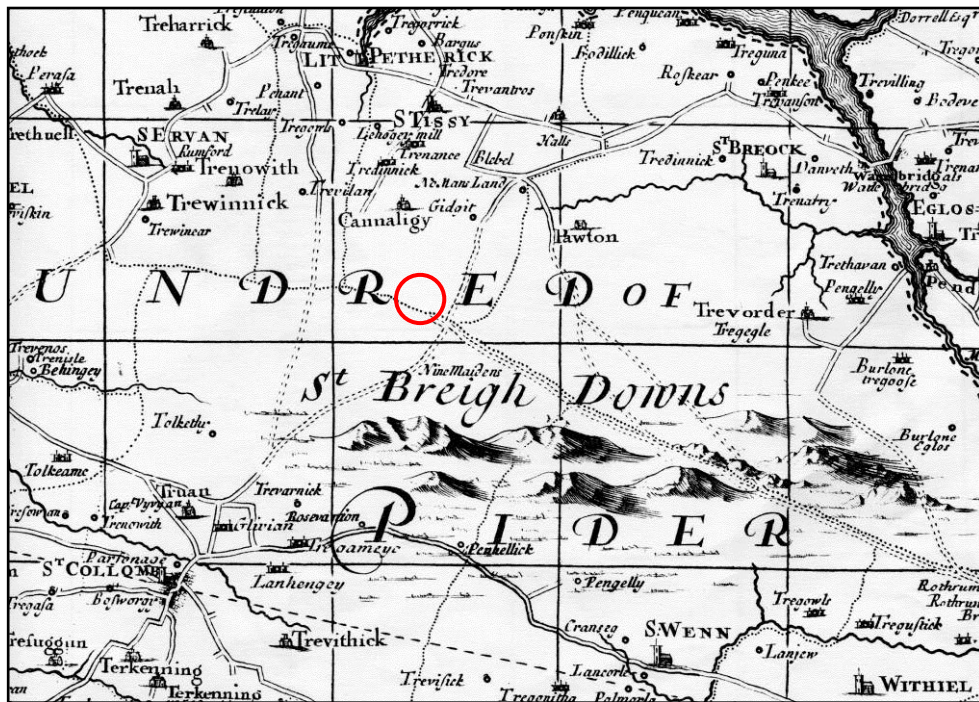


Fig 3. The project area and its surroundings, shown on Joel Gascoyne's 1699 Map of Cornwall as part of St. Breock Downs. The project area is circled in red.



Fig 4. The proposed turbine site and its surroundings, shown on John Norden's 1724 Map of Cornwall as an extensive area of hilly downland. The project area is circled in red.



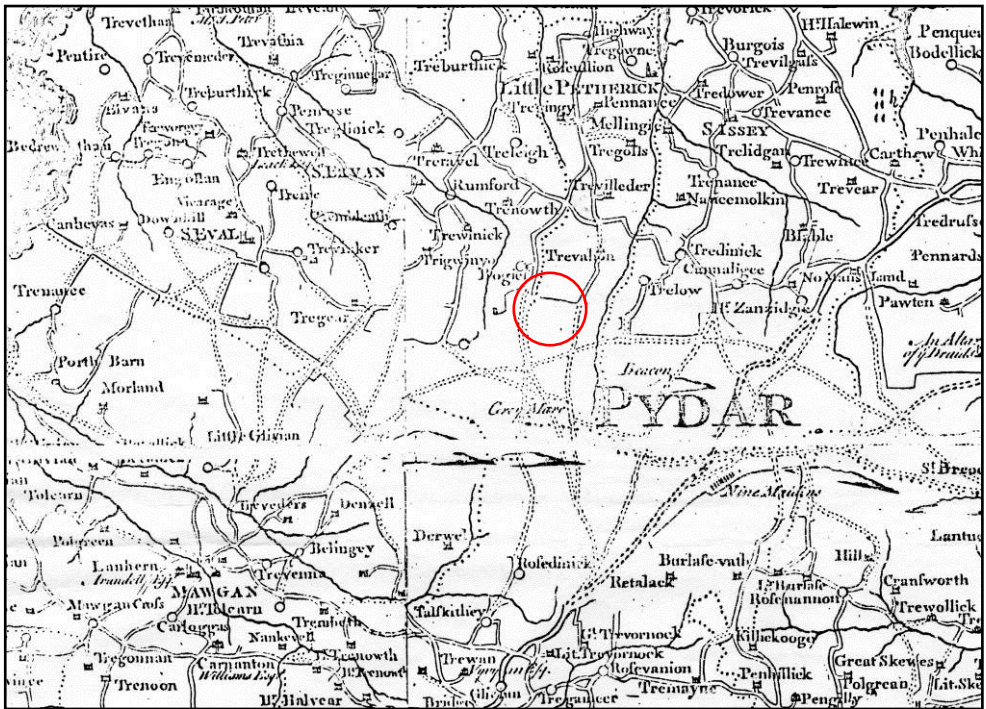


Fig 5. The proposed turbine site and its surroundings, shown on Martyn's 1748 Map of Cornwall as predominantly open downland. The project area is circled in red.



Fig 6. The project area and its surroundings as shown on the circa 1809 1<sup>st</sup> Edition OS mapping. The landscape to the south was largely open downland.

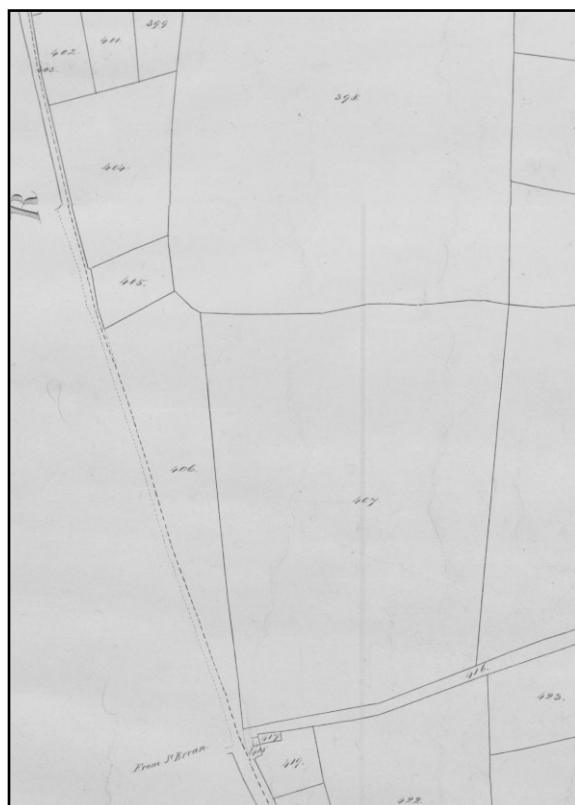


Fig 7. The project area as shown on the circa 1840 Little Petherick Tithe Map. The two turbines are proposed for field 447 (centre).

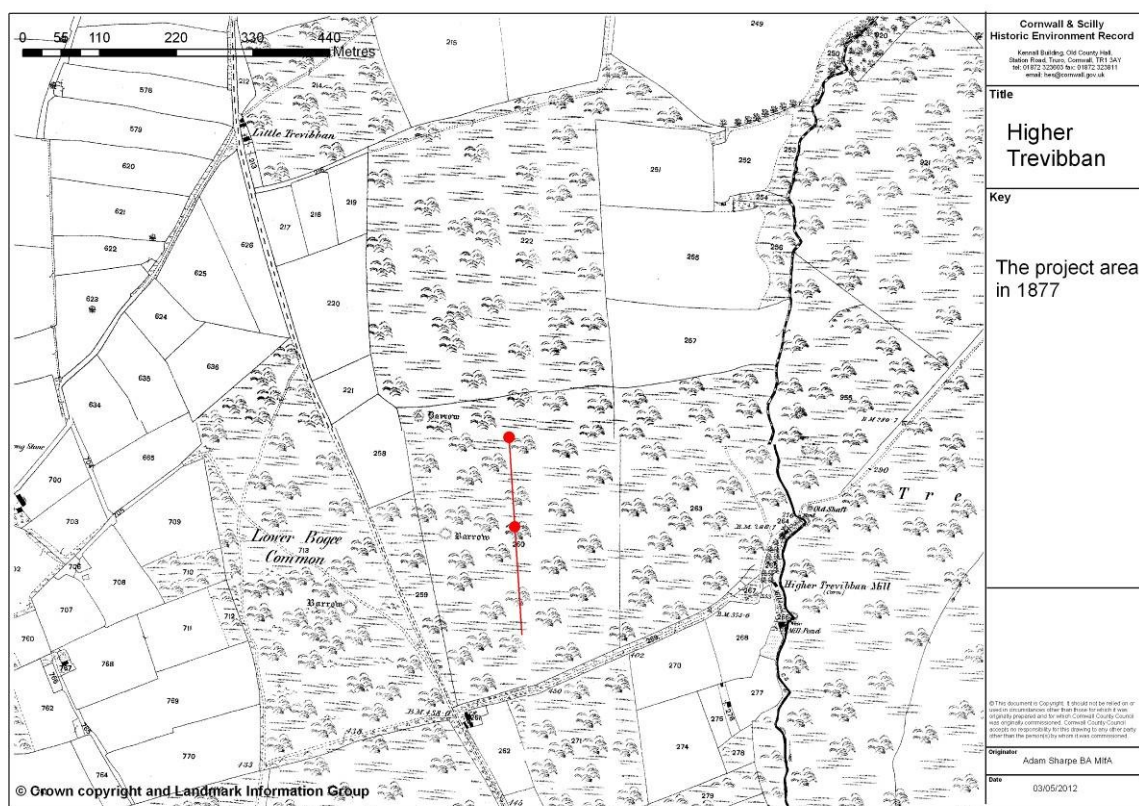


Fig 8. The project area as shown on the circa 1877 1<sup>st</sup> Edition OS 25" to the mile mapping. Although the downland had been enclosed, it was still recorded as being dominated by scrubby grassland.



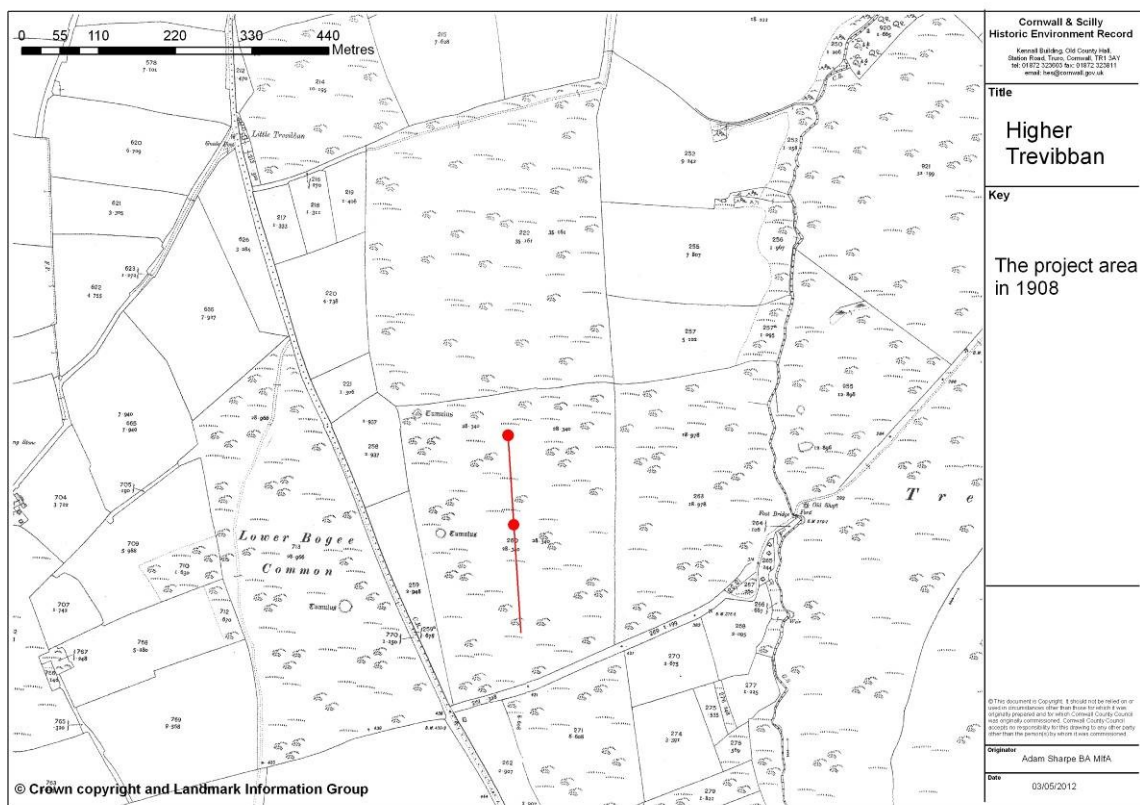


Fig 9. The project area as shown on the circa 1908 OS 25" mapping showing that little improvement of the downland had taken place over the past three decades.



Fig 10. The project area as shown on a 2005 CCC aerial photographs, showing how the former downland character of this area has been completely removed through the process of enclosure and the development of the farm buildings.

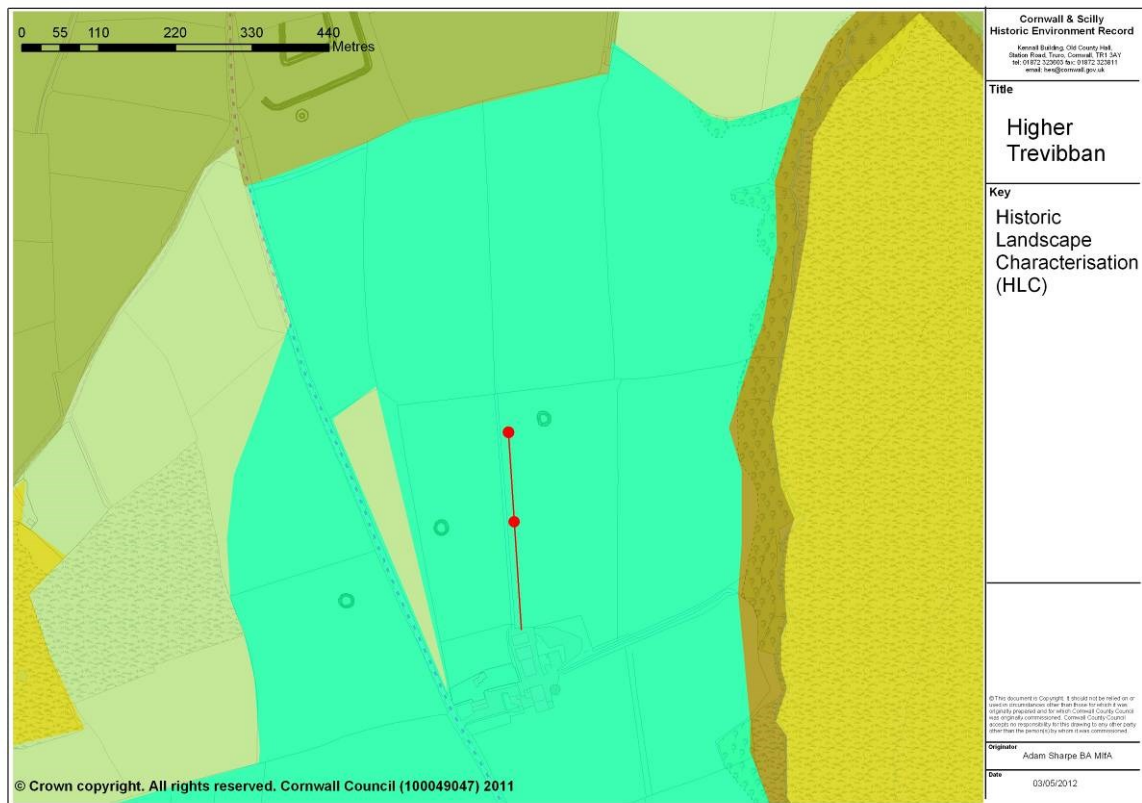


Fig 11. Historic Landscape Character mapping summarises the changes shown on the previous map extracts, showing progressive enclosure from downland over a period of some years.

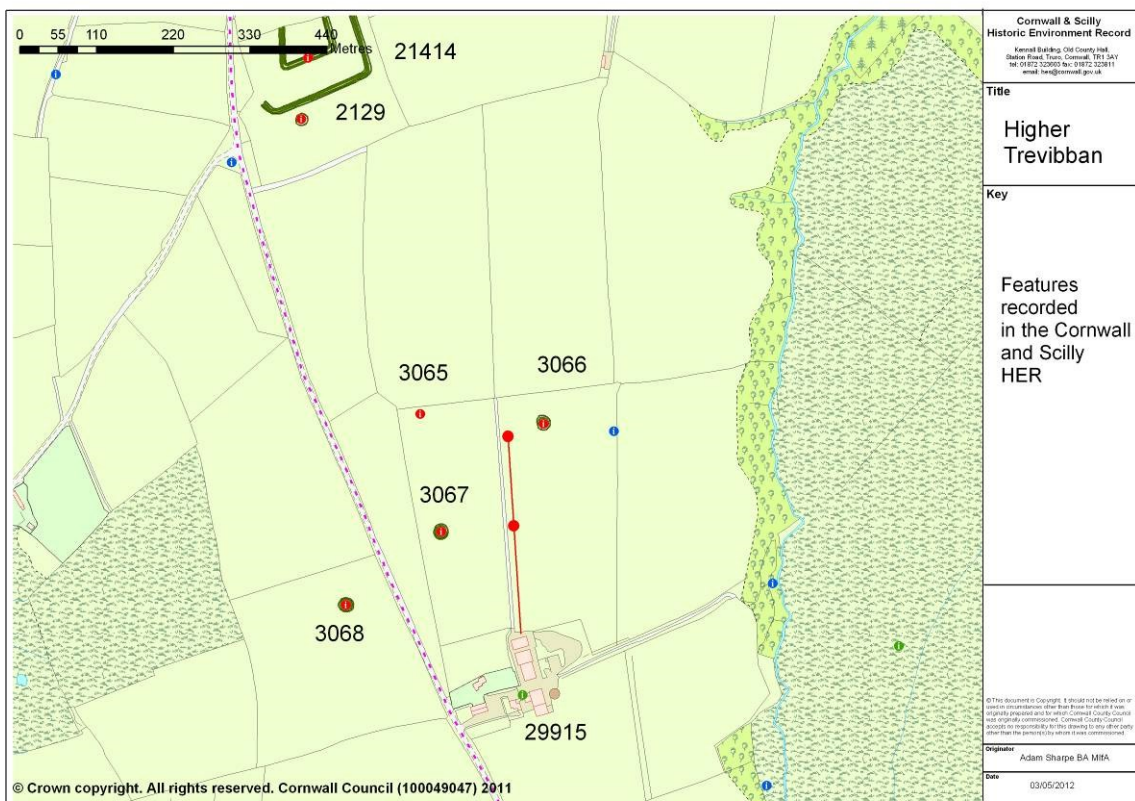


Fig 12. Archaeological sites recorded close to the proposed turbine include five documented Bronze Age barrows, an Iron Age enclosure and a medieval trackway (which runs through Higher Trevibban, see Fig 14).



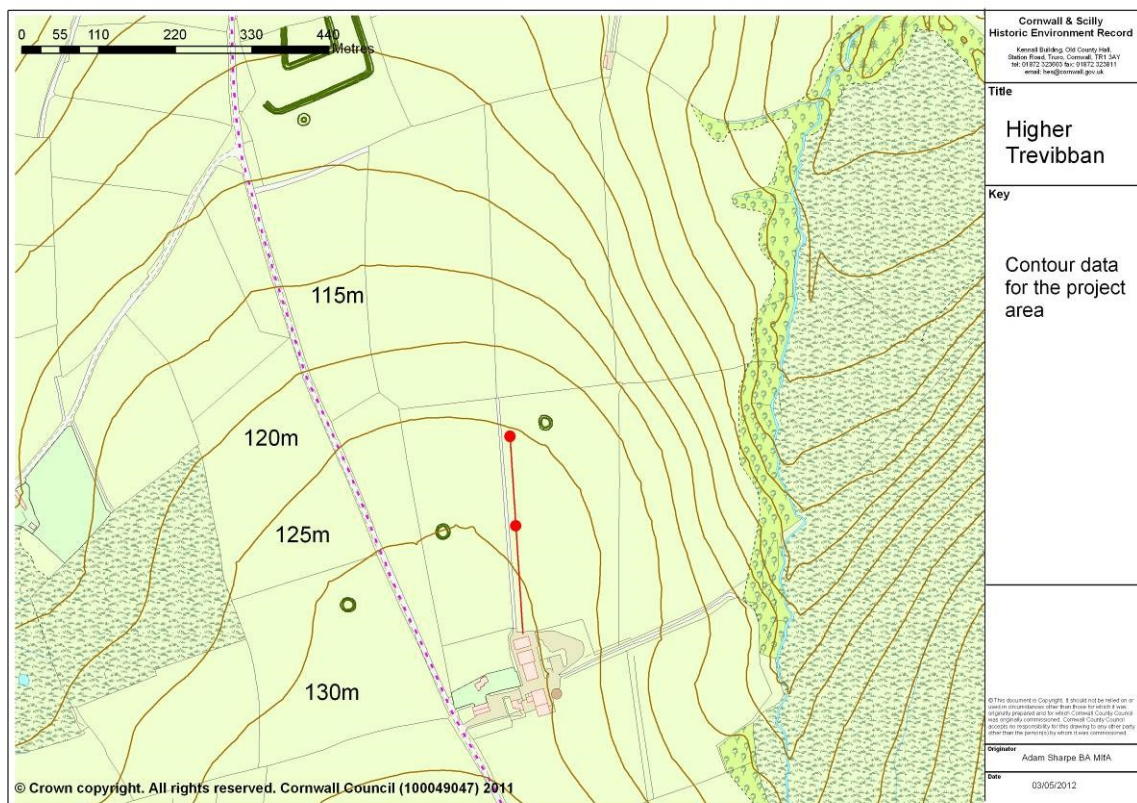


Fig 13. OS contour data for the area immediately surrounding the proposed wind turbine shows the site located on a spur falling to the north, west and east.

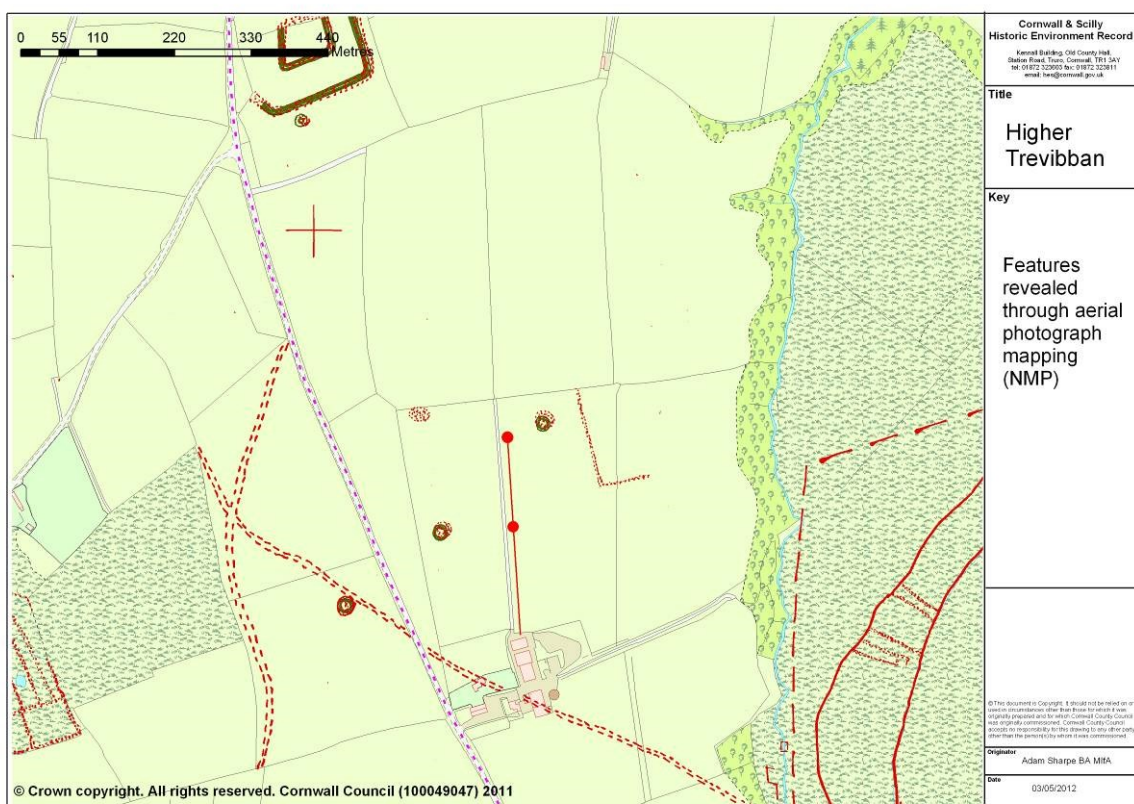


Fig 14. NMP mapping from aerial photographs covering Bogee Downs Downs, showing the medieval holloways to the west and south of the application area.



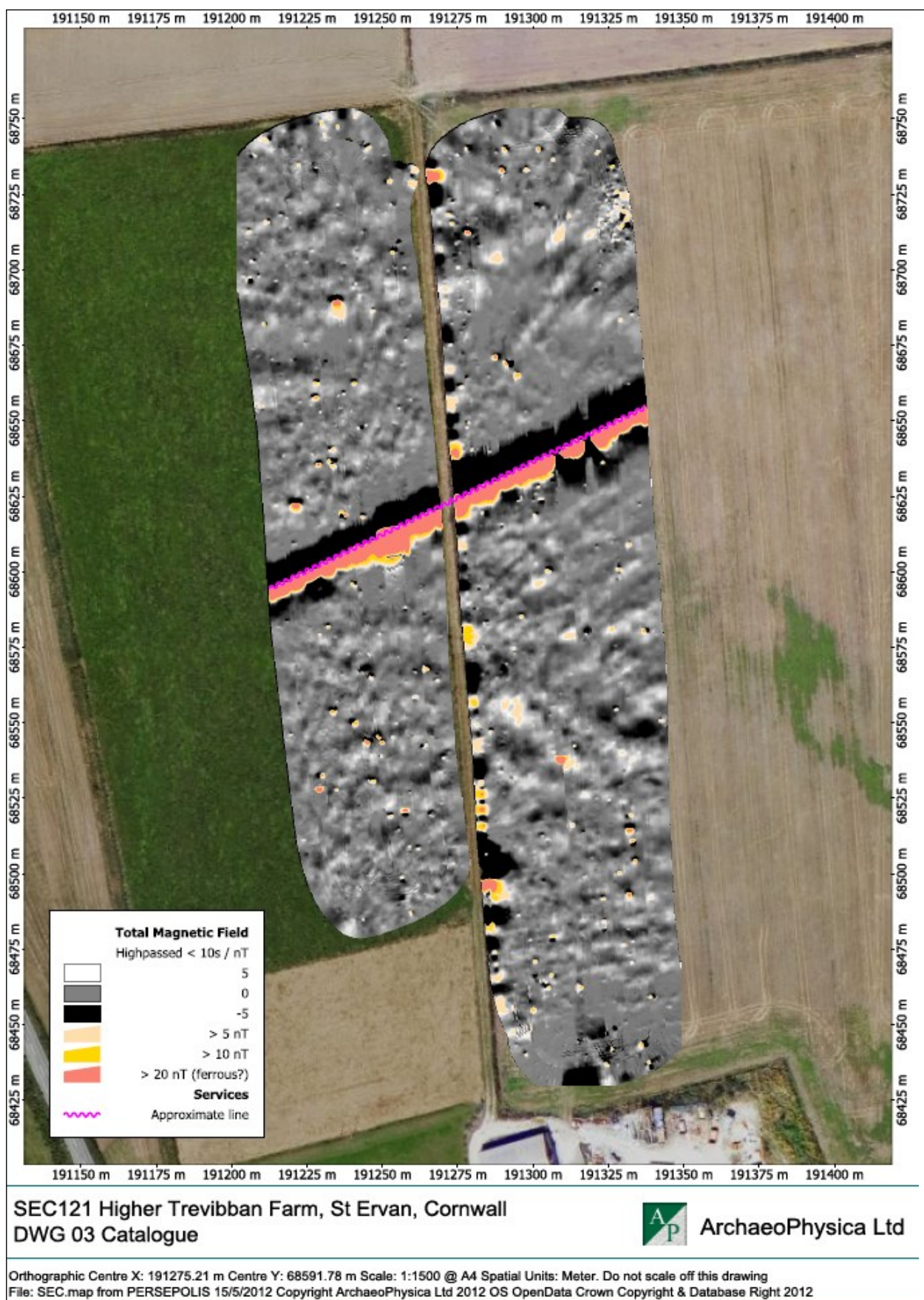


Fig 15. The interpreted geophysics data for the proposed Higher Tregawne wind turbine and cable route. No archaeological features were revealed.



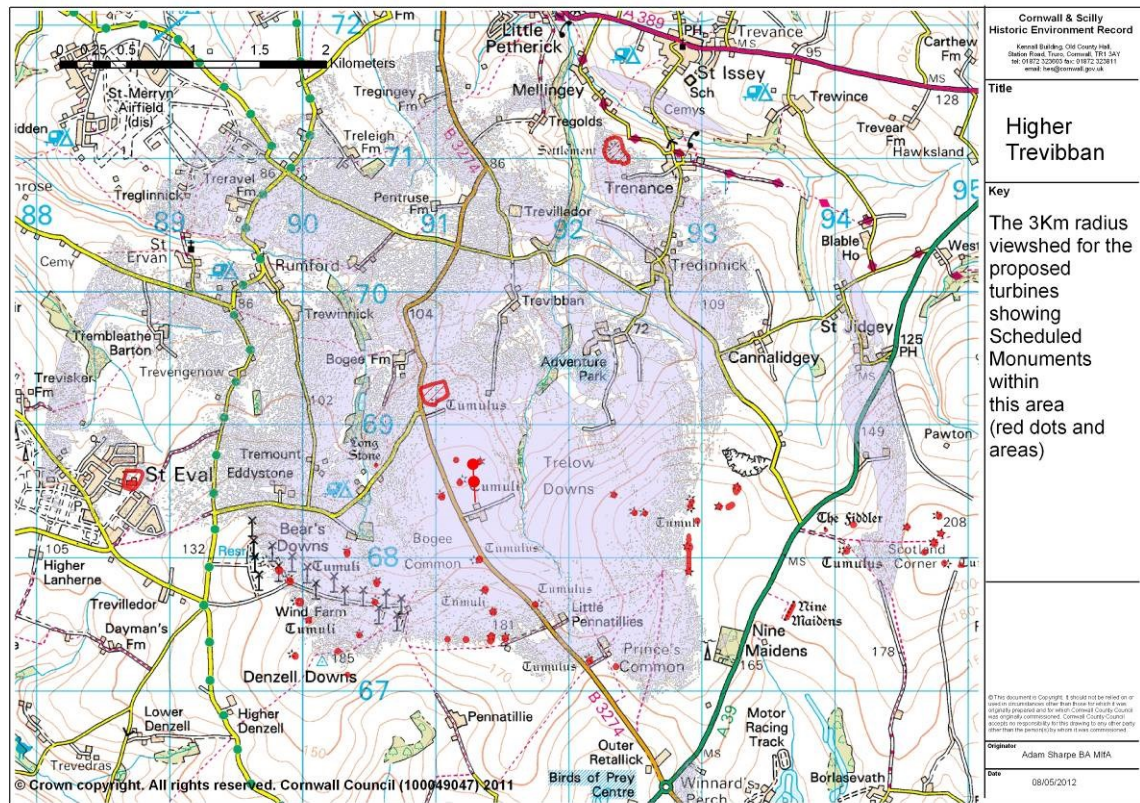


Fig 16. Mapping showing the ZTV within a 3Km radius of the site proposed for the wind turbine, showing potentially intervisible Scheduled Monuments.

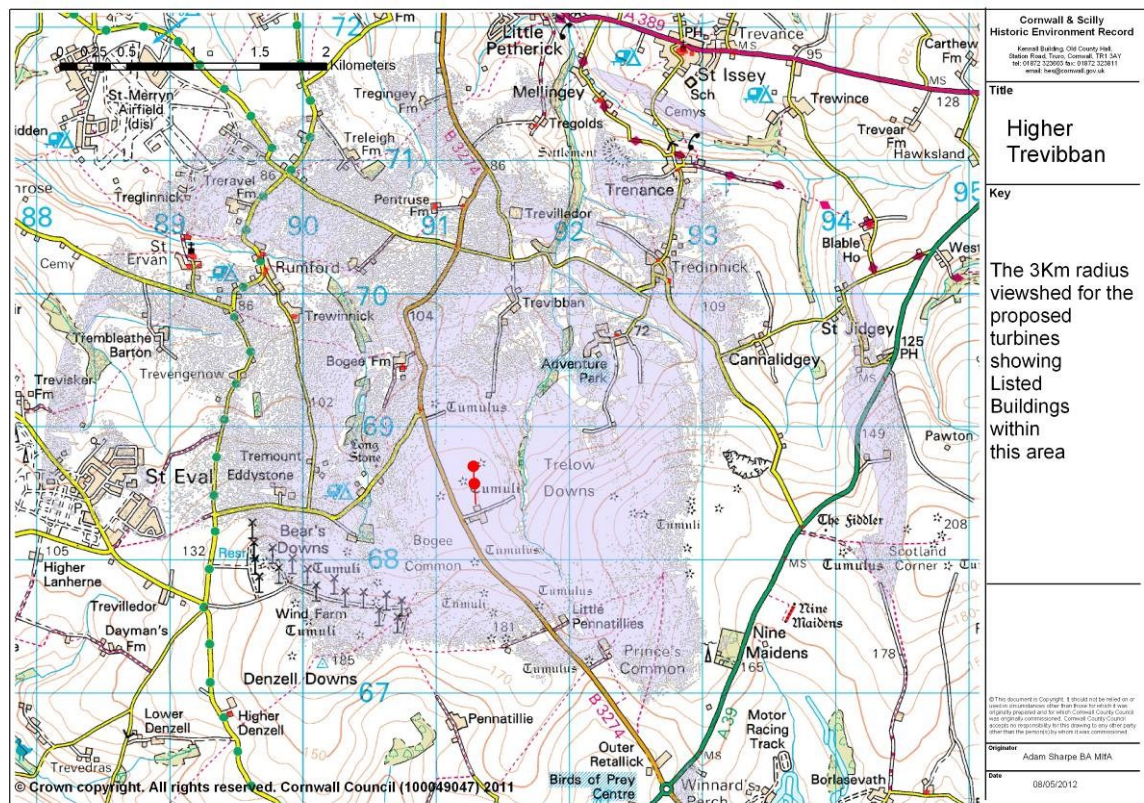


Fig 17. Mapping showing the ZTV within a 3Km radius of the site proposed for the wind turbine, showing potentially intervisible Listed Buildings.



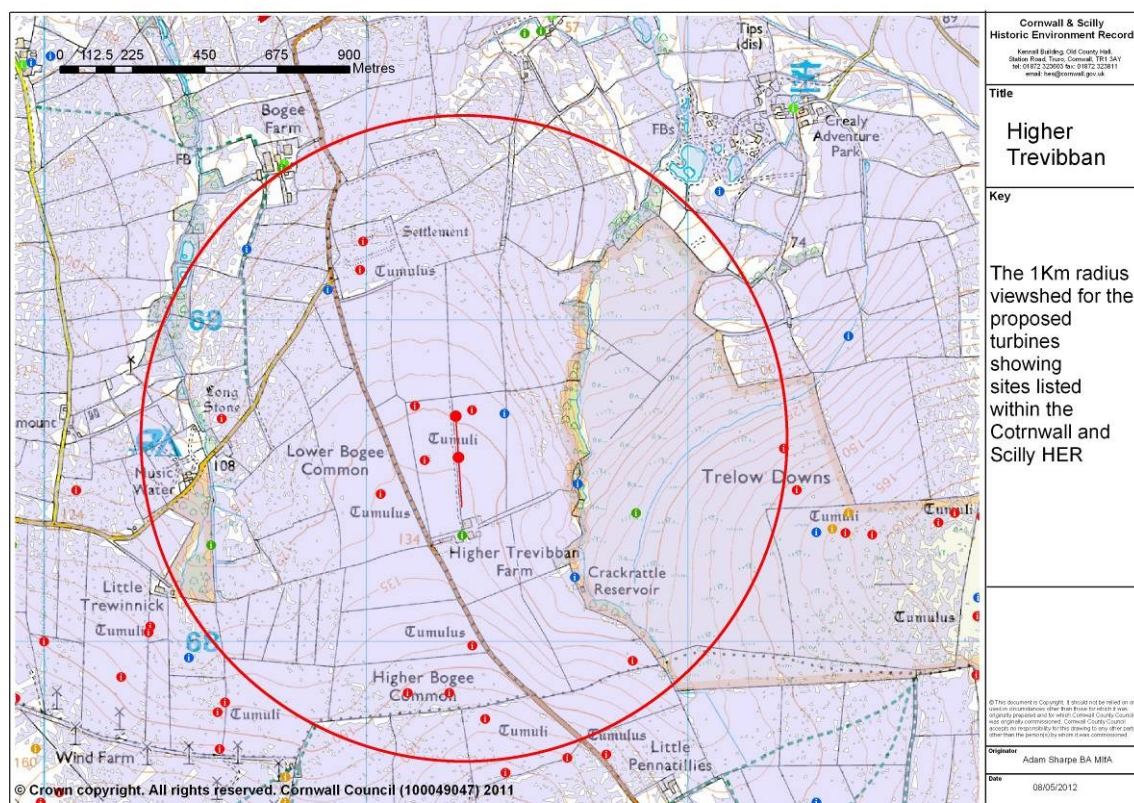


Fig 18. Mapping showing the ZTV within a 1Km radius of the site proposed for the wind turbine, showing potentially intervisible heritage assets (including the Scheduled Monuments shown in Fig 17).

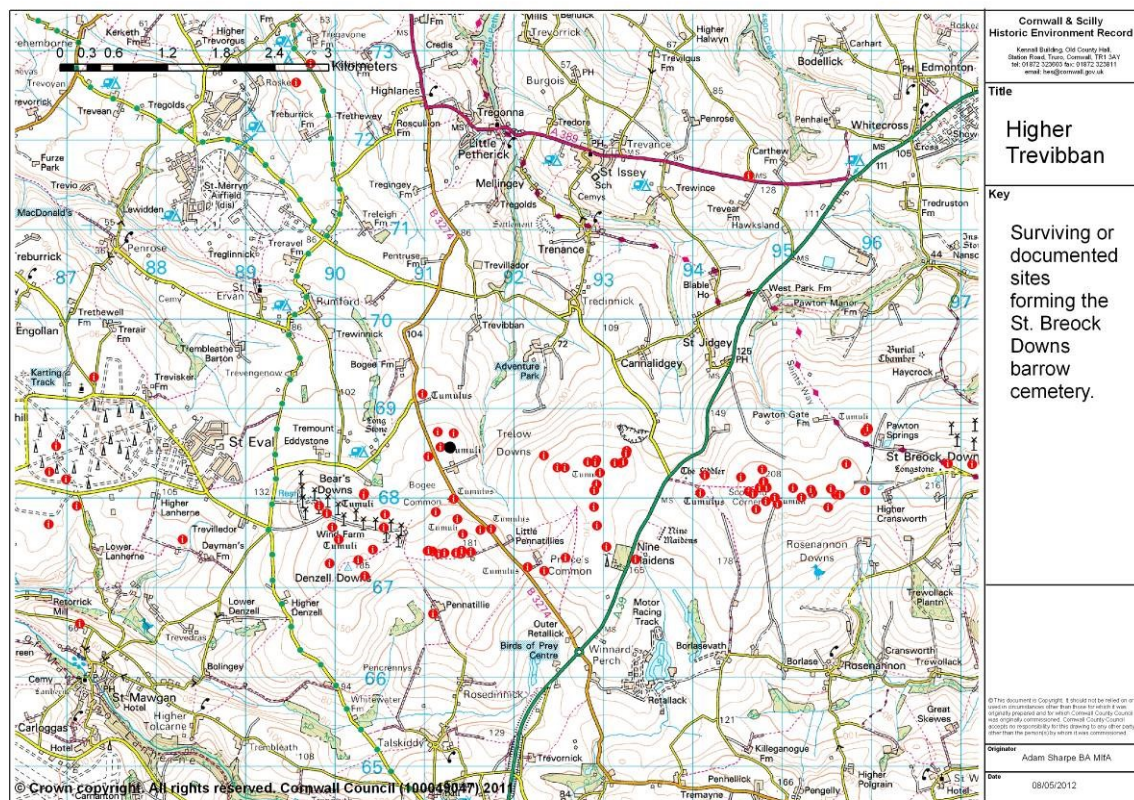


Fig 19. Mapping showing the topographical setting of the proposed wind turbine (black dot) showing documented barrows forming the St. Breock Downs barrow cemetery.





*Fig 20. Looking north across Higher Bogee Downs with Higher Trevibban left centre. The proposed turbines would be sited behind the large agricultural sheds.*



*Fig 21. Looking south from the site of the proposed northern turbine site back towards Higher Trevibban with Trelow Downs forming the left skyline.*





*Fig 22. Looking east from the site of the proposed southern turbine mast towards Trelow Downs, with some of its barrows on the skyline.*



*Fig 23. Looking south west from the site of the proposed southern turbine mast across the central barrow (arrowed) with the Bears Downs wind farm forming the skyline.*





*Fig 24. Looking east from the site of the proposed northern turbine towards the north eastern barrow (arrowed) with Trelow Downs and its barrows forming the skyline.*



*Fig 25. Looking north towards Bogee Round (arrowed) and the coast near St. Merryn beyond.*





*Fig 26. Looking south from the ploughed down Bogue Round with the Bears Down wind farm on the skyline. The proposed Higher Trevibban wind turbine would be far left centre in this view.*



*Fig 27. Looking south across Rumford towards Higher Trevibban (just below the left skyline) with the Bears Downs wind farm forming the right skyline.*





*Fig 28. Looking towards Higher Trevibban from St. Ervan Church, showing the complete blocking of intervisibility with the proposed wind turbines by buildings and vegetation.*



*Fig 29. The Longstone to the south of Bogee Farm looking north west. Intervisibility between this site and the proposed Higher Trevibban turbines is completely blocked by trees along the edge of the road immediately to its east.*





*Fig 30. Looking north from the proposed turbine sites towards Trenance Round (arrowed). Intervisibility with this site is fragmentary at best given the condition of the site and the local topography.*



*Fig 31. A telephoto view looking north from the proposed wind turbine sites towards St. Issey just over 3Km to the north north west. The Bears Downs wind turbines form the skyline in the reverse direction.*